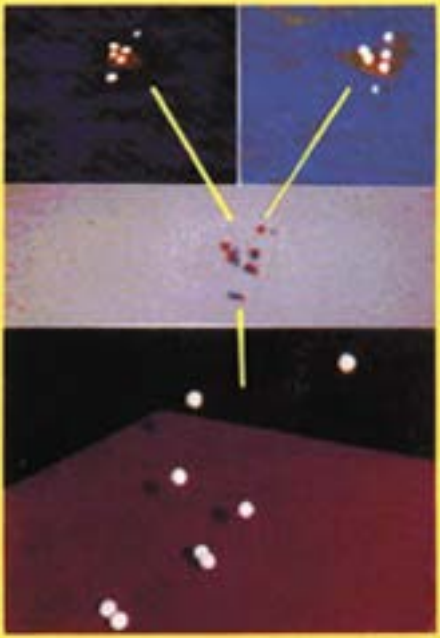
INTERDISCIPLINARY UFO RESEARCH

Compiled and Edited by
ALDEBRAND VON LUDWIGER
for the Mutual UFO Network — Central European Section



MUFON-CES-Report No. 11
1993

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Front cover: 3-dimensional image developed from two films showing unidentified lights taken by two independent witnesses in 1990 near Greifswald, Germany.

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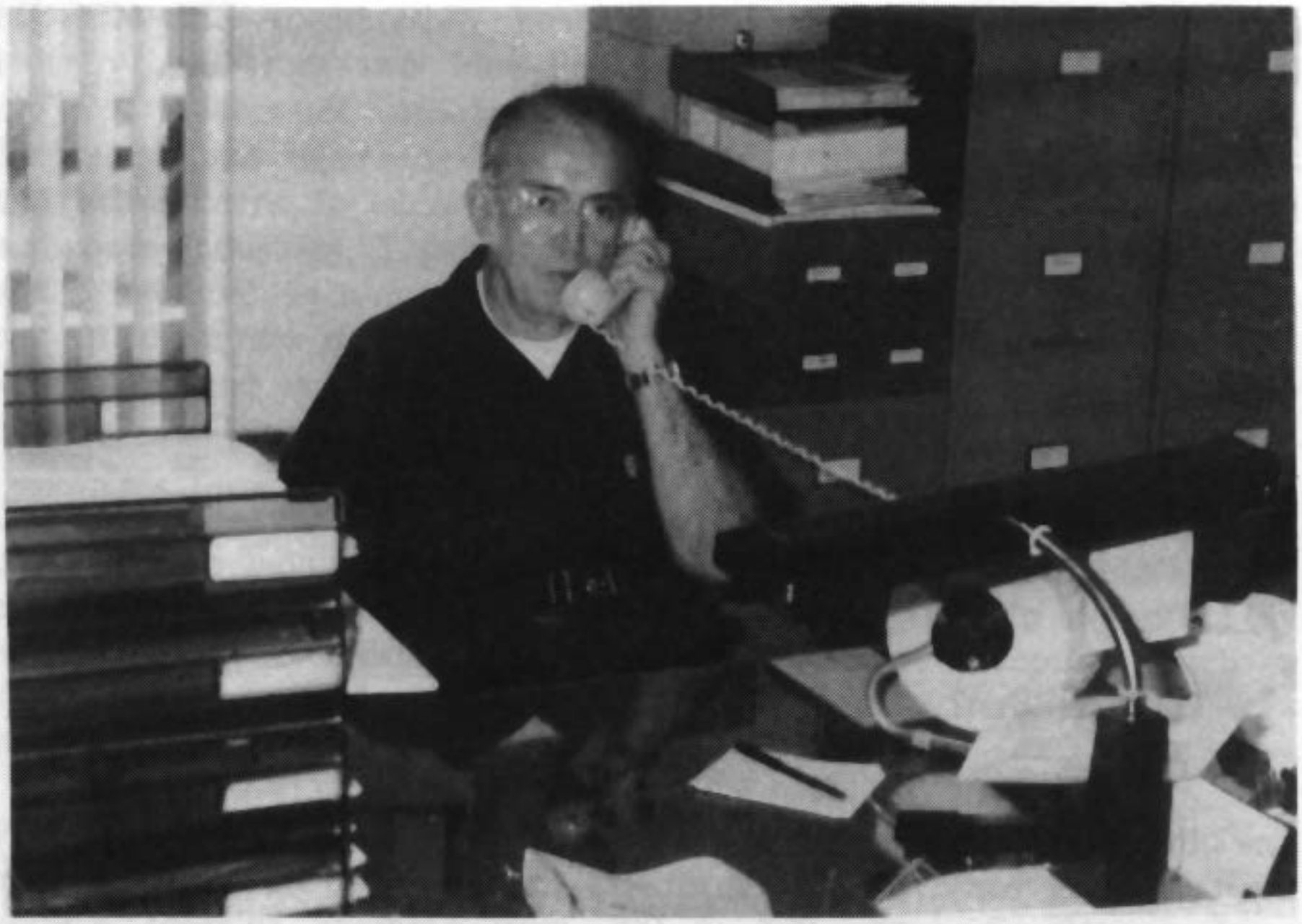
To

WALTER H. ANDRUS, JR.

under whose leadership MUFON has grown into

the largest ufological organization world–wide



Walt Andrus in characteristic pose

Are UFOs a New Kind of Natural Phenomenon?

by

Illobrand von Ludwiger

(Based on a lecture held at the First European Conference of the SSE in August, 1992, in Munich)

1. MUFON–CES

The Mutual UFO Network – Central European Section (MUFON–CES for short) was founded in 1974. Members of the group are open–minded in regard to the origin of UFOs. They are convinced, however, that UFOs represent real objects in the sky, which cannot be identified. The group presently numbers 75 active members in Germany, Switzerland, and Austria. Membership is by invitation only and is terminated if active participation drops below a certain level.

MUFON–CES membership now includes 25 natural scientists from industry and from two Max–Planck Institutes, and 6 professors from different universities. Among them are 15 physicists, 4 mathematicians, 3 chemists and mineralogists, 3 biologists, 1 archaeologist, and 4 amateur astronomers. In addition, there are 27 engineers from computer and aerospace industries, 1 psychiatrist, 2 psychologists and hypnotherapists, and 5 medical doctors and dentists. Finally, 2 scientific photographers, one of them the director of an institute for scientific photography, 7 journalists, and the head of a detective bureau belong to our organization.

Our chief aim is to elevate the discussion of UFOs to a level of serious scientific inquiry. For this purpose it is essential to stimulate interest in the topic among the scientific community. We do not officially engage in public information campaigns. (There are exceptions, such as the publication in April, 1992, of my book *The State of UFO Research*, v. Ludwiger 1992, in German).

Papers presented at our annual meetings are worked out in detail, and most of them are published in the form of Conference Reports. Each volume contains anything from 200 to 500 pages. So far we have published a total of 10 MUFON–CES volumes with more than 3200 pages of German text.

UFOs should be studied from both physical and psychological points of

view. Until now, however, only physical examinations can be conducted with a sufficient degree of objectivity and free from contradictions.

It has been possible during field investigations to identify many UFOs "in the broader sense" (as we call them), such as hot air balloons, planets, luminous ammunition, unmanned aerial vehicles, search–lights of landing airplanes, and others. Altogether we have investigated more than 80 UFO sightings. In several cases we could enlist the help of a professional medical hypnotist and of psychologists and psychiatrists.

Following Rutledge (1981), we divide all UFO observations "in the stricter sense" into two phenomenological classes:

A) Objects of metallic appearance and construction, and

B) Objects consisting of luminous zones without physical structure (nocturnal lights).

A question still under discussion is whether luminous paranormal ap–pearances, such as the Fatima vision, should form a class C of their own.

Class A objects appear to be guided by intelligent beings. However, since occupants do not discuss their origin with us, one is compelled to deduce it, as far as possible, from the observed behavior of UFOs and from investigations of physical traces.

As a consequence, we have concentrated our efforts on an investigation of the physical aspects of the phenomenon and to a lesser degree on the psychological reactions of witnesses. This does not mean, however, that we have neglected the latter: a number of reliable studies have been concerned with data evaluation and credibility analysis of witnes–ses.

Throughout our work special emphasis has always been placed on sci–entific methods of inquiry. The correctness of our methods could be demonstrated by applying them to the interrogation of witnesses and to the theoretical treatment of problems. A procedure should be termed unscientific or pseudo–scientific only if the method employed is wrong, and not, as argued by professional skeptics, because it is applied to "strange" phenomena.

One result of our studies showed that there indeed exist unified field theories of matter and gravitation capable of providing at least qualita–tive answers to the problem of the origin of UFOs. The implication is

that from a purely astrophysical point of view the extraterrestrial hy–pothesis cannot be excluded, provided the theories are verified by experiments on elementary particles.

Physicists have long been searching for a complete and consistent field theory, uniting quantum theory and gravitation. The theory should be comprehensive enough to theoretically interpret a number of old facts and new discoveries in those fields which at present are either incom–pletely understood or completely unexplained. In the author's opinion, the solution of the UFO problem is intimately connected with the dis–covery of the correct quantum theory of gravitation.

The most promising theories so far, uniting quantum theory and general relativity, seem to be the superstring theories. On the other hand, these theories have been unsuccessful in their attempts to predict the unified mass spectrum of elementary particles. For this reason physicists of MUFON–CES prefer the 6–dimensional unified quantum geometrody–namics of Burkhard Heim (1984, 1989).

In the new concept of the universe arising from that theory the exist–ence of unidentified flying objects and their properties no longer seem as unbelievable as in the framework of our present 4–dimensional space–time world. This is discussed more fully in the article *Basic Ideas of Burkhard Heim's Unified Field Theory* in this volume.

After analyzing the spectrum of sightings we reached the conclusion that solid objects, physically interacting with their surroundings, are at the core of the UFO phenomenon. Luminous phenomena like nocturnal lights – even though much more frequent than daylight discs – as well as paranormal light effects such as psychological projections according to C.G. Jung are borderline cases, which should be at–tributed to UFOs only after thorough investigation.

When asked in 1983 what he thought of UFOs, Franz Josef Strauss, then government head of Bavaria and former Minister of Defense, now deceased, answered:

> "I am still generally distrustful of UFO observations. Personal–ly, I think that UFOs are meteorological phenomena like fire–balls or ball lightning".

Clearly, this interpretation of UFOs only fits class B observations.

Class B objects could be a form of natural energy, manifesting itself in space under certain conditions. This class of objects may well be a

newly discovered kind of natural phenomenon, formerly known as will–o′–the–wisp and falsely attributed to burning swamp gas. True swamp gas accounts for only a small fraction of light phenomena.

Swamp gas consists of methane and results naturally from the decay of biological matter in marshy areas. Certain atmospheric conditions cause it to ignite spontaneously. Balls of light (BOLs), on the other hand, frequently appear over stony and dry areas, and hence cannot be due to swamp gas. BOLs are exceedingly stable, having lifetimes of an hour or more. This is quite different from the lifetime of ball lightning, which only lasts from a few seconds up to perhaps one minute. BOLs disappear suddenly, only to reappear and to pulsate, with pulses growing alternatingly longer and shorter, until the lights vanish altogether.

Michael Persinger (1977) of Laurentian University, Ontario, and Paul Devereux (1982) of Wales, have independently proposed theories relating events beneath the earth′s surface to the appearance of BOLs. There is no question that some kind of correlation exists, for the appearance of "earthquake lights" is a confirmed fact, even though the process responsible for producing them is not understood. According to Persinger, tectonic stresses due to geological pressures, eventually giving rise to earthquakes, are responsible for luminous phenomena leading to reports of UFO sightings.

Devereux′s statistics suggest the existence of a higher than average number of UFO observations from areas with an above average number of geological fault lines. If this hypothesis is correct, it could be utilized to predict future outbreaks of UFO sightings.

Balls of Light frequently display what observers consider an intelligent behavior. Hillary Evans writes (1985):

> "While it is easy to dismiss this as an ′experimenter effect′, it would be unscientific to ignore a dimension of the phenomenon which could tell us something about its nature."

The reason for a general lack of interest in the phenomenon may be due to the fact that the so–called "earth–lights" seem to interact with the human mind (Rutledge 1981, Devereux 1982, Havik 1987, Sterly 1987, Long 1990). That property no longer belongs to natural science but to psychology.

As mentioned above, we are mostly concerned with Burkhard Heim′s 6–dimensional unified field theory. One prediction of that theory is the spontaneous creation of energy bursts in space. These energy quanta

are projections from higher dimensions into the 3–dimensional space perceived by our senses. Each burst carries an energy of about 500 kWatt h. Such energy flashes could manifest themselves in the form of balls of light (class B UFOs) or of vortex motions in the atmosphere. They may be able to interact with the human mind because both they and our thoughts extend into the 5th dimension, where they can establish a resonance interaction. The 5th dimension is an organizational coordinate and in some sense corresponds to Sheldrake's morphogenetic field (Sheldrake 1985).

2. Refutation of Some Prejudices Concerning UFOs

Some important facts concerning UFOs should be made clear, since they are not generally known to the public or to the scientific community. Most scientists are too busy to derive information on borderline science from sources other than newspaper articles. For this reason their knowledge of the field is no better than that of journalists. Investigative journalism, normally required in all areas of reporting, usually is absent when applied to topics whose study is not financially supported.

The resulting types of incorrect press reports have given rise to a series of prejudices in the scientific community, which I should like to analyze in some detail. Following is a list of the most frequent assertions made by organized skeptics and uninformed scientists regarding the properties of UFOs. While refuting these claims, I shall, at the same time, describe the most important properties of the phenomenon.

Assertion 1: *Believers feel that UFOs are extraterrestrial spaceships.*

In our experience, observers of UFOs want to know what they have seen. Almost no one claims to have seen a spaceship.

There is no convincing evidence to justify the assumption that unidentified flying objects are extraterrestrial spacecraft! All that scientific investigators know is that the phenomenon exists, and that it is not explained by the psycho–sociological behavior pattern of witnesses caused by the physical interaction of UFOs with their surroundings.

This leads to the conclusion that UFOs are real, physical objects. Some scientists believe that lights in the sky have a natural origin, and that electromagnetic fields accompanying UFOs are capable of influencing the human mind in the sense of modifying our ability to perceive

things (Persinger and Derr 1990, Devereux 1990).

Other scientists are of the opinion that the appearances are paranormal in origin. UFOs might be projections of psychic images in the sense of C.G. Jung, or projections from parallel space–time worlds into our world (Vallée 1990).

Other conjectures are that UFOs are time machines, coming here from our own future (Meckelburg 1980).

At a Chicago meeting of 53 UFO experts in 1976 only 18 scientists declared that they would prefer the extraterrestrial hypothesis as an explanation for UFOs. 28 preferred other theories, and 7 were without opinion.

As long as research is restricted to private scientific investigations without the benefit of official financial support there is little hope of finding a satisfactory answer to the question of where UFOs come from. Nevertheless, a great deal is known about their properties.

Official financial support might well be forthcoming if the interest of politicians could be aroused. When asked if the UFO phenomenon should be investigated scientifically, Franz Josef Strauss replied:

> "An agency commissioned by the Federal Government for the purpose of investigating UFO observations is conceivable and would be sensible and purposeful. Such a study group should work in close cooperation with air–defense organizations."

(Habeck 1983, MUFON–CES Report No. 9, 1983).

Assertion 2: *UFOs have been scientifically investigated and all details of the observations have found a natural explanation. Neither the US Air Force commissioned project Blue Book nor the Colorado Project contain discoveries of new, physically significant phenomena.*

The US Air Force project Blue Book was initiated in 1952 for the purpose of examining whether unidentified flying objects could endanger national security. The investigators were told to look for explanations but did not themselves do any investigating. The last head of project Blue Book, Captain Edward Ruppelt, wrote in 1956 that out of 4400 UFO sightings only 179 (4%) had found a conclusive explanation (Ruppelt 1956). However, by classifying cases into categories such as

"probable" and "possible to identify with..." it became possible to raise the quota of "identified" cases to 70%.

The scientific counsel for the project at that time was the astronomer J. Allen Hynek. For 10 years he tried hard to explain unidentified observations. As time went on, his attempts became less and less successful. Eventually, Hynek (1966) admitted that a residue of 10–20% of all reports remained unidentifiable. The more complete were the data and the more reliable was the report, the greater was the likelihood that it remained unidentified! Hynek called upon the scientific community to launch a study into the subject. However, in the sixties scientists no longer believed in the seriousness of UFO reports, because by then laymen and charlatans had seized upon the topic and used it to mislead the public with unfounded claims of supposed contacts with "extraterrestrials".

The first scientific analysis of the approximately 4000 UFO reports collected by project Blue Book from 1947 till 1953 was conducted in 1956 by the Battelle Memorial Institute. 3.2% of the cases were classified as "excellent", i.e. highly dependable. Applied to the roughly 12000 cases collected by 1968 this would imply that more than half of the 697 sightings then classified as "unidentifiable", or 384 cases, were "excellent" sightings useful for further scientific study (Maccabee 1977).

The first civilian scientific investigation of the UFO phenomenon was conducted in 1966 by a team of scientists from the University of Colorado under the leadership of the well–known atomic spectroscopist Edward U. Condon. The study was commissioned by the US Air Force. Under the terms of agreement the study was intended to present evidence that all UFO reports were hallucinations or misinterpretations of natural events. 59 cases were investigated, of which 33 cases remained unidentified.

Condon, in the introduction to the report covering some 1000 pages states, in conformity with the conditions of the study, that no scientific knowledge could possibly be gained from further analysis of the phenomenon (Condon 1968). However, very little of what he writes in the introduction makes reference to the work of his staff, and what he does write about it is misleading. The negative opinion expressed in Condon's summarizing remarks still is the reason why mainstream science even today remains convinced that no essential information can be derived from a scientific study of the UFO phenomenon.

The physicist Thornton Page wrote in the October 1969 issue of the *Journal of Physics* (Page 1969):

"Condon's carefully written conclusions do not logically follow from the case studies...", and: "In fact, the scientists' general refusal to take UFOs seriously may strengthen the 'new left' view that science is based more on authority than on observation and reason".

The most comprehensive critique of the Condon Report was expressed in the first issue of the *Journal of Scientific Exploration* by Peter A. Sturrock (1987), astrophysicist at Stanford University and president of the Society for Scientific Exploration (SSE): He established the fact that the very short time allotted for research to the Colorado Project obviously was insuffient to allow financing of a full-time working group. Furthermore, the project failed to develop a uniform and systematic procedure for cataloging the large number of older cases provided by the Battelle Memorial Institute from their valuable collection of data.

Assertion 3: *UFOs are mostly the result of social hysteria and public fancies. UFO witnesses in general are only found among the uneducated who are not trained to observe phenomena in the sky.*

In an extensive study of press coverage of UFOs, Strentz (1970) came to the conclusion that most UFO reports were submitted by scientists and military personnel. Between 1947 and 1950 their reports amounted to 35.5% of the total. Between 1961 and 1963 the occupations of witnesses were as follows:

In 17.2% of the cases witnesses were military or civilian pilots and flight controllers. 16.2% of the reports came from the Air Force or from Professor Hynek, 14% were reported by scientists and technicians (i.e. the most skeptical observers), and 10% were submitted by employees of other US military institutions.

Between 1963 and 1966 only about 11% of the reports came from this group of experts.

The report *Observations of Anomalous Atmospheric Phenomena in the USSR – Statistical Analysis* (Gindilis, Menkov, and Petrovskaya 1967) of the Soviet Academy of Sciences lists 135 cases in which the occupation of witnesses was known. 52% of the observers turned out to be scientists, engineers, pilots, and technicians.

Contrary to the opinion held by skeptics, only 3% of all cases proved

to be hoaxes and only 3% came from the mentally ill.

An interesting statistical evaluation of sighting reports by the French police is shown in Fig. 1.

Assertion 4: *UFO encounters mostly originate during times of crisis, when people are in quest of help from supernatural forces or from "extraterrestrials".*

No scientific sociological study so far has turned up evidence for the existence of correlations between times of crisis and an increase in UFO sightings. Increases in UFO observations in certain regions during a limited period of time are known as "flaps".

The first great flap in UFO history occurred in the USA during June and July of 1947 (Gross 1988), (Fig. 2).

In France, UFOs appeared in great numbers during October, 1954 (Michel 1958), (Fig. 3).

A flap of UFO sightings took place in Russia in 1967.

Many flaps have occurred in all regions of the world. The latest one took place in Belgium and lasted from 1989 till 1991 (Fig. 4).

Skeptics claim that newspaper articles stimulate the public into reporting an increased number of UFOs. However, a comparison between the distribution of cases collected by project Blue Book with that of reports published by Associated Press and US newspapers shows that press coverage does not provoke UFO reports (Fig. 5).

This is very clearly evidenced by a study of local press reports of UFO sightings in Gulf Breeze, Pensacola, Florida (Maccabee 1991), (Fig. 6).

Assertion 5: *Nearly all UFOs are seen from very far away.*

In 1981 the UFO catalog of Professor D. Saunders (Colorado University) contained about 2000 reports from 140 countries of cases where UFOs had left landing marks on the ground. In about 40% of these cases witnesses were less than 15 m away from the landed object (Phillips 1985), (Fig. 7).

At such close distances confusion with natural phenomena can definitely be ruled out.

Assertion 6: *No fragments have ever been recovered that could serve as material evidence for the physical existence of UFOs.*

Up till now, no UFO has come into the possession of civilian scientists, but much circumstantial evidence indicates that the Secret Service of the US Air Force recovered a crashed object near Roswell, New Mexico, in 1947, although this has never been confirmed by the US government.

Debris of unidentified objects other than satellites have, however, been collected and investigated.

From April 19 till April 29, 1990, the "Second Congress on Anomalous Phenomena", organized by the Russian Academy of Sciences, was held in Tomsk. Out of the 572 talks given, 140 were devoted to UFO problems.

A few lectures dealt with analyses of metallic fragments collected at Dalnegorsk, near Vladivostok. In January, 1986, a large glowing red sphere was seen hitting a nearby mountain. Six times it tried to rise again, but without success. In the end it burned for about an hour and developed a temperature in excess of 4000 degrees C. The only remains were small spherules composed of iron and lead and a net–like structure of quartz filaments 17 microns thick, interwoven with threads of gold. Their physical properties differed from those of known terrestrial materials (their densities, for example, were different) (Dvushilni et al. 1990). In 1991 we received a detailed analysis report from our colleague, Dr. Sergei Kusionov, of St. Petersburg University.

When unidentified objects descend near cars, the latter sometimes are covered with a white powdery substance. One such case occurred in January, 1988, in Australia.

While driving near Mundrabilla, Australia, the Knowles family reported that a UFO lifted their car off the highway and dropped it again. Subsequently, an unusual dusty substance was found to cover their Ford Telstar. An analysis revealed the material to consist of potassium chloride (KCl). The same substance was discovered on the car of a police officer who was driving near Harrisburg, Pennsylvania, at 5:25 a.m. on December 4, 1988, when a very bright object, hovering at a distance of some 40 m, made him come to a sudden halt. The object

was about 25 m long with the shape of an elongated ellipsoid and appeared to be made of a highly polished silvery material. The witness suffered a painful sunburn. After the object had departed, a deposit of a powdery, dust-like substance was found on his car. A sample was analyzed by a professional laboratory and most of it was shown to again consist of potassium chloride (Gordon 1989), (Fig. 8).

It is characteristic of UFOs that they seldom leave traces other than landing marks. Not infrequently, however, they interact differently with their surroundings and the resulting effects can be investigated.

Our data collection, published in 1978, lists about 600 cases involving 1319 physical interactions of UFOs with their environment (v. Ludwiger 1978), (Fig. 9).

The most frequent types of interaction are

1. electromagnetic	660 cases	(59%)
2. high or low temperature and radiation	172 "	(15%)
3. psychological	141 "	(13%)
4. gravitational	101 "	(9%)
5. movies, photos, and radar recordings	39 "	(3.5%)

The first group includes 220 cases of cars whose engines stalled in the neighborhood of UFOs. In Saunder's data collection UFOCAT Mark Rodeghier (1988) found 422 cases of cars whose electrical circuits were affected. In 35% of the cases UFOs were less than 30 m away. The effect of UFOs on car engines decreases exponentially with distance (Fig. 10).

C. Poher and J. Vallée (1975) discovered anomalies in the measurements of geomagnetic field strengths recorded by some ground stations in France. These occurred at times when UFO observations were reported in the areas concerned. Assuming the source to generate a magnetic dipole field, simultaneous measurements of the field strength by various stations led to the conclusion that the magnetic field at the location of the unidentified object had a strength of about 300 000 Gauss (30 Tesla). This is an exceedingly strong field, which cannot be reproduced on earth on a large scale (Fig. 11).

The French space agency CNES (Centre d'Etudes Spatiales) established a division in 1977 for the purpose of investigating UFOs. It was the world's first agency officially sponsored by a national government and

charged with the study of UFO phenomena. (Now UFO research is financed also by the government of China).

The GEPAN division, now part of military research (DRET) with its name changed to SEPRA (Service d'Expertise des Phénomènes de Rentrées Atmosphériques), in their *Note Technique*, No. 16 (GEPAN 1984) published the results of an analysis of plants over which an unidentified object had hung suspended for a number of seconds. The event took place near Trans-en-Provence in 1981.

Probes of the plants, analyzed at the universities of Toulouse, Metz, Pau, and Rangouille, were found to display characteristics of premature aging. All attempts to reproduce these results by the use of heat, radioactive irradiation, or microwave radiation failed.

In most landing cases the force fields accompanying UFOs produce a great deal of heat, scorching the vegetation in the vicinity. However, in 32 events a temperature *reduction* was recorded, affecting the surroundings of UFOs as well as humans. In a few cases an increase in radioactivity has been noted (our data collection contains 22 cases), (Fig. 12).

The energetic origins of some interactions between objects and persons have never been identified. The following event took place in Delphos, Kansas, during November, 1971. A luminous object, 3 m in diameter, was seen hovering about 60 cm above ground. After a few minutes the object departed. The main witness suffered a headache and eye irritation (Fig. 13).

In the darkness the ground over which the object had been seen displayed a luminous ring. The finger tips of three witnesses who touched the fluorescent soil hurt as if they had touched dry ice (CO_2). The numbness in their finger tips lasted several days. 18 laboratories performed analyses of soil samples. They established the existence of chemoluminescence, but so far it has not been possible to identify the type of energy responsible for producing it. It does not seem to be an electromagnetic form of energy (Faruk 1989).

Assertion 7: *All photos of UFOs are blurred. No two pictures show the same shape if taken by independent witnesses from different positions.*

Today, any photo can be faked. Nevertheless, some pictures and movies have been proven genuine (Figs. 14, 15).

We own 3 video films of two groups of objects taken on August 28, 1990. Two of the films were taken from Greifswald and one from the Isle of Rügen in Germany. The objects were filmed for altogether 4 minutes by Ludmilla Ivanova, a medical doctor from Moscow. The same objects were also filmed by Vladimir Vinogradov of Nizhniy Novgorod from a position only 25–30 meters away from Mrs. Ivanova. A third video film of the objects was taken by Mr. and Mrs. Kaiser from a position near Putbus on the Isle of Rügen, about 30 km away from Greifswald. The distance from the witnesses to the objects was about 24 km. They hovered in the sky about 5–8 km north of Peenemünde (former production facility of the German V–2 rockets) and had an approximate size of 18 m (cf. Figs. 18–26 in the article *Analysis of German UFO Photos and Video Films* in this volume). It was possible to reconstruct a 3–dimensional picture from the 3 video films (see front cover).

Between November, 1989, and March, 1991, some 1500–2000 UFO sightings were reported from Belgium. Many of them were seen by hundreds of witnesses. In most cases a large triangular object was observed, displaying lights or search–lights at each corner and a red light in the center (SOBEPS 1990), (Fig. 16).

During this wave of sightings the Belgian study group SOBEPS (Société Belge d'Etude des Phénomènes Spatiaux) recorded about 900 cases in which witnesses claimed to have been less than 300 m away from the object. There were several multiple radar/visual confirmations of the UFO. On the night of March 30, 1990, a UFO was tracked by 4 separate Belgian NATO radar stations and by the on–board radar of an F–16 military plane. The F–16 was scrambled to pursue the UFO which was also seen visually by several witnesses on the ground.

Descending from a height of about 3000 m the UFO dove three times below the radar horizon of about 100 m after the radar tracking device had locked onto the target, developing an acceleration of up to 43 g. The Belgian Minister of Defense, Guy Coeme, gave permission to transfer the recordings of 3 ground stations and 2 jet radar devices to SOBEPS for further analysis.

Assertion 8: *The military establishment does not take UFO sightings seriously.*

A study of US documents obtained from secret agencies like CIA, DIA, and NSA, clearly indicates that UFOs have always been taken very seriously by the US Air Force.

During the UFO flap in Belgium, Belgian Air Force Chief of Staff Colonel de Brouwer presented radar recordings of UFOs to the press on June 22, 1990, and explained that "our defense system is powerless vis–à–vis these machines..."

With that statement de Brouwer repeated a remark made by his colleague, Colonel General I. Maltsev, Russian Chief of Staff of the Anti–Aircraft Defense Headquarters, who wrote in the *Robotshaya Tribuna* on April 19, 1990: "Terrestrial machines could hardly possess such capabilities..." (Sachastshik 1990).

These are opinions expressed by high–ranking military personnel, who probably possess more information about UFOs than civilian scientists.

When President Bush was asked by one of his campaign helpers, who was on the MUFON Board, what he thought about UFOs, his answer was: "You don't know the half of it" (Andrus, 1992).

Assertion 9: *UFO reports always repeat the same stories.*

UFOs continue to be an "illegitimate" area of study for scientists because of the Air Force's debunking policy, the ridicule heaped on observers due to the lack of tangible evidence for the existence of UFOs, and because of the negative publicity promoted by so–called "contactees", whose spectacular claims are often demonstrated to be false. The longer the scientific community rejected the subject, the more amateurs filled the void.

In 1973 a massive wave of sightings occurred in the USA. For the first time since 1947 the US Air Force officially stayed out of the picture. However, documents released in the mid–1970's made it clear that the Air Force was still carrying out investigations of UFO reports submitted by military personnel or coming from military installations. J. Allen Hynek, astronomer and former consultant to the Air Force, took the opportunity during the 1973 UFO wave to announce the opening of his "Center for UFO Studies", CUFOS, a scientific organization devoted to the study of the UFO mystery.

In addition, the new Midwest (later Mutual) UFO Network, MUFON, established itself as a leading UFO investigative organization, and the two groups cooperated in collecting data and analyzing reports.

By the end of the 1970's the study of UFOs had become more sophisticated than ever before, and a great deal of knowledge had accumu–

lated regarding patterns, effects, appearances, and traces. In 1987 Peter A. Sturrock founded the "Society for Scientific Exploration". Its technical journal, the *Journal of Scientific Exploration*, has been publishing refereed papers on UFOs and other topics in strict conformity with scientific standards.

While uninformed scientists are still puzzling over the question of whether or not unidentified flying objects represent a physically real phenomenon, hundreds of American citizens require treatment by psychiatrists as a result of conscious or subconscious encounters with UFOs. These persons show all the symptoms of classical post-traumatic stress disorders (PTSD), which can only be induced by real physical situations.

In 1989 Dr. Rima E. Laibow, a psychiatrist from New York, founded a special group within the Organization of American Psychiatrists for the purpose of investigating and treating so-called "UFO abductees". This new organization, called TREAT (Treatment and Research of Experienced Anomalous Trauma), is doing research for the purpose of uncovering the real or psychological origin of the abduction syndrome (Laibow 1990). Some of Dr. Laibow's work is described in her article *Some Clinical Considerations Pertaining to UFO Abduction Reports* in this volume.

Nevertheless, the status of UFO research in main stream science is still very much the same as it has been from the beginning.

As Richard Hall wrote in 1988, why 40 years of impressive human testimony, instrumental recordings, and physical evidence has essentially escaped the attention of science constitutes a human mystery of major proportions (Hall 1988). Human psychology may provide the answer. Or is the explanation connected with the psychology of alien intelligence?

Assertion 10: *Observations of landed craft with nearby occupants have purely psychological origins such as hallucinations.*

If UFO observations were induced by press reports the sightings would be evenly distributed all over. Actually, however, straight flight paths of objects in several cases have been pursued over many dozens of kilometers. In contrast, hallucinations or misinterpretations certainly do not spread out along straight geographical lines.

As witnessed, for example, in France during October, 1954, at the time

of flaps not only are objects of class A seen moving along straight geographical lines, but alleged landings and observation of small occupants also occur at points along such lines (Michel 1958), (Fig. 17).

The statistical probability that 5 observations of the flight path of a strange object accidentally lie on a straight line is 1.4×10^{-6}. In 1957 Aimé Michel, studying news clippings from 1954, discovered some paths defined by 6 observations along a nearly straight line.

The probability P that out of a total of n observations, m accidentally lie on a (nearly) straight line (i.e. are "orthotonic") is 1.2×10^{-8}. This result can be derived from the expression

$$P(m,n) = \binom{n-1}{m-2} p^{m-2} (1-p)^{n-m} ,$$

where p is the ratio of the orthotonic surface to the total possible surface. In Aimé Michel's case $n = m = 6$ and $p = 1.5^0/211^0 = 0.007$.

The conclusion, therefore, is that observations of strange objects made from points along orthotonic lines most likely are not hallucinations, even when they include reports of UFO occupants.

In contrast to meteors or planes, most UFOs do not follow a long, continuous flight path. Generally, they only move through relatively short distances and then disappear from sight or from radar screens. Typical flight paths could be recorded by ground–based radar stations or F–16 jet planes of the Belgian Air Force.

During the night of May 3, 1990, the ground radar of Semmerzake near Brussels registered several tracks of unidentified objects which had not risen from any airport. They moved with speeds of between 35 and 50 km/h and vanished without a trace after covering a distance of several dozen kilometers (Fig. 18).

Observers frequently described the movement of these objects as jerky. Three–dimensional representations of the paths followed by some of the objects and recorded by radar near Brussels are shown in Figs. 19 and 20.

3. What Can We Believe?

The appearance of unidentified objects affects various groups within our society, regardless of the interpretation of UFOs. These circles are

(1) the military, (2) the witnesses, (3) the scientists, and (4) the public.

1. Not only do such objects violate national air space authority, they frequently appear over nuclear weapons depots and nuclear power stations as well. For this reason they form a serious threat to national air defense systems.

2. All over the world people require medical or psychiatric care after making reliable claims of close encounters with unidentified flying objects. These victims are entitled to proper treatment, irrespective of whether their description of abductions by UFO occupants corresponds to reality or not. Clearly, the UFO–syndrome presents a problem for psychologists and psychiatrists worth investigating.

3. Science, too, is confronted with the UFO problem. Its investigative methods are the only tools available for uncovering the origin of unknown objects. Actually, though, the phenomenon is ignored by the scientific community because it is so rare and transitory that its existence is not assured. As a consequence, one cannot expect financial support for research in this field.

4. Neither the military services nor scientific institutions have so far presented convincing explanations to the public for the UFO phenomenon, whose outline appears to become increasingly clear. The feeling of not being reliably informed induces many citizens to invent their own explanations, which to them may appear convincing. The most widely held opinion is that UFOs have an extraterrestrial origin, and that extraterrestrials are here to help mankind. Some believe that actual conversations with UFO occupants can be arranged by means of spiritistic manipulations. In general, though, such "channelers" cannot produce reliable evidence to convince others of their extraterrestrial contacts.

UFO spiritists are not interested in an investigation of UFOs in accordance with scientific rules, since they believe to already know the truth. It suffices for them to meet like–minded colleagues all over the world and to exchange "revelations" of extraterrestrials on expensive, so–called "world congresses". The "loudness" of their claims misleads the public into believing that their reports elucidate the core of the UFO phenomenon. Actually, though, informed scientists consider point 4 to be irrelevant.

Neither military personnel nor natural scientists or psychologists and psychiatrists can by themselves penetrate to the core of the phenome–

non. This can succeed only through common interdisciplinary research carried out by those and other professional groups.

The literature abounds with examples of irrational statements about the appearance of UFOs by authors, including well–known names, who are not sufficiently acquainted with the full spectrum of the phenomenon.

The famous psychologist C. G. Jung (1958), for example, considered UFO appearances to be projections of the subconscious mind. He failed to take into account the physical interactions described in a substantial number of reports.

Another example is the psychologist K. Ring (1992), who assumes abductions to be purely internal psychic experiences, again disregarding the physical effects produced by UFOs which carry the "abductors".

Investigators of the research group NICAP, on the other hand, only took physical interactions into account and rejected all reports about sightings of UFO occupants (Hall 1988).

The American secret services in the past and present are interested only in the military threat UFOs may pose. Photos and films taken by military personnel or debris of crashed objects are not handed over to independent scientists.

Every abduction case should be investigated jointly by psychotherapists, natural scientists, and military experts. The task of physicists and chemists would be to detect and analyze possible traces of landed objects, while military air reconnaissance should utilize radar recordings to confirm the presence of unidentified flying objects at the time in question. Finally, psychotherapists should treat the witnesses.

Several private research groups in the USA like CUFOS, SSE, and MUFON, come quite close to the ideal of interdisciplinary UFO research, although government support is lacking and cooperation with the military leaves much to be desired. The reason, at least in the USA, may be that military research is unwilling to share knowledge with civilian scientists in specific areas of the UFO phenomenon (e.g. knowledge about a gravitational drive).

Only indirect proof of the existence of UFOs will be available as long as UFO occupants are not inclined to enter into a mutual exchange of information with us, or to let us have some artifacts. Unfortunately, indirect evidence is not enough to convince skeptical scientists of the existence of unidentified flying objects and their strange operators. On

the other hand, not all events accepted as facts in everyday life are scientific truths.

Which witnesses of UFO sightings should we regard as the most dependable? A president of the United States of America trained in natural science? Such a witness already exists! A general secretary of the UN? Such a witness, too, already exists! Perhaps a winner of the Nobel prize?... Even reports coming from groups of scientists, high military officers, politicians, and high ranking police officers, taken by themselves, have not convinced the majority of citizens of the reality of UFOs.

It is reasonable to doubt the unusual experiences of others as long as the number of persons reporting such events is small. It was Kant who suggested a criterion for judging the credibility of unusual sightings such as the appearance of ghosts: Every individual case should be questioned, but a certain credibility should be associated with the phenomenon as a whole. This is the method of statistical certainty, which should also be applicable to UFO reports.

The evaluation of statistically significant amounts of physical data and sightings of unidentified objects has introduced some structure into the heterogenous data material. An example is the large number of similar reports about sudden engine failures of cars driven by witnesses in the vicinity of UFOs. These reports are convincing evidence of the fact that some types of UFOs – by no means all – affect gasoline engines by interrupting their ignition systems, even though the hood should protect the latter from static electric and magnetic fields.

A statistical analysis of reports has shown that the operators of unidentified flying objects generally are small, gray, humanoid beings.

Finally, inferences concerning the intention of UFO occupants can be drawn from the sum total of UFO reports from all over the world.

Based on the findings gathered in 45 years of labor by scientifically trained researchers from reports of reliable witnesses and from the evaluation of measurements carried out with a variety of instruments, the following picture of the UFO phenomenon emerges:

- Unidentified flying objects are physical structures capable of transporting representatives of foreign civilizations to this planet (coming from another solar system, from a parallel universe, or from the future).

- The objects in general are enveloped by an energy field able to produce physical or psychological effects on their surroundings or on the observer. The objects can manipulate gravity.

- The occupants of UFOs commonly are described as small, humanoid beings, able to exert amazingly strong hypnotic powers on observers and strong, paranormal forces on their environment.

- UFO operators do not try to inform us about their origin or about their intentions. They do, however, seem to take a marked interest in atomic power stations and in all types of military installations.

- With few exceptions, witnesses who remember contacts with UFO occupants, either under hypnosis or through conscious recall, report that medical experiments were performed on them, apparently for the purpose of genetic exploration. These experiments with humans are done against their will and make it easy to understand why UFO operators carefully try to avoid observation.

- Our defense systems are powerless to protect citizens from infringement by UFO occupants. In view of this one can understand the government policy of withholding from the public the truth about UFOs and about the intention of their passengers, all the more since experience so far has shown that the unknown devices are not hostile.

- UFO appearances are very rare events, except during periods of flaps. There is, therefore, no need to be afraid of them, just as there is no need to be afraid of meteorite falls. However, one should be informed about their existence in order to react correctly in the event of an unexpected encounter.

- If we accept the views of Jacobs and Hopkins concerning the intention of UFO operators, we must conclude that they are not likely to establish official contact with us in the near future.

- The skeptic, who considers every challenge resulting from hitherto unexplained facts as a threat to his narrow world view, will continue to regard the avoidance of UFO occupants to communicate with us as confirmation of his belief that unidentified flying objects do not exist.

- For critical investigators there seems to be no alternative other than to try and infer new laws on the basis of the observed

physical and paranormal effects. This is an attractive exercise for all philosophically oriented scientists who find themselves confronted with a technology of the future. It is in this sense that we of MUFON–CES try to investigate the UFO phenomenon.

References

Andrus, W.H. (1992). UFOLOGY: The Emergence of a New Science, *MUFON UFO Journal*, No. 295, 3.

Condon, E. (1968). *Scientific Studies of UFOs*, Dutton & Co., New York.

Devereux, P. (1982). *Earth Lights – Towards an Understanding of the UFO Enigma*, Book Club Associates, London.

Devereux, P. (1990). The "Earth Lights". Approach to the UFO Problem, *J. of UFO–Studies*, Hynek CUFOS, Chicago, 100–105.

Dvushilni, W.W., Gernik, W.W., and Groshkov, E.S. (1990). Magnetic Traces of an Object in Dalnegorsk, *Proceedings of the 2nd Scientific–Technological Conference in Tomsk from April 19–30, 1990* (in Russian).

Faruk, E.A. (1989). The Delphos Case. Soil Analysis and Appraisal of a CE–2 Report, *J. of UFO Studies, Vol. 1, new series*, Hynek CUFOS, Chicago, 41–66.

GEPAN (March,1984). GEPAN's Most Significant Case, *MUFON UFO Journal*, No.193, 3–16.

Gindilis, L.M., Menkov, D.A., and Petrovskaya, I.P. (1976). *Observation of Anomalous Atmospheric Phenomena in the USSR, a Statistical Analysis*, Academy of the Russian Inst. f. Space Research, Moscow (in Russian). English edition 1977 by CUFOS, Chicago.

Gordon, S. (May, 1989). Pennsylvania Law Officer Reports CE2 Incident, *MUFON UFO Journal*, No. 253.

Gross, L.E. (1988). *UFOs: A History, Vol. 1: 1947*, Arcturus Book Service, Stone Mountain.

Habeck, R. (1983). *MUFON–CES Report No. 9*, Feldkirchen–Westerham, 41.

Hall, R. (1988). *Uninvited Guests – A Documented History of UFO Sightings, Alien Encounters and Coverups*, Aurora Press, Santa Fe, New Mexico.

Havik, L. (1987). More About the Hessdalen Phenomena, *Bolide*, 3.

Heim, B. (1989, revised). *Elementarstrukturen der Materie, Vol. 1*, Resch Verlag, Innsbruck, Austria.

Heim, B. (1984). *Elementarstrukturen der Materie, Vol. 2*, Resch Verlag, Innsbruck, Austria.

Hynek, J.A. (1966). UFOs Merit Scientific Study, *Science*, Vol. 154, 329.

Jung, C.G. (1958). *Ein moderner Mythos – von Dingen die am Himmel gesehen werden*, Rascher Verlag, Zurich.

Laibow, R.E. (1990). Clinical Discrepancies Between Expected and Observed Data in Patients Reporting UFO Abductions. Implications for Treatment, *2nd Conference on TREAT*, Virginia Polytechnic Institute and State University, Blacksburg, Virginia.

Long, G. (1990). *Examining the Earthlight Theory, the Yakima Microcosm*, Hynek CUFOS, Chicago.

v. Ludwiger, I. (I. Brand) (1978). Strahlenwirkung in der Umgebung von UFOs, *MUFON–CES Report No. 4*, 349–372.

v. Ludwiger, I. (1992). *Der Stand der UFO–Forschung*, Verlag Zweitausendeins, Frankfurt.

Maccabee, B.S. (1977). Scientific Investigation of UFOs, *J. of UFO Studies, Vol. 1 & 3*, CUFOS, Chicago.

Maccabee, B.S. (1991). Gulf Breeze without Ed, *MUFON 1991 International Symposium Proceedings, July 5–7*, Chicago, 236.

Meckelburg, E. (1980). *Besucher aus der Zukunft*, Scherz, München/Bern.

Michel, A. (1958). *Flying Saucers and the Straight Line Mystery*, Criterion Books, New York.

Page, Th. (1969). Study of UFOs, *Am. J. of Physics*, 1071.

Persinger, M.A., and Lafrenière, G.L. (1977). *Space Time Transients and Unusual Events*, Nelson–Hall, Chicago.

Persinger, M.A. (1990). The Tectonic Strain Theory as an Explanation for UFO Phenomena – A Non–Technical Review of the Research 1970–1990, *J. of UFO Studies*, Hynek CUFOS, Chicago, 147–151.

Phillips, T. (1985). Physical Trace Landing Reports: The Case for UFOs, *MUFON 1985 UFO Symposium Proceedings: The Burden of Proof*, St. Louis, Missouri.

Poher, C. & Valée, J. (1975). Basic Pattern in UFO Observations, *AIAA 13th Aerospace Sciences Meeting*, Pasadena, California.

Ring, K. (1992). *The Omega Project: Near–Death Experiences, UFO Encounters, and Mind at Large*, William Morrow & Co., New York.

Rodeghier, M. (1988). A Summary of Vehicle Interference Reports and a Description of a Possible Natural Phenomenon Causing Some Events, *The Spectrum of UFO Research*, Hynek CUFOS, Chicago, 153–168.

Ruppelt, E.J. (1956). *Unidentified Flying Objects*, ACE Book 71400, New York.

Rutledge, H.D. (1981). *Project Identification. The First Scientific Field Study of UFO Phenomena*, Prentice–Hall, Inc., Englewood Cliffs, New Jersey.

Sachastshi, K. (1990). UFOs on Aerial Defense Radar, *Robotshaya Tribuna*, April, 19. 1990 (in Russian).

Sheldrake, R. (1985). *A New Science of Life*, Anthony Bond, London.

SOBEPS (1990). *Vague d'OVNI sur la Belgique*, SOBEPS, Bruxelles.

Sterly, J. (1987). *Kumo–Hexen und Hexen in Neu Guinea*, Kindler, München.

Strentz, H. (1970). *A Survey of Press Coverage of UFOs 1947–1966*, Strentz, Evanston, Illinois.

Sturrock, P.A. (1978). An Analysis of the Condon Report on the Colorado UFO Project, *J. of Scientific Exploration*, Vol. 1, No. 1.

Vallée, J. (1990). Five Arguments Against the Extraterrestrial Origin of UFOs, *J. of Scientific Exploration*, Vol. 4. No. 1, 105–117.

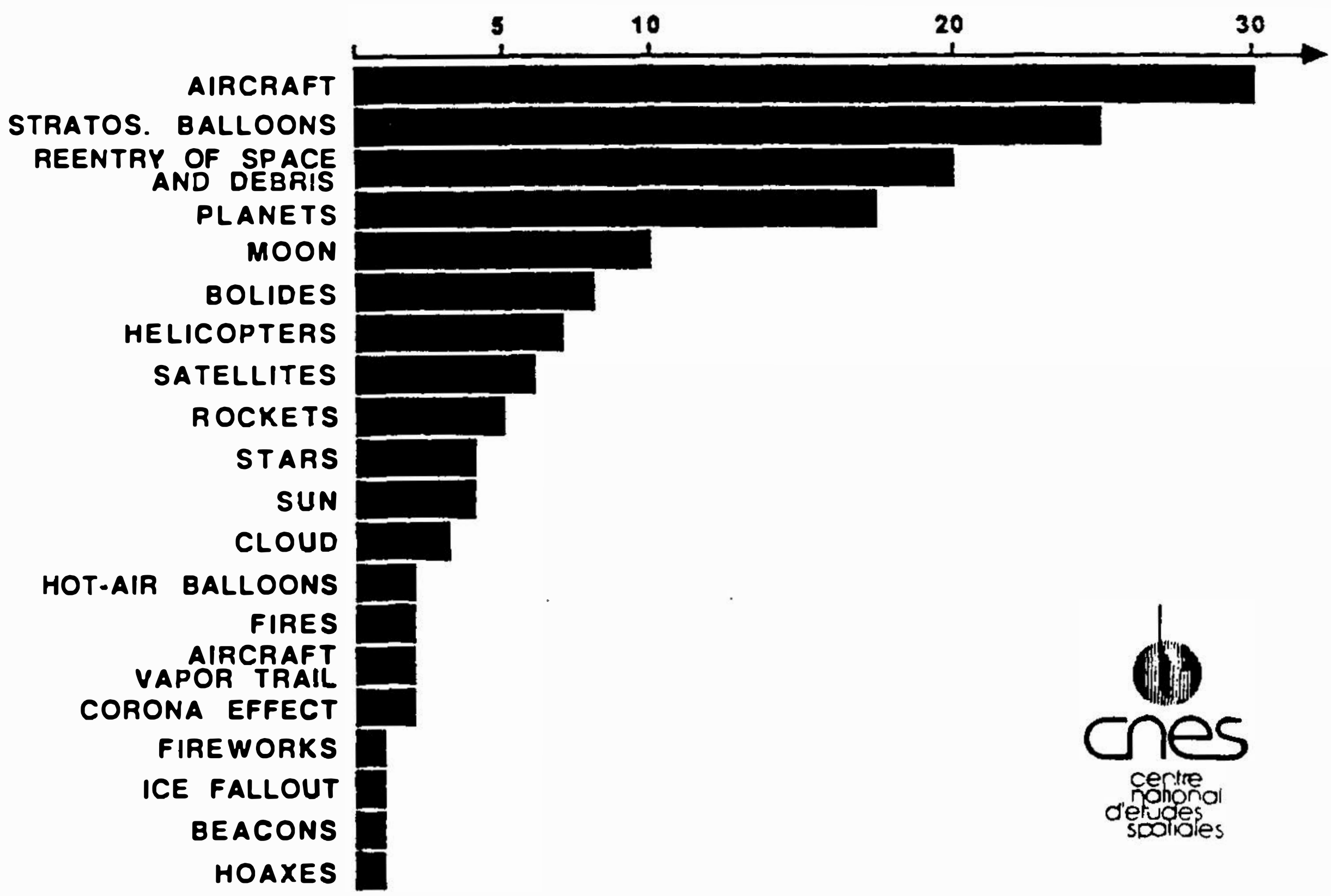
CLASSIFICATION BY NUMBER OF GENDARMERIE REPORTS ANALYSED

SUMMARY OF RESULTS 1974 - 1978

CATEGORY	DEFINITION	NUMBER	%
A	IDENTIFIED	23	3.3
B	PROBABLY IDENTIFIED	153	22
C	IMPOSSIBLE TO ANALYZE	239	35
D	UNIDENTIFIED	263	38
	TOTAL	678	

Certain phenomena observed in the upper atmosphere are sighted by many individuals and give rise to numerous similar witness reports. Each of these "multiple" cases is counted once only.

CATEGORIES A AND B (partial results)



cnes
centre national d'études spatiales

Figure 1: Classification by number of analyzed UFO reports in France during 1974 - 1978 (J.-J. Velasco, MUFON 1987 International UFO Symposium Proceedings, Washington)

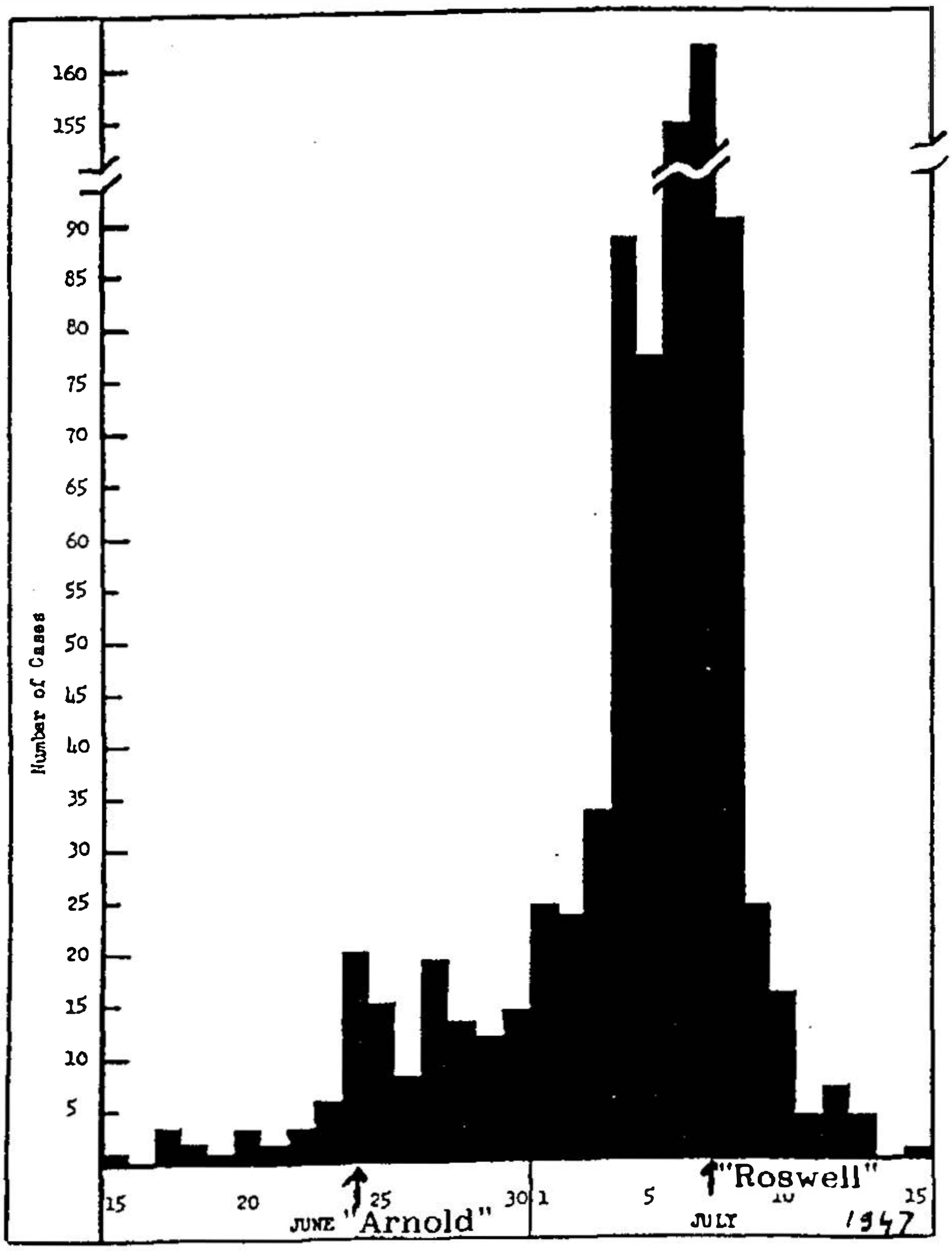
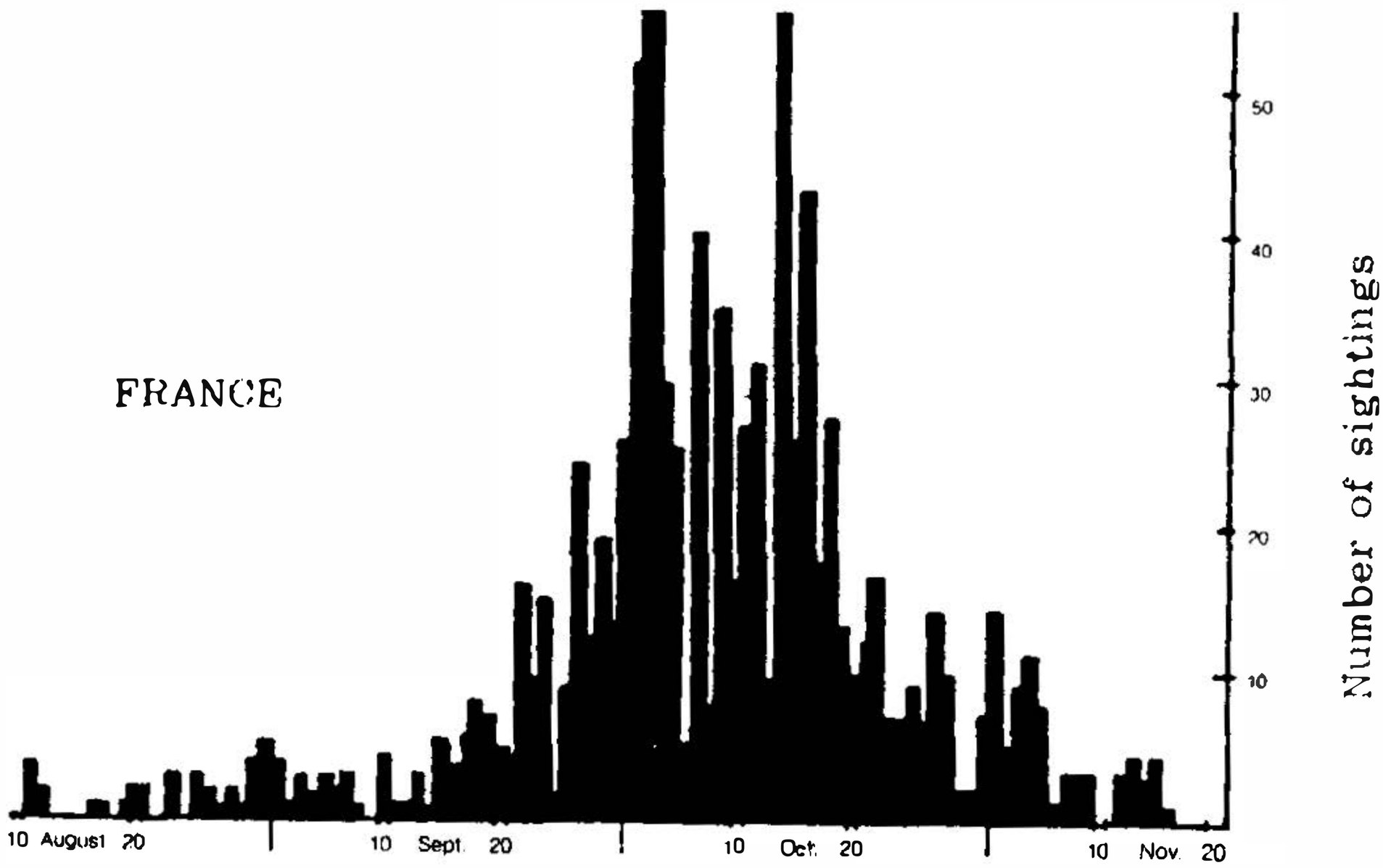
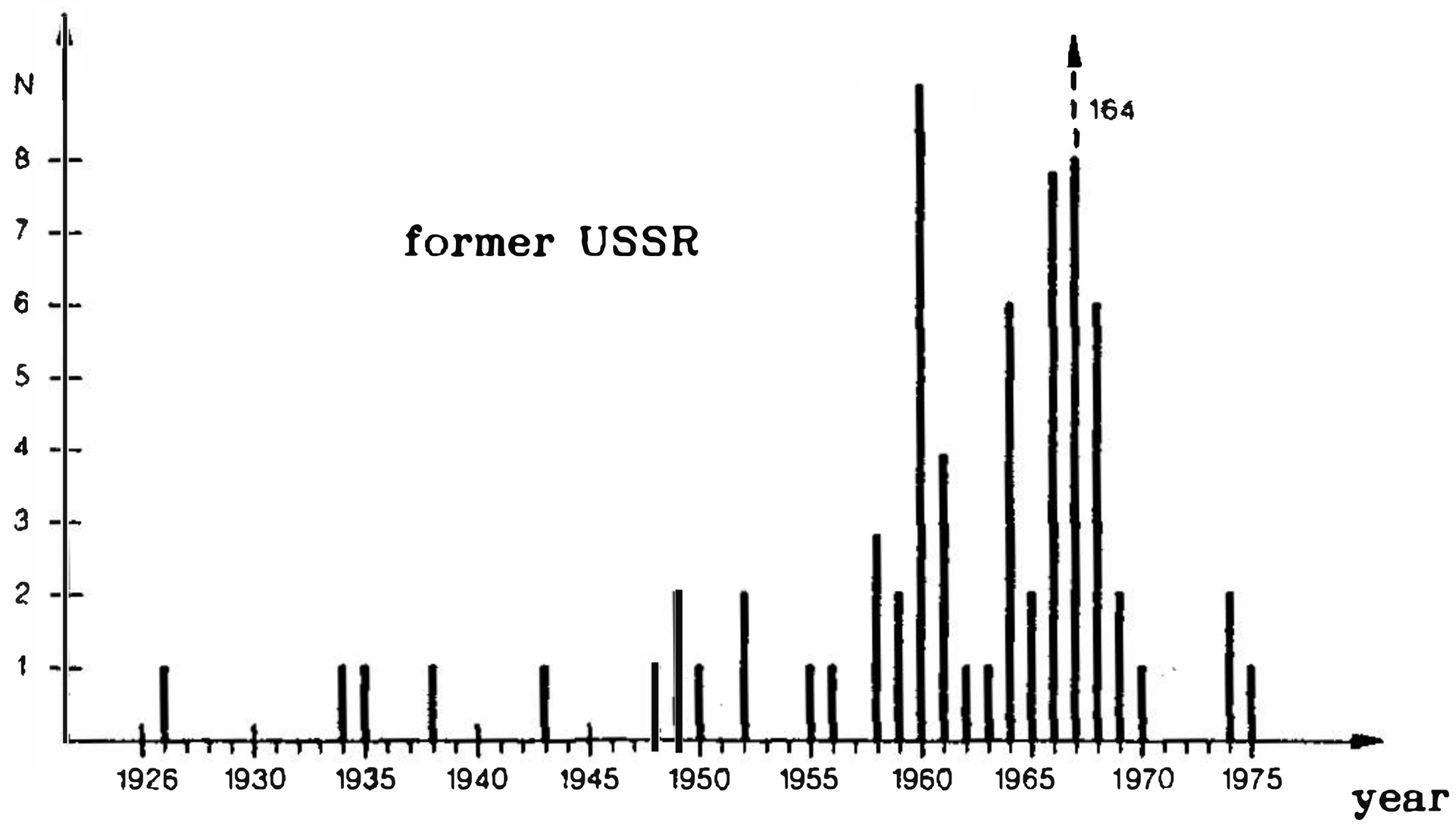


Figure 2: Distribution of daily sightings in the US between June 15 and July 15, 1947 (Ted Bloecher: Report on the UFO Wave of 1947, 1967, Tucson, Arizona)

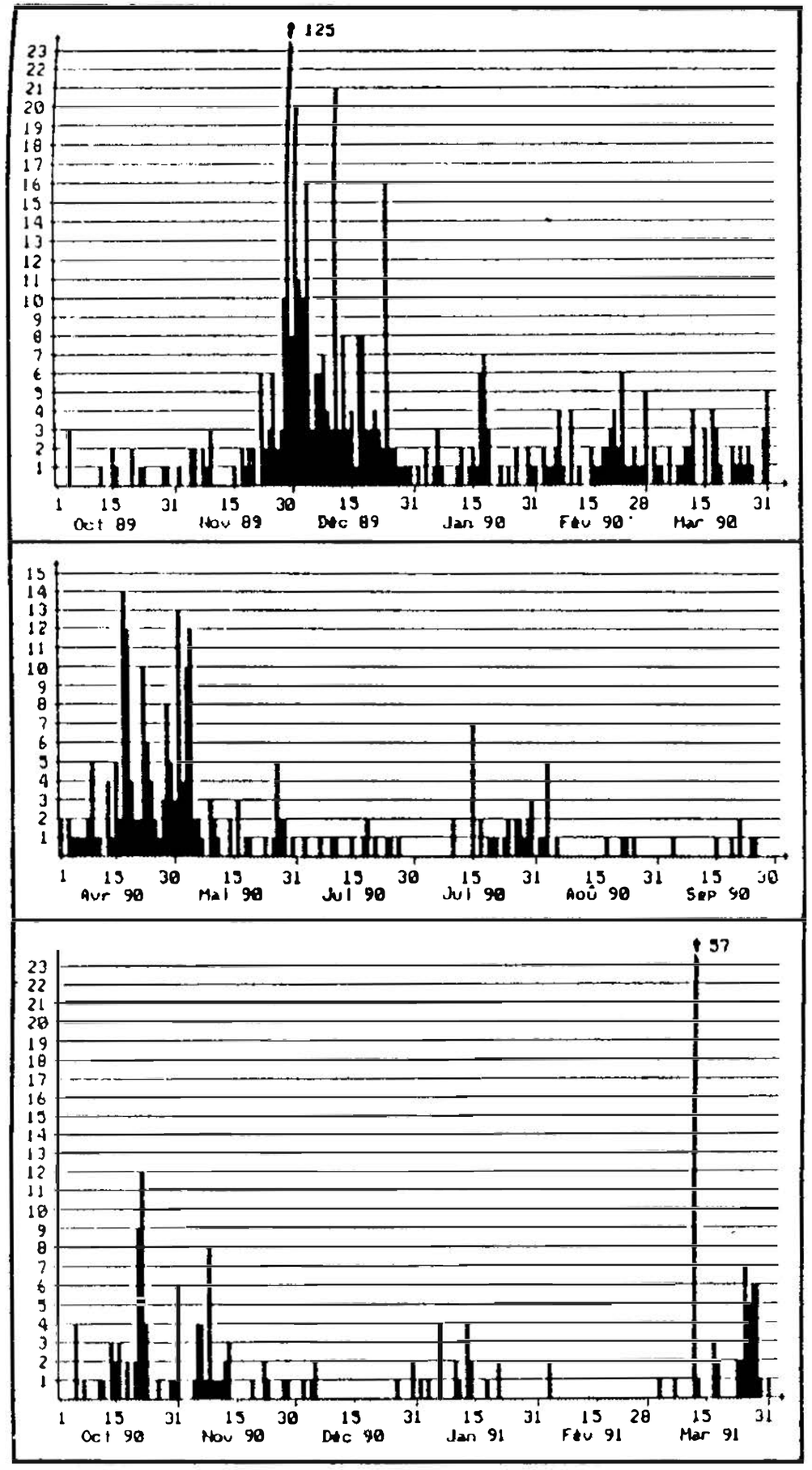


Frequency of Sightings (France, 1954)



Distribution of number N of annual UFO sightings covered by the report

Figure 3: Distribution of UFO reports in France and in the former USSR



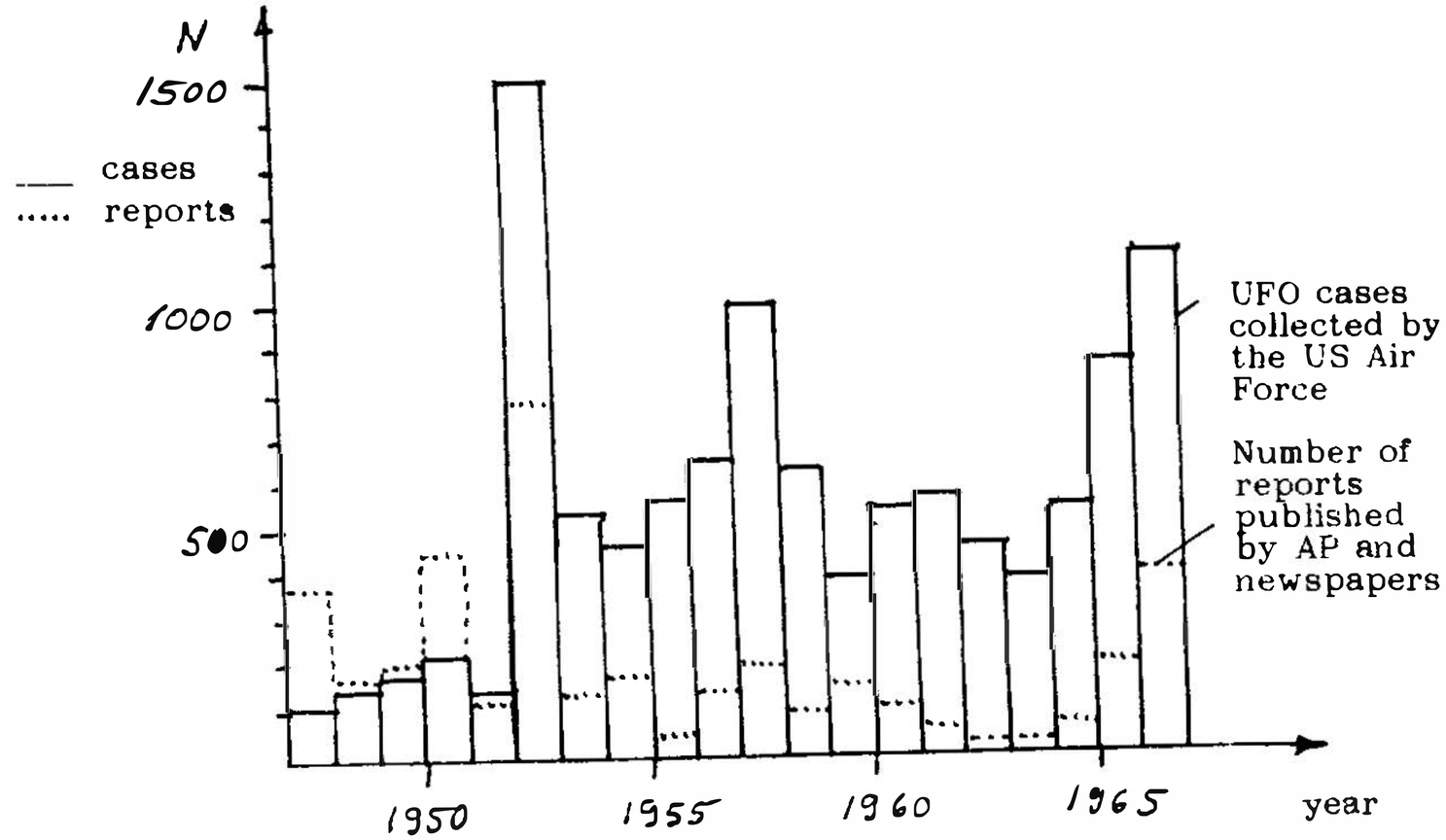


Figure 5: Number of published UFO reports and UFO sightings (Strentz 1970)

Figure 4: Distribution of Sightings in Belgium, SOBEPS (1990).

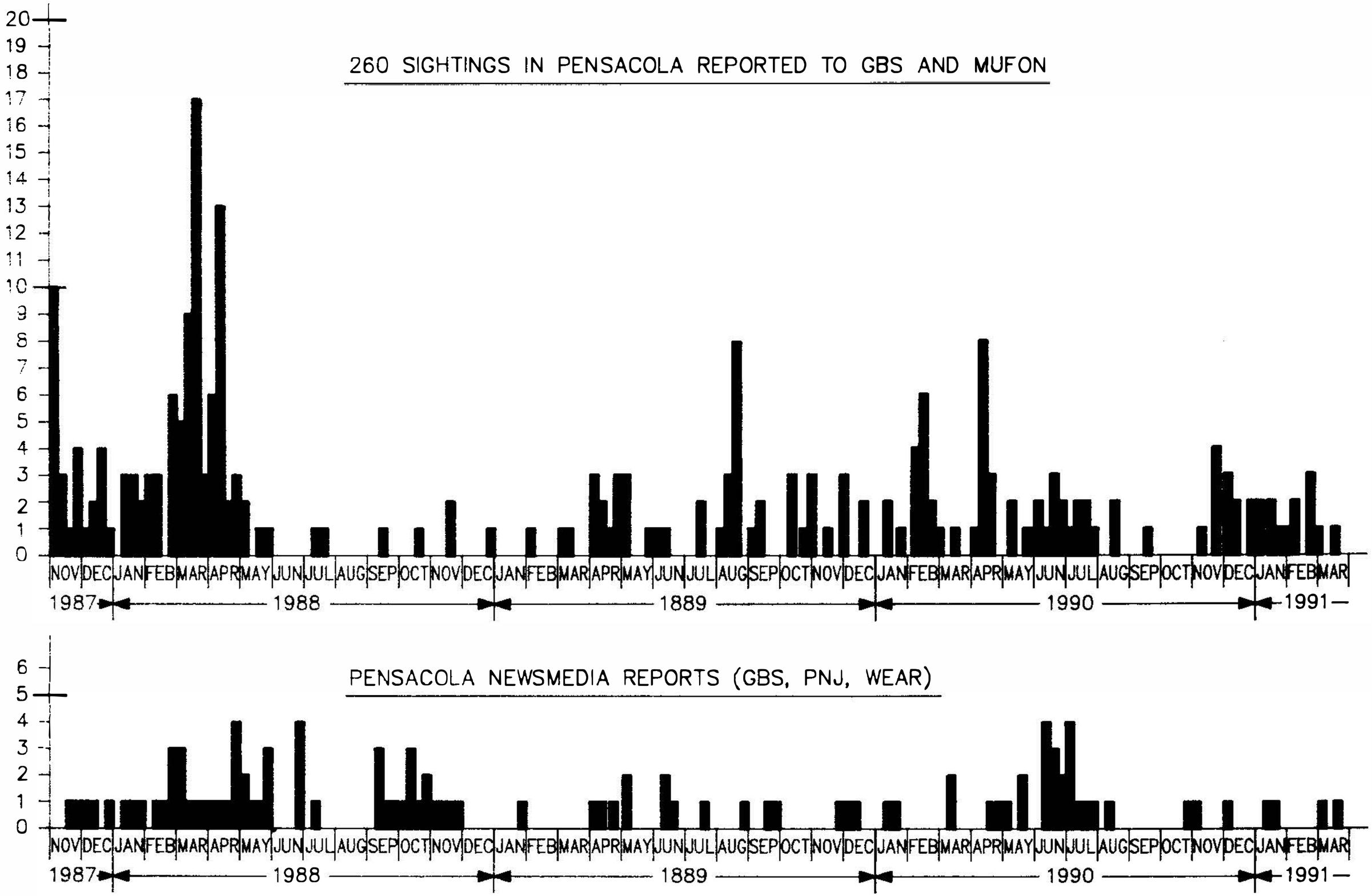


Figure 6: Weekly sightings and newsmedia reports, starting Sunday, Nov. 8, 1987 (B.S. Maccabee, MUFON 1991 International UFO Symposium Proceedings, Chicago, Illinois)

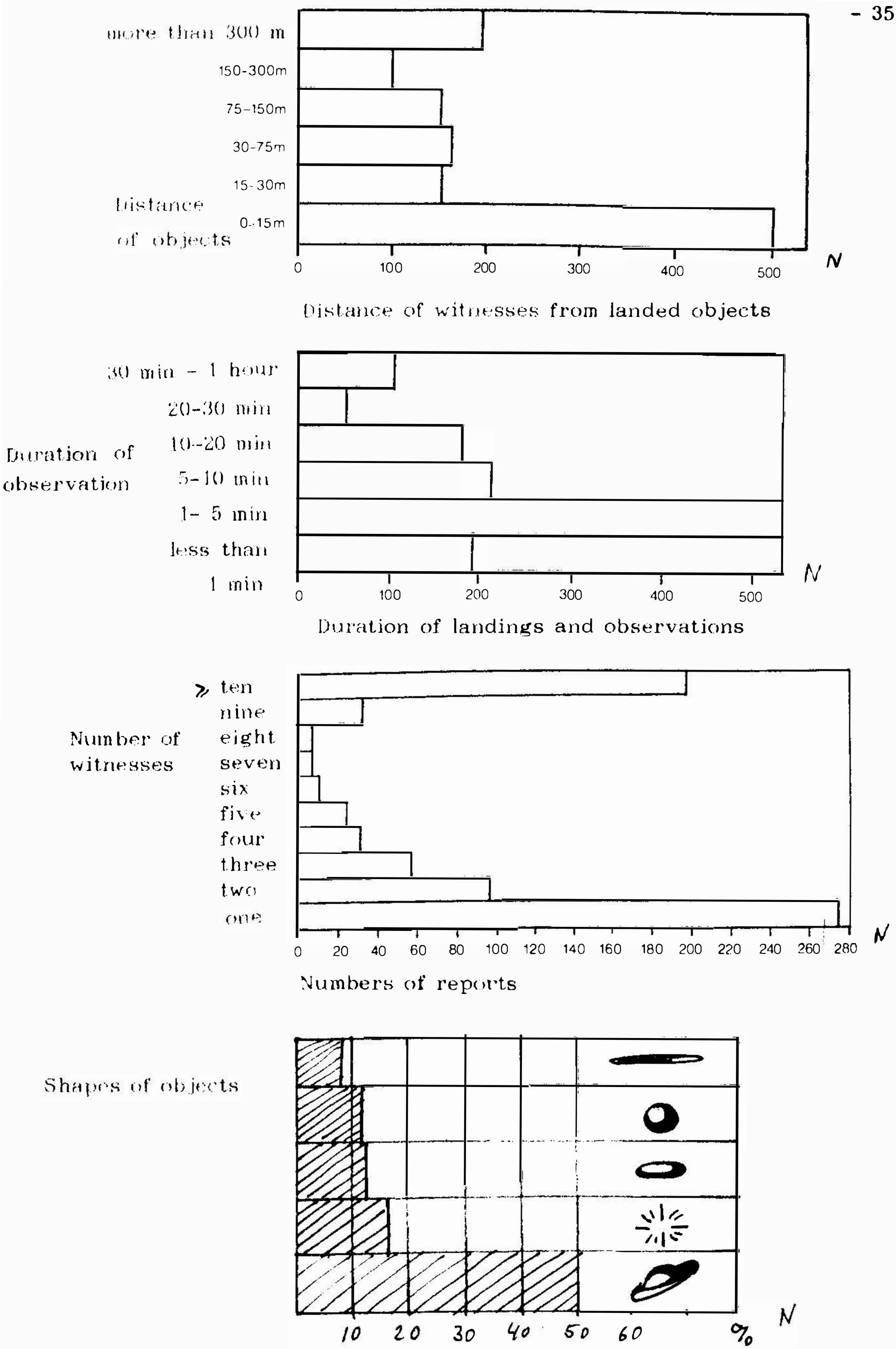


Figure 7: Parameters in UFO sightings: distances, durations, number of witnesses, shapes of objects (I.v.Ludwiger, 1992, Stand der UFO-Forschung, Frankfort: Zweitausendeins)

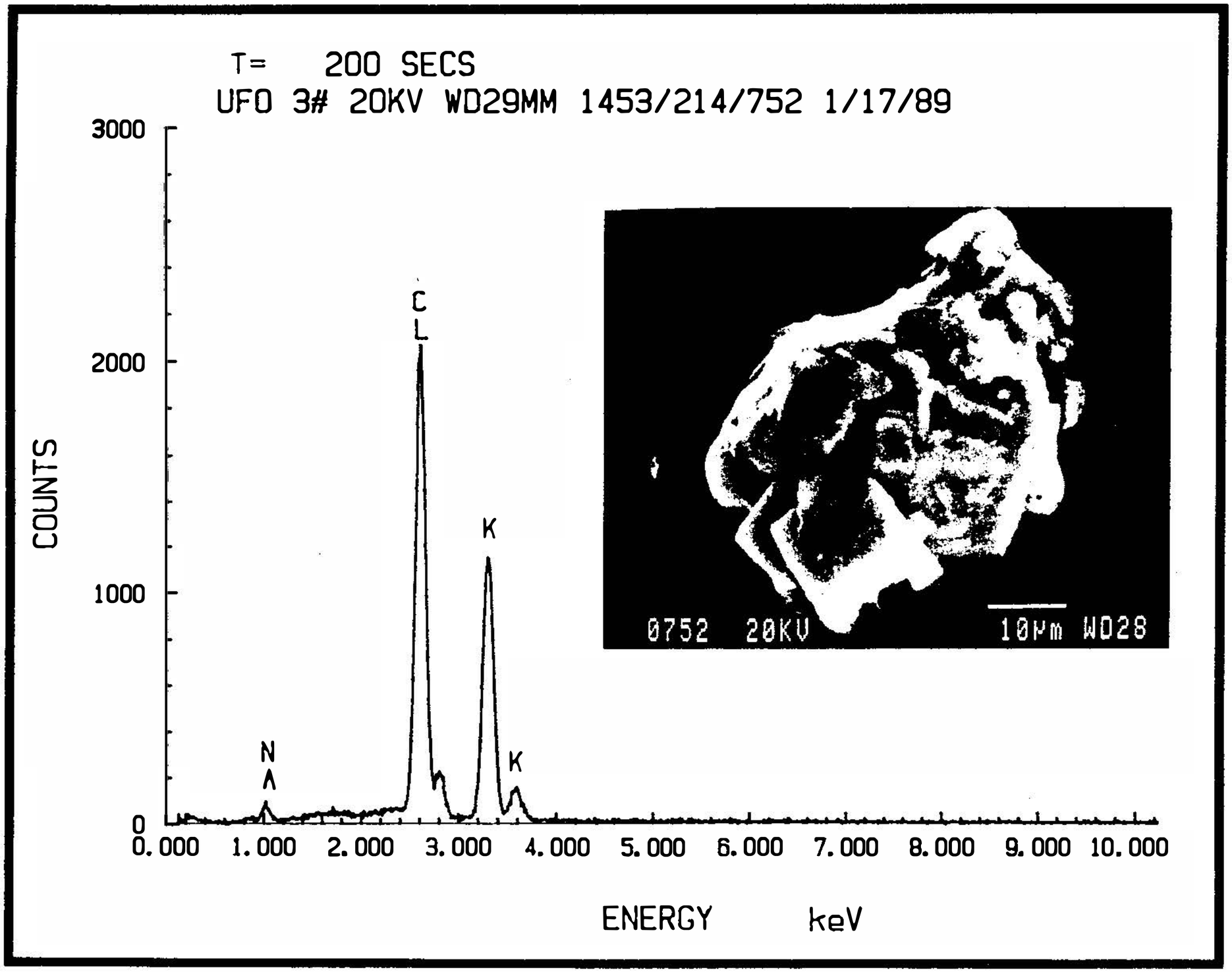


Figure 8: Chemical composition from a case in Pennsylvania (Stan Gordon, MUFON UFO Journal, May 1989)

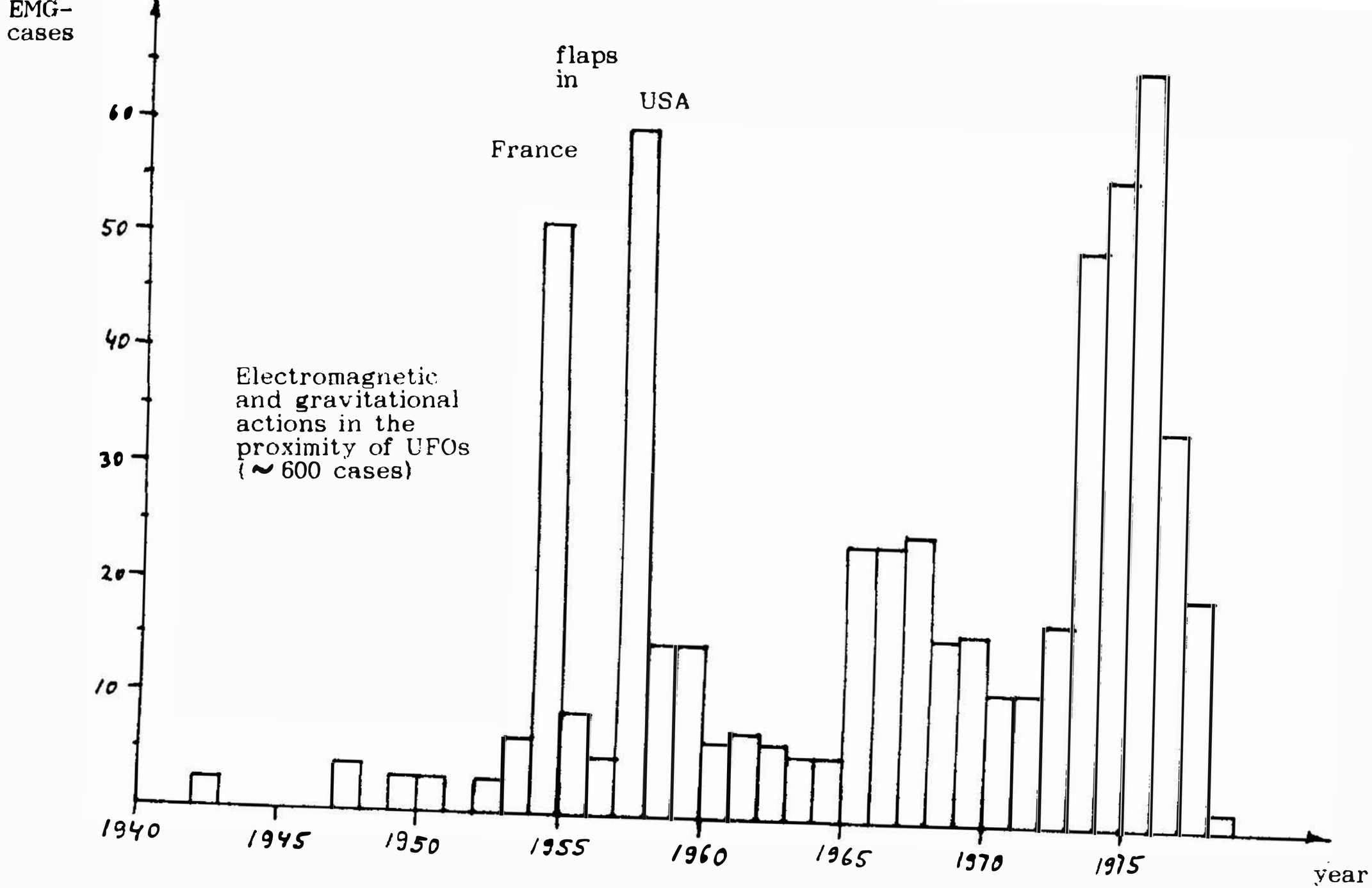
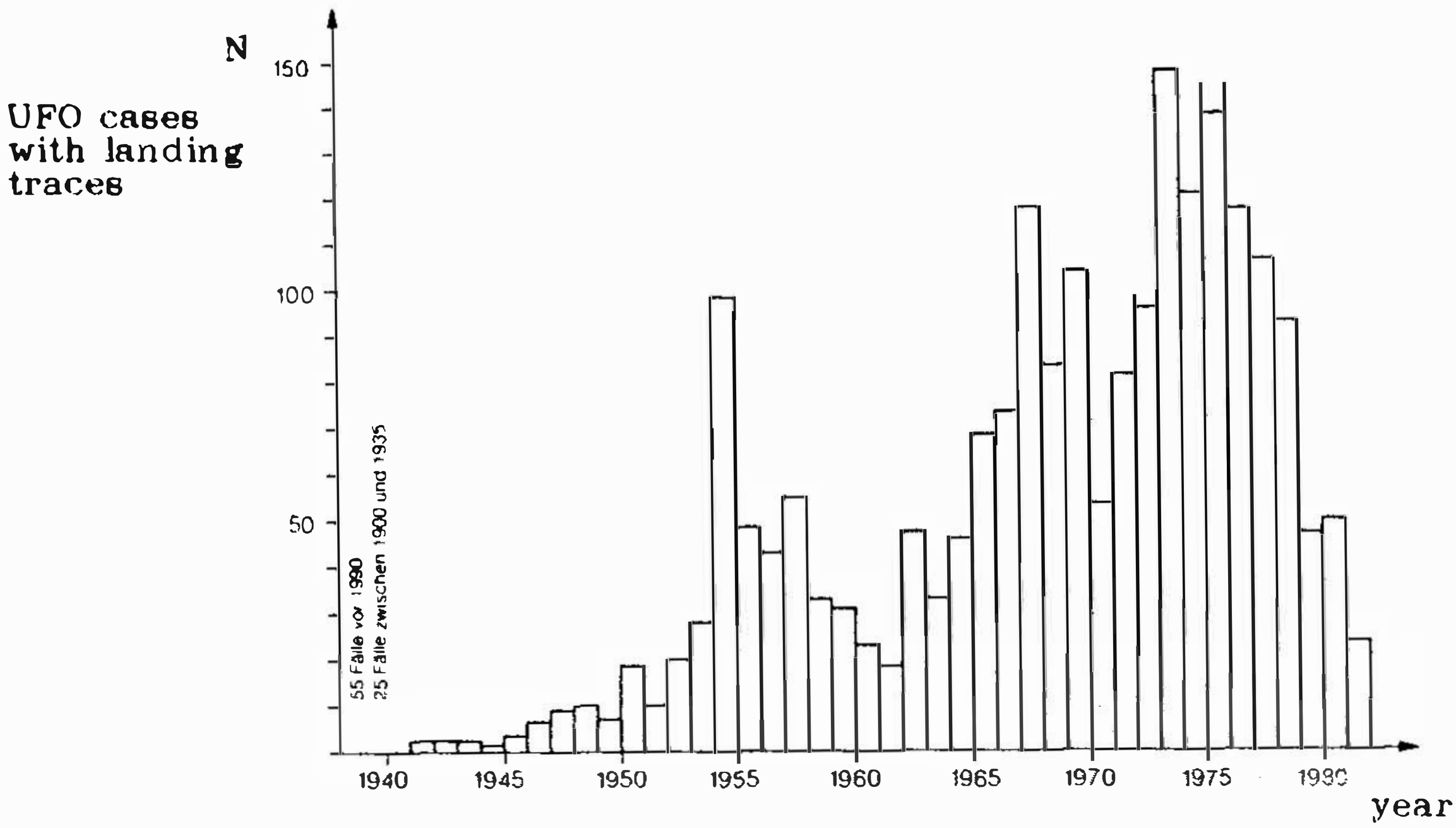
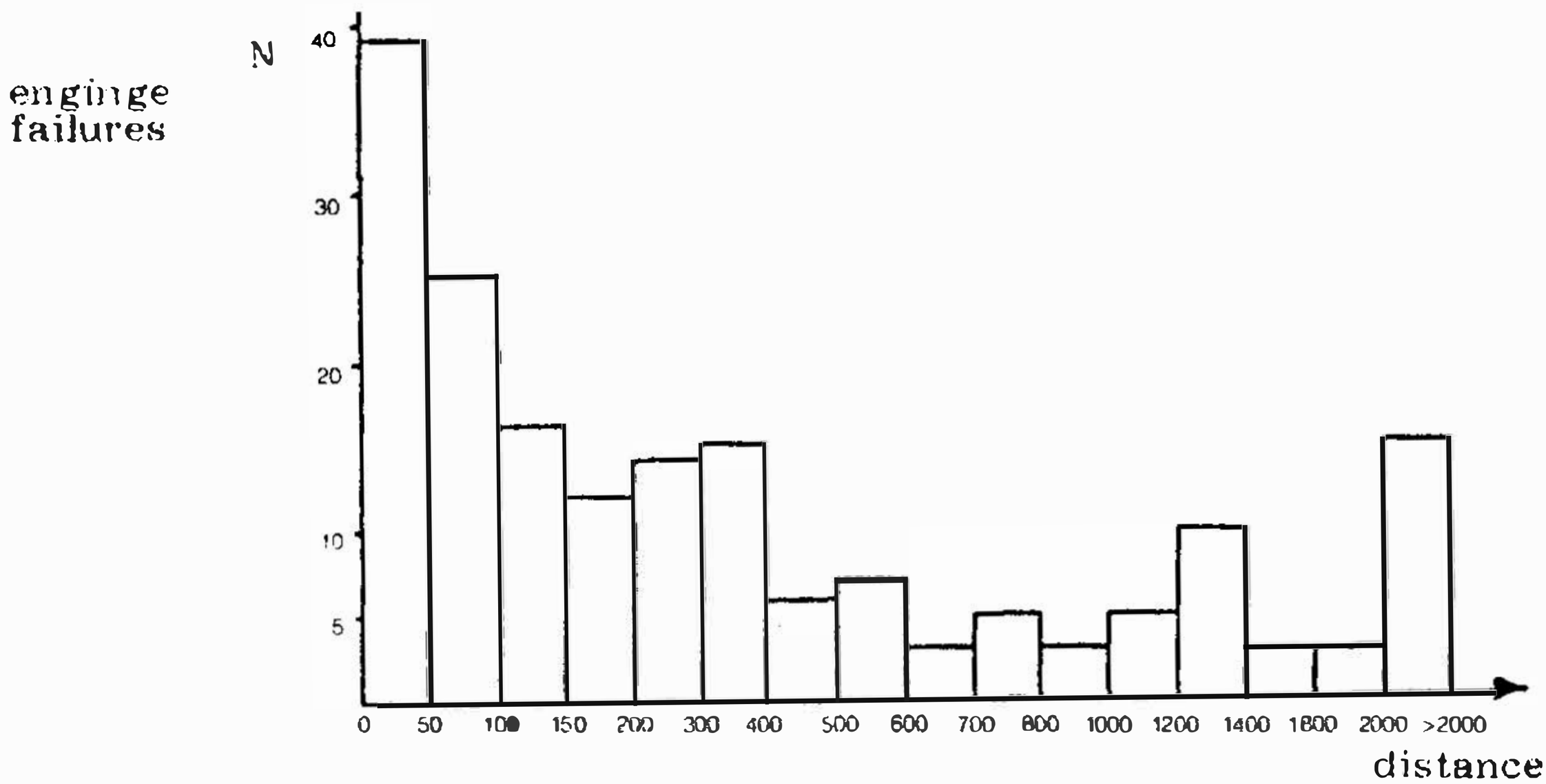


Figure 9: Annual distribution of UFO cases with electromagnetic effects



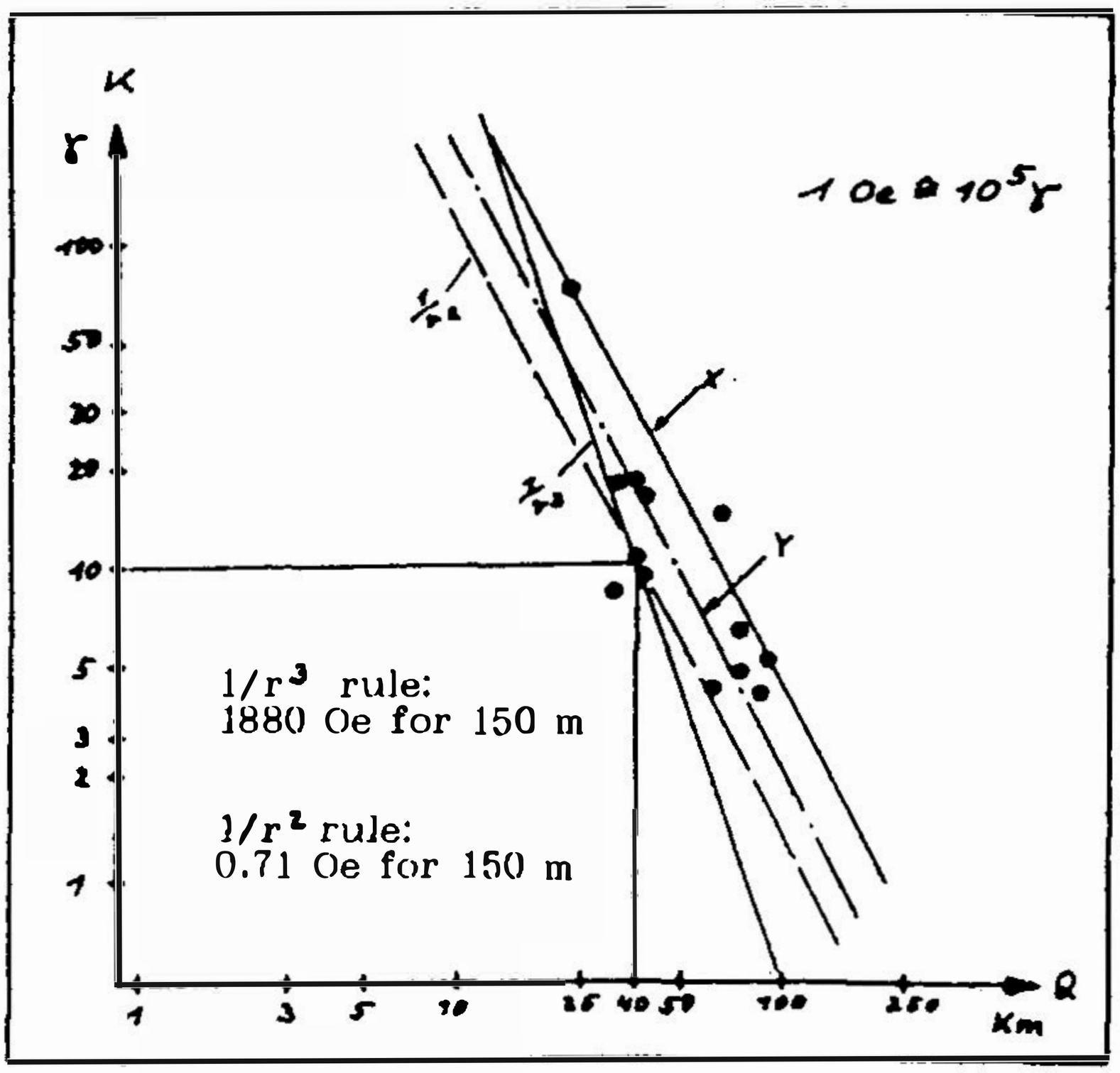
Annual distribution of all landings leaving physical marks (Ted Phillips, MUFON 1981 UFO Symposium Proceedings, MIT, Cambridge)



Influence of UFOs (of all sizes) on car engines as a function of distance. The effects decrease exponentially (Marc Rodeghier, The Spectrum of UFO Research, 1988, Chicago, Illinois; Hynek Center for UFO Studies)

Figure 10: Physical traces associated with UFO sightings

Correlation between UFO observations and disturbances of the magnetic field



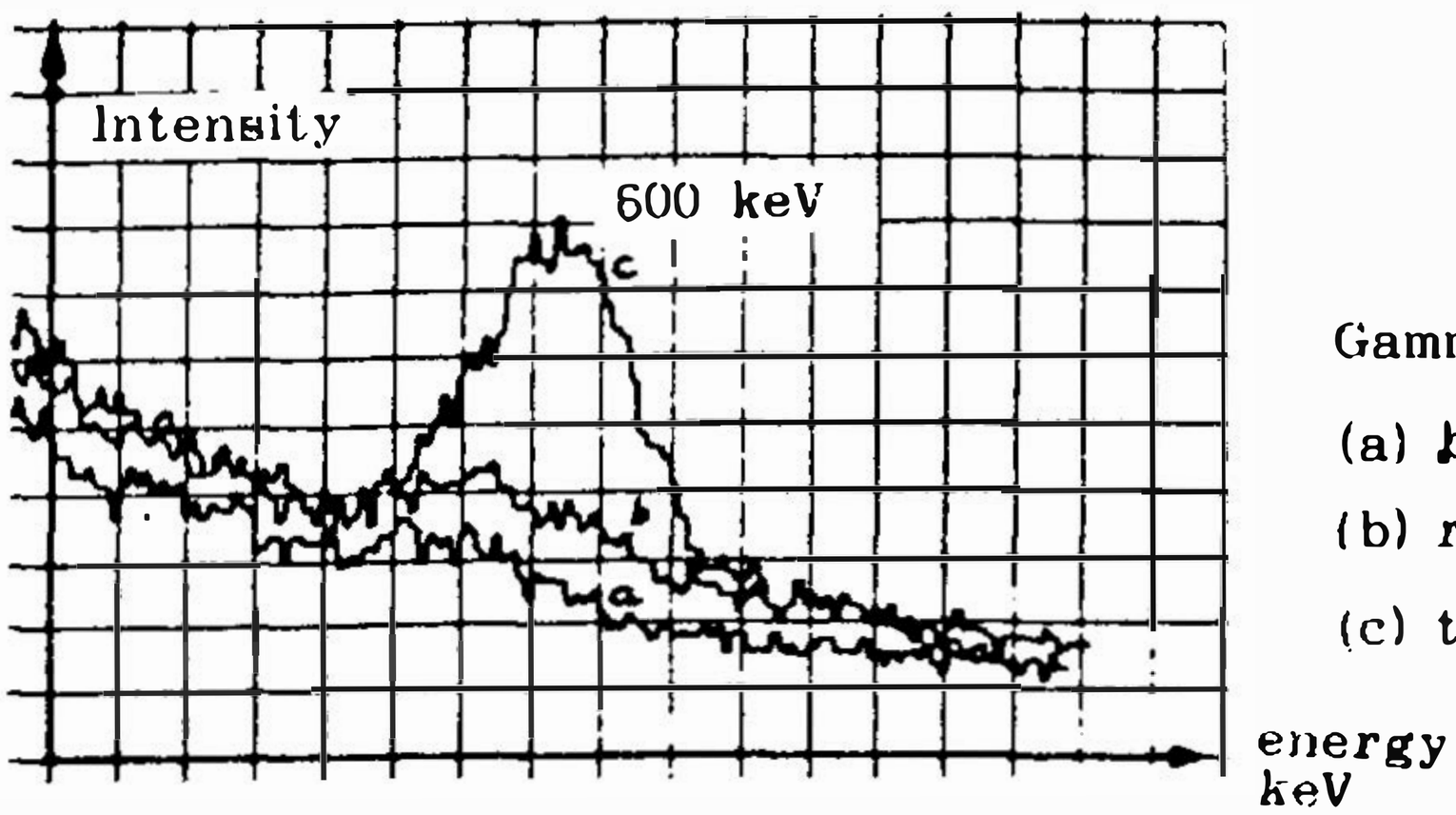
Graph showing upper limits of disturbances caused by a UFO (from a statistical study of October, 1954). (1 **gamma = 10^{-6} earth's magnetic field)**

Key:

K = Peak to peak disturbances of the vertical component of the earth's magnetic field.
Q = Distance in km of UFO from Chamon-la Foret.
X = Calculated upper limit of disturbances caused by a UFO.
Y = Observed upper limit of disturbances caused by a UFO.
o = UFO observation in the neighborhood of Chambon-la-Foret.

Source:

FSR Vol. 20, No. 1, Jan./Febr. 1974



Gamma activity from

(a) background,

(b) reference soil,

(c) test soil.

Gamma activity of the soil at the spot on which a red luminous sphere landed in Enebacken, Sweden (August 29, 1970)

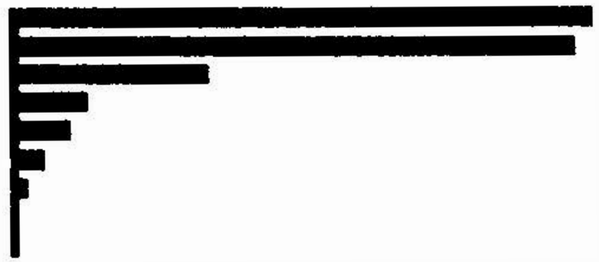
Source:

FSR Vol. 17, No. 1, Jan./Febr. 1971

Figure 11: Magnetic and radioactive effects caused by UFOs

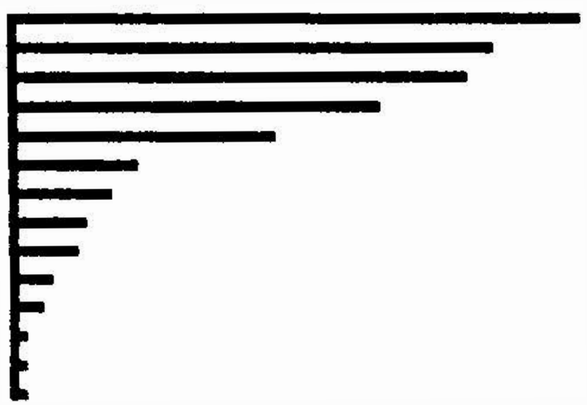
Electromagnetic and Gravity Effects by Geographical Region

United States	488
Europe	479
South America	166
Australia	67
Canada+Central Am.	44
Asia	32
Africa	16
Soviet Union	16
Sea, polar region	8



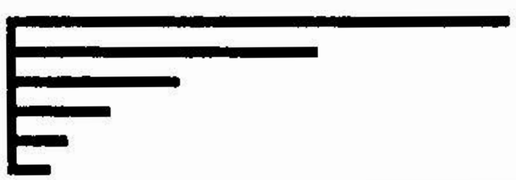
General interferences

Television sets	121
Lighting systems	102
Radios, no car radios	96
Watches	80
Power plants	58
Compass systems	28
Car accumulators	24
Batteries	18
Telephones	16
El. gen., motors	13
Radar installations	10
[illegible] voltmeter	6
Tape recorder	6
Velocity meter	6



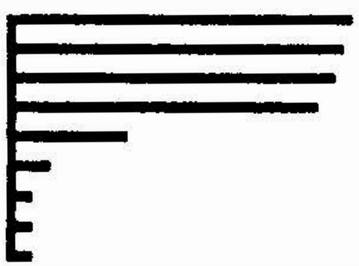
Special physiological effects

Paralysis	67
Prickling, tingling	43
Disturbance of vision	26
Sunburn	15
Electrical shock	10
Vacuum effect	8



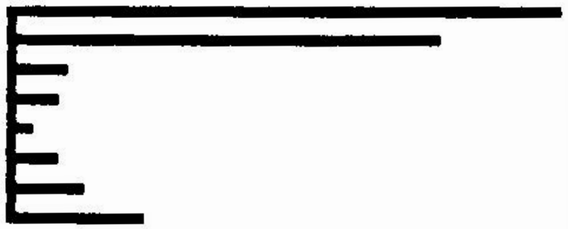
Special physical effects

Synchronization	24
Static electricity	23
Radioactivity	22
Magnetization	21
Surface changes	8
Faraday effect	3
Refraction	2
Phosphorescence	2
Fluorescence	2



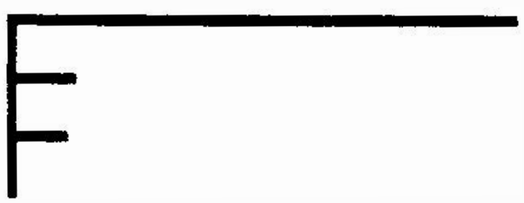
Mechanical effects

Pressure, pull, levitation of	
solid objects	118
humans	91
ufonauts	12
water	11
animals	5
Deformation	11
Whirling effect	16
Vibration	30



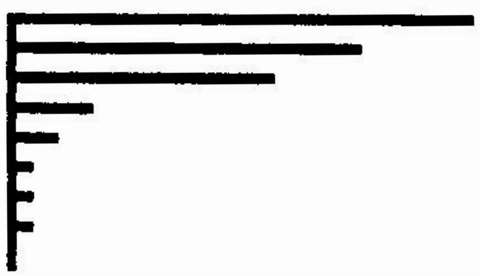
Thermodynamic effects

Heating of materials and/or organisms	114
Cooling of materials and/or organisms	32
Burning of materials and/or organisms	29
Water evaporation	5



Registration of UFOs

Photographs	16
Magnetic detectors	12
Films	9
Iondetector	3
Temperature recorder	2
Radar exposure	1
Tape recording	1
El. field detector	1
Spectrometer	0



EM-Interferences with

cars, motorcycles, planes, ships, and rockets

Total number of effects on

Cars	614
Planes	49
Motorcycles	33
Ships	9
Rockets	1

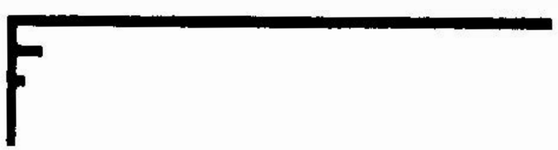
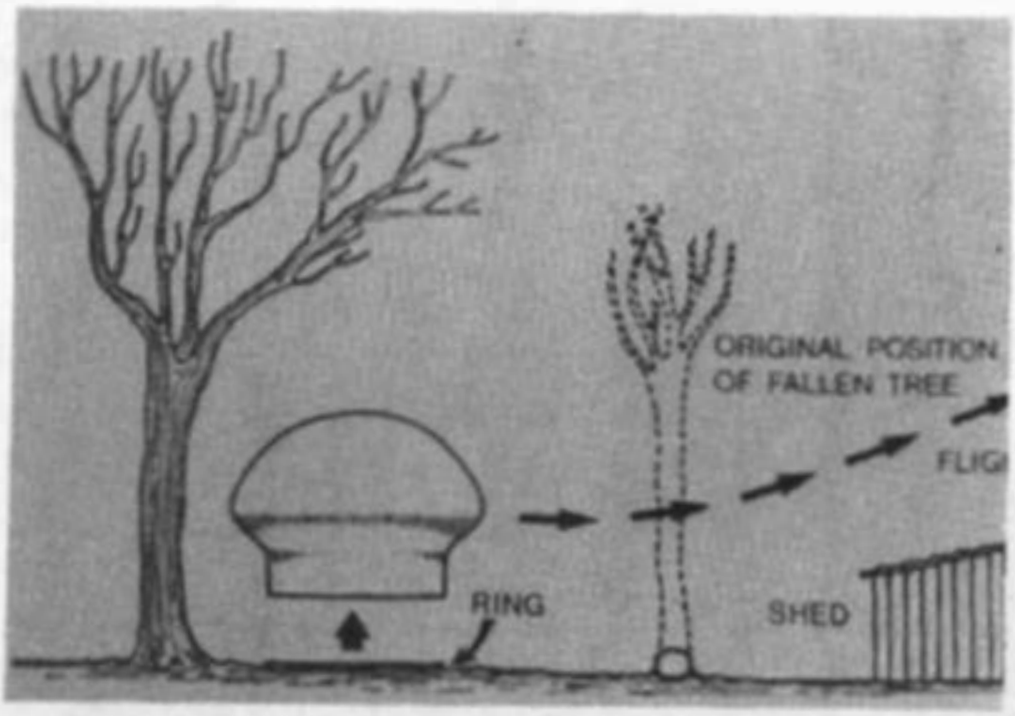


Figure 12: Distribution of physical effects caused by UFOs, collected by A. Schneider (MUFON-CES Report No.: 9, 1983)



Sketch of the object in Delphos (E. A. Paruk, 1989)

Ring outlined by unmelted snow taken December 4, 1971. Soil samples were taken from here for chemical analysis.

Figure 13: In November 1971 the 16 year old son of a farmer in Delphos, Kansas, observed an object hovering close to the ground. A hitherto unknown form of energy acted upon the soil for a period of 3 minutes, leading to effects which cannot be explained by the action of high temperatures alone.

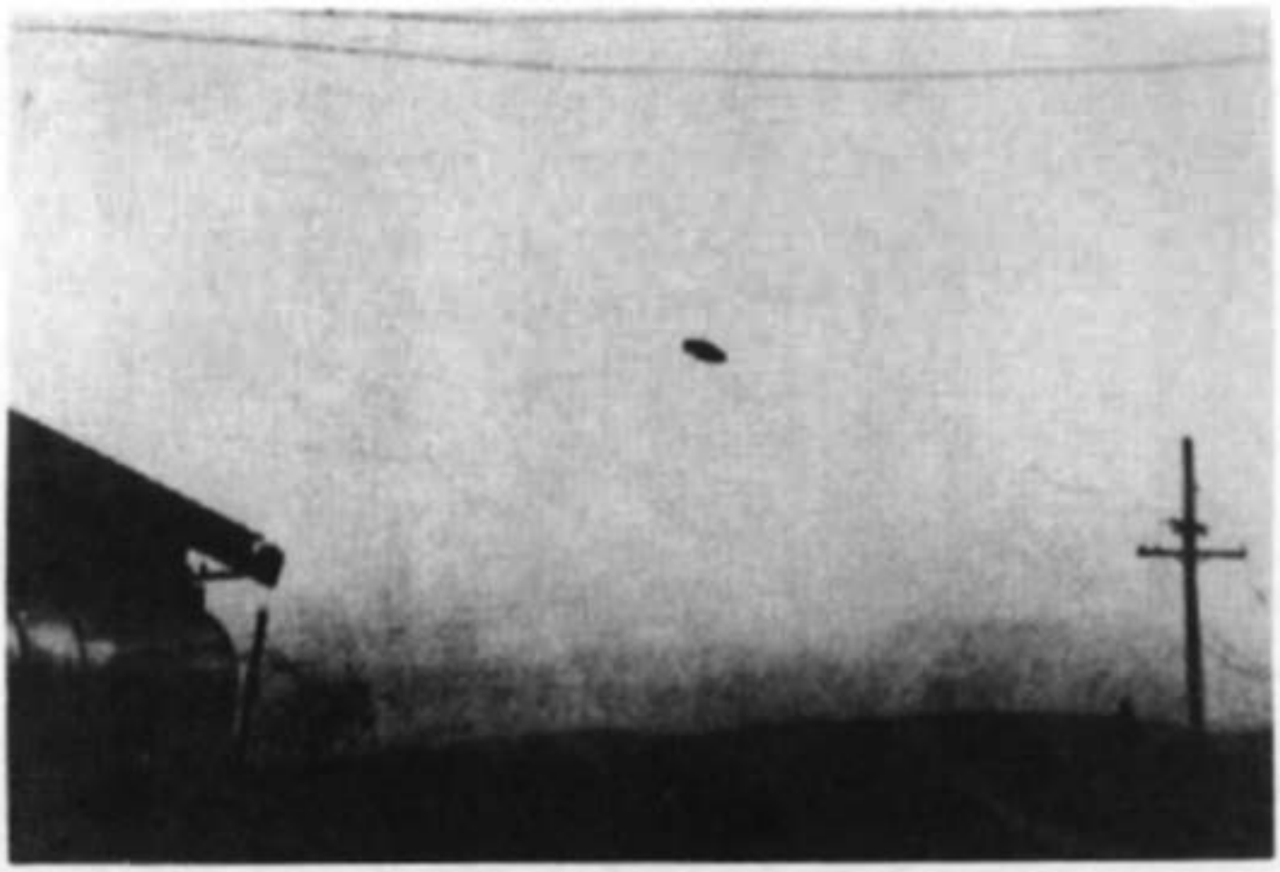


Figure 14: One of 2 photographs taken by farmer Paul Trent on May 11, 1950, at McMinnville, Oregon. It remains one of the most remarkable – and to all appearances authentic – pictures ever taken of a UFO.

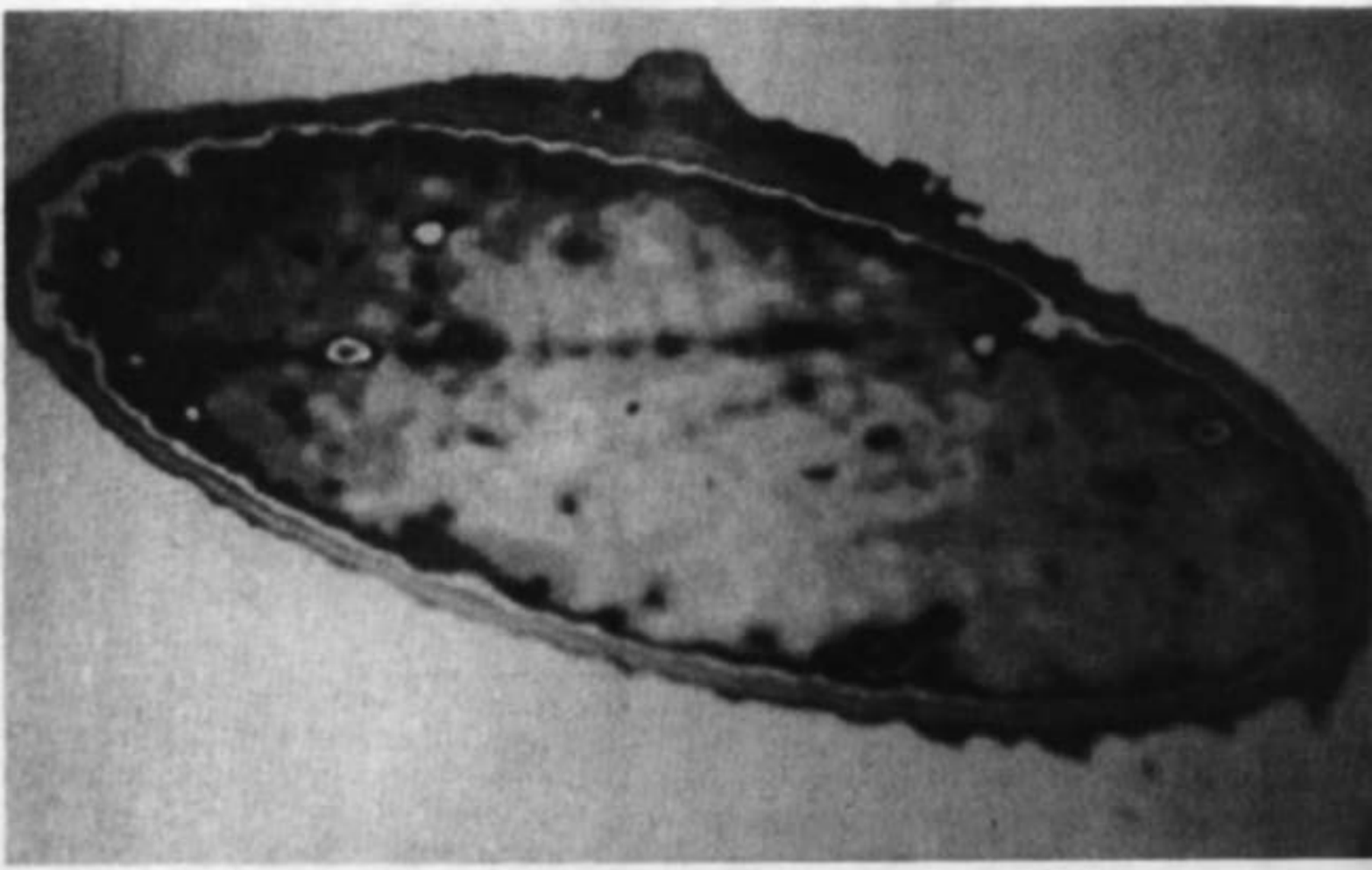
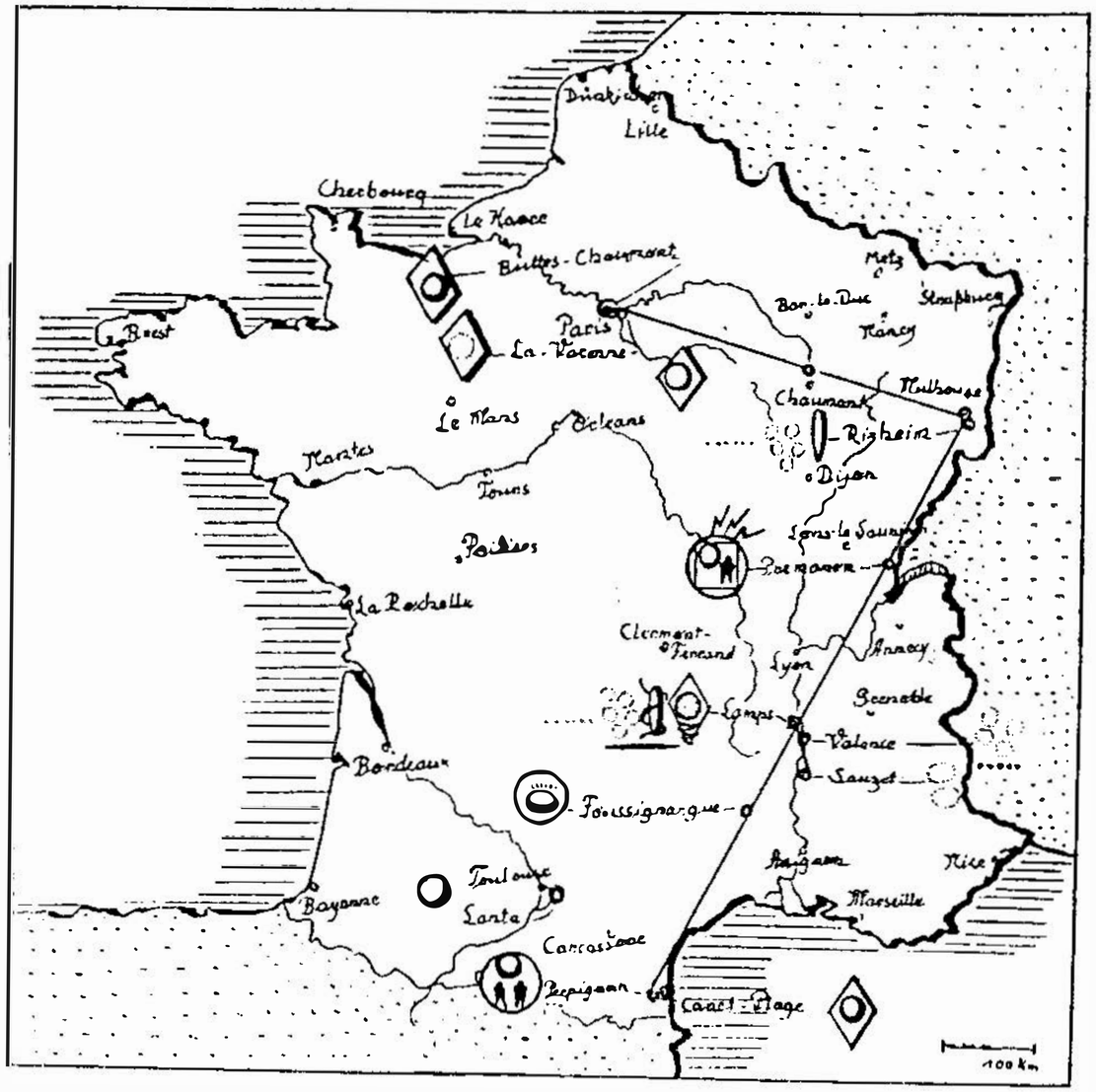
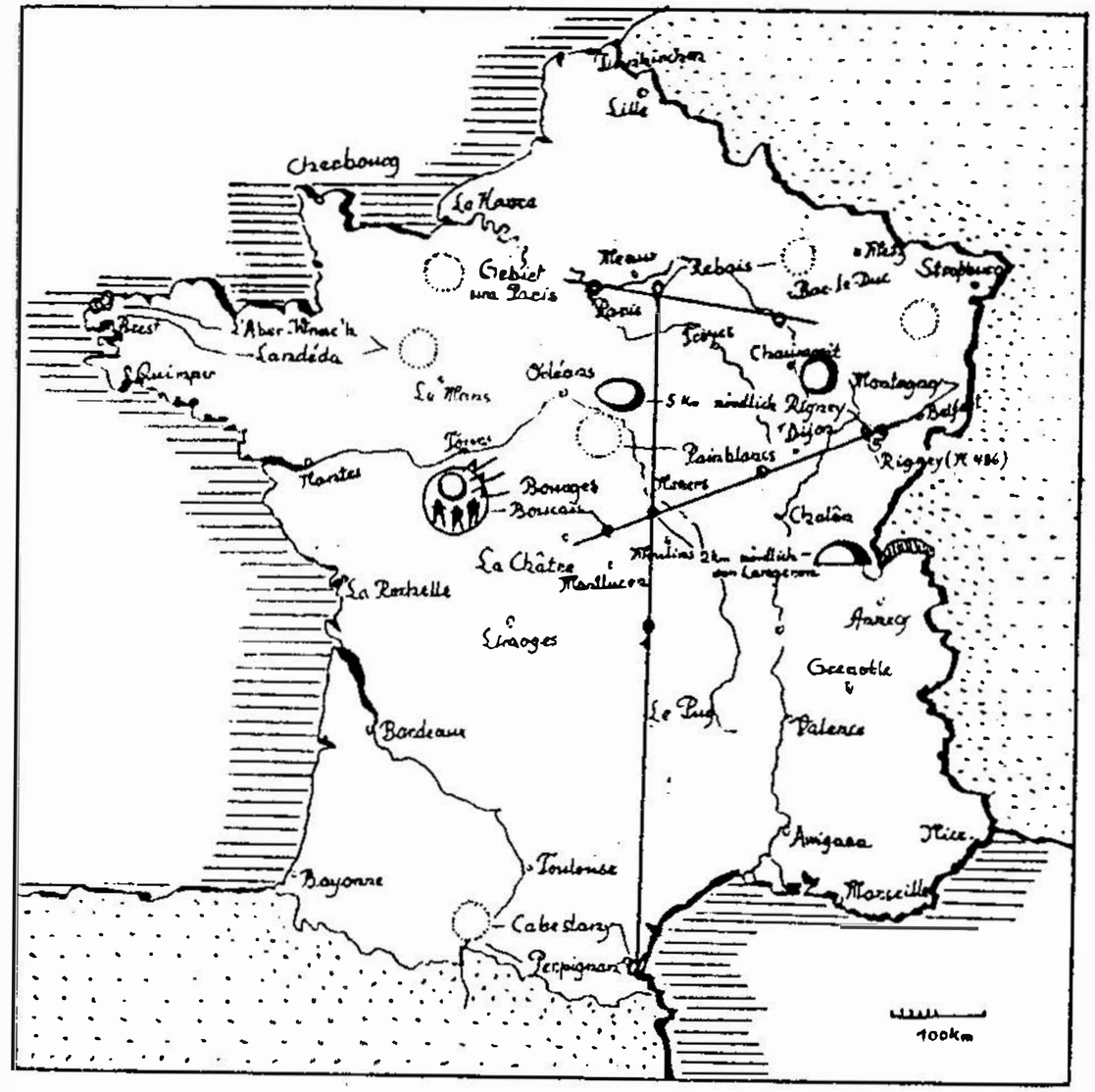


Figure 15: A close-up of the photograph of Fig. 14 shows the blurred edge characteristic of large objects at a great distance. The diameter of the McMinnville object was about 14 m.

Figure 16: One of several hundred triangular objects seen over Belgium between November, 1989, and 1991. This photograph was taken on April 7, 1990, near the town of Petit-Rechain in the province of Liège (SOBEPS 1990).



Sightings and alignments on September 27, 1954.



Sightings and alignments on September 29, 1954.

Figure 17: UFOs over France, September, 1954 (Michel 1958).

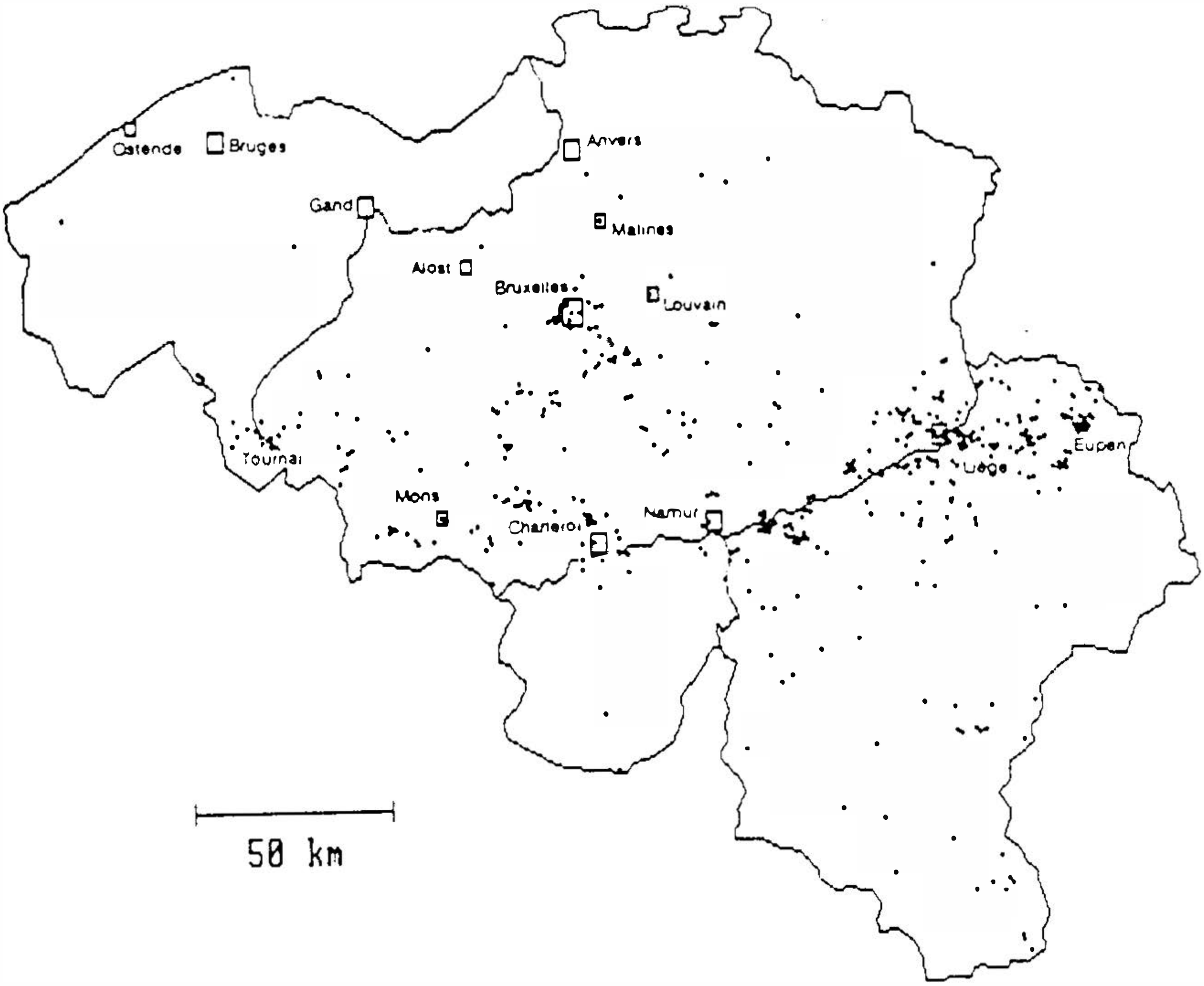
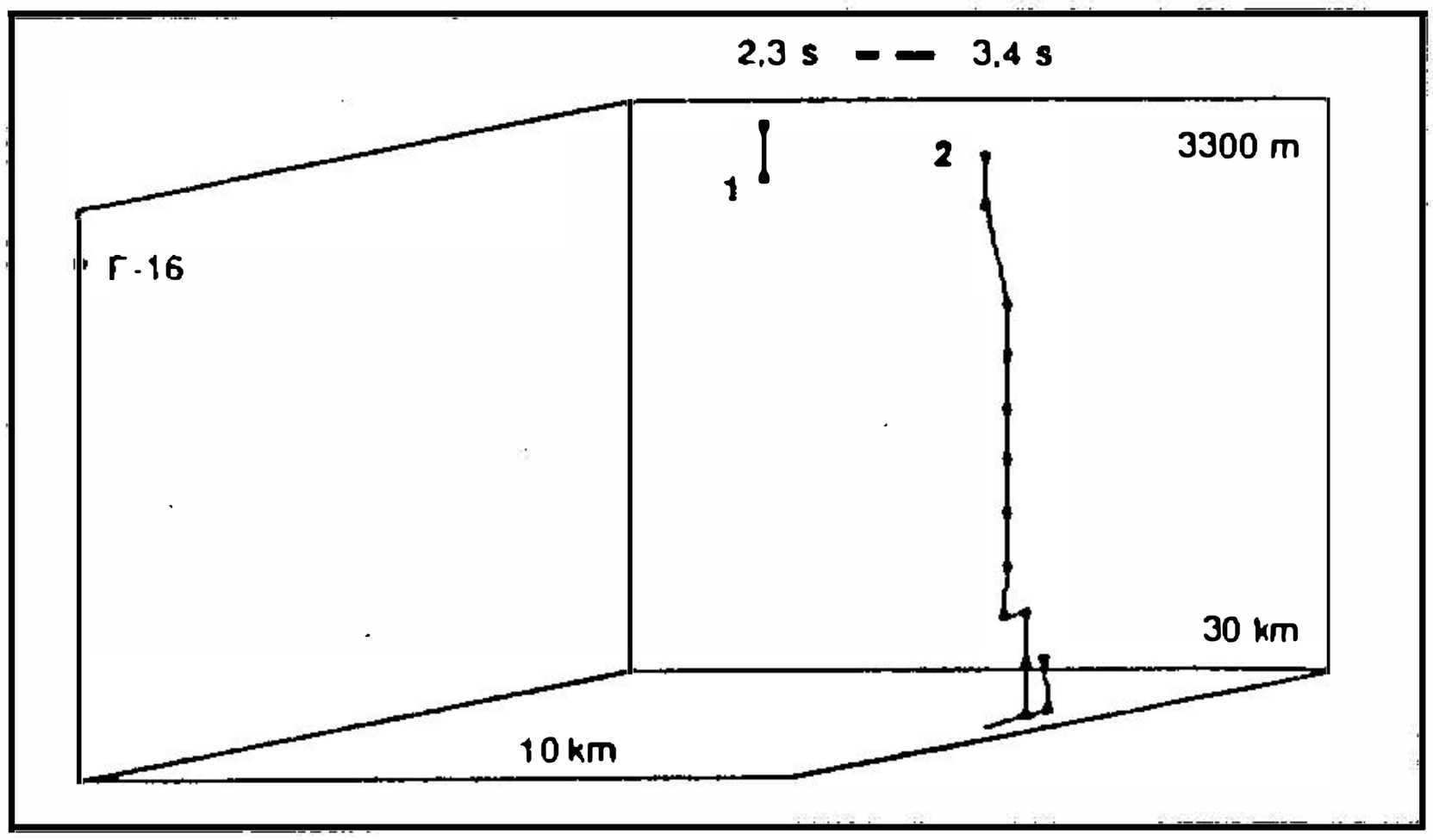
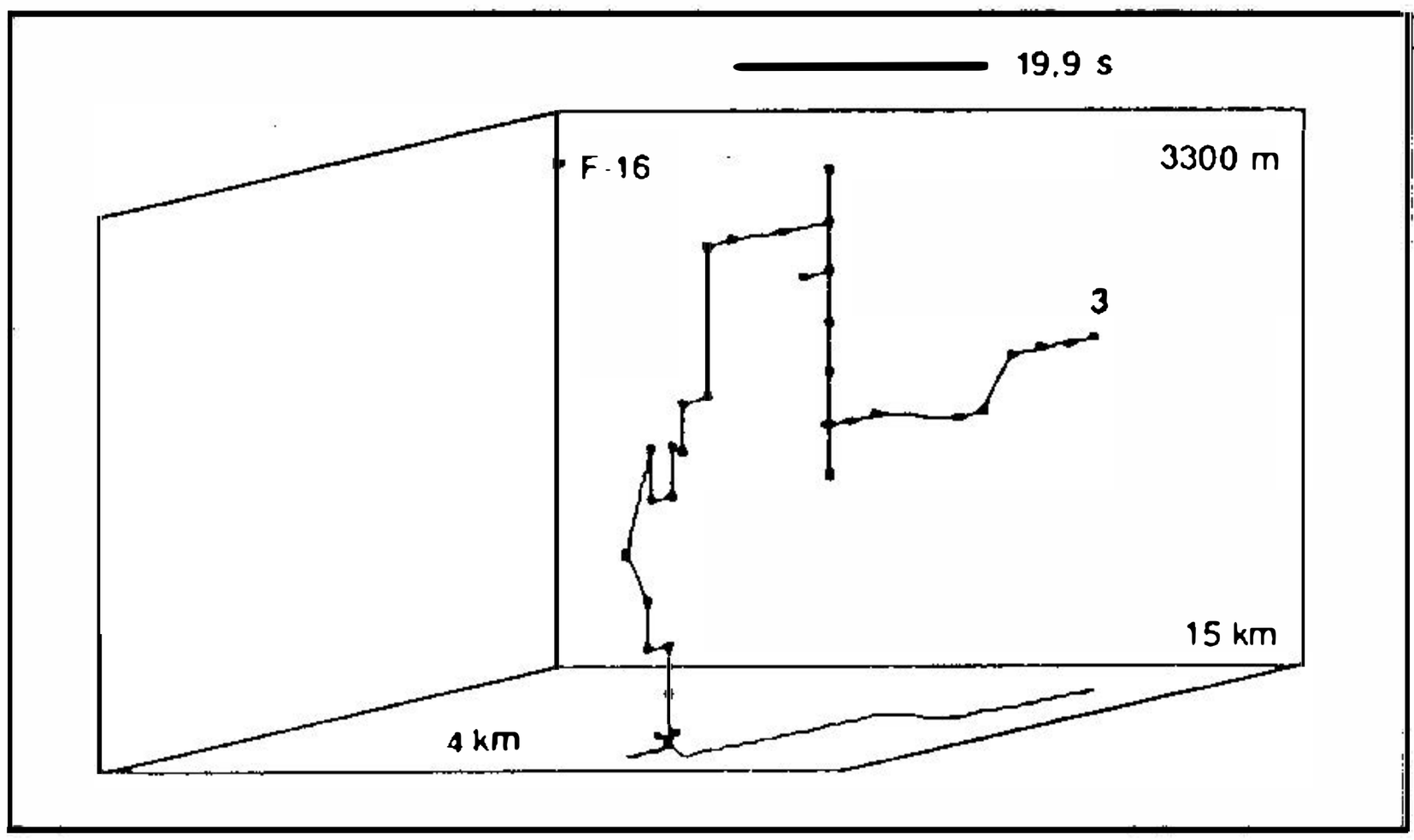


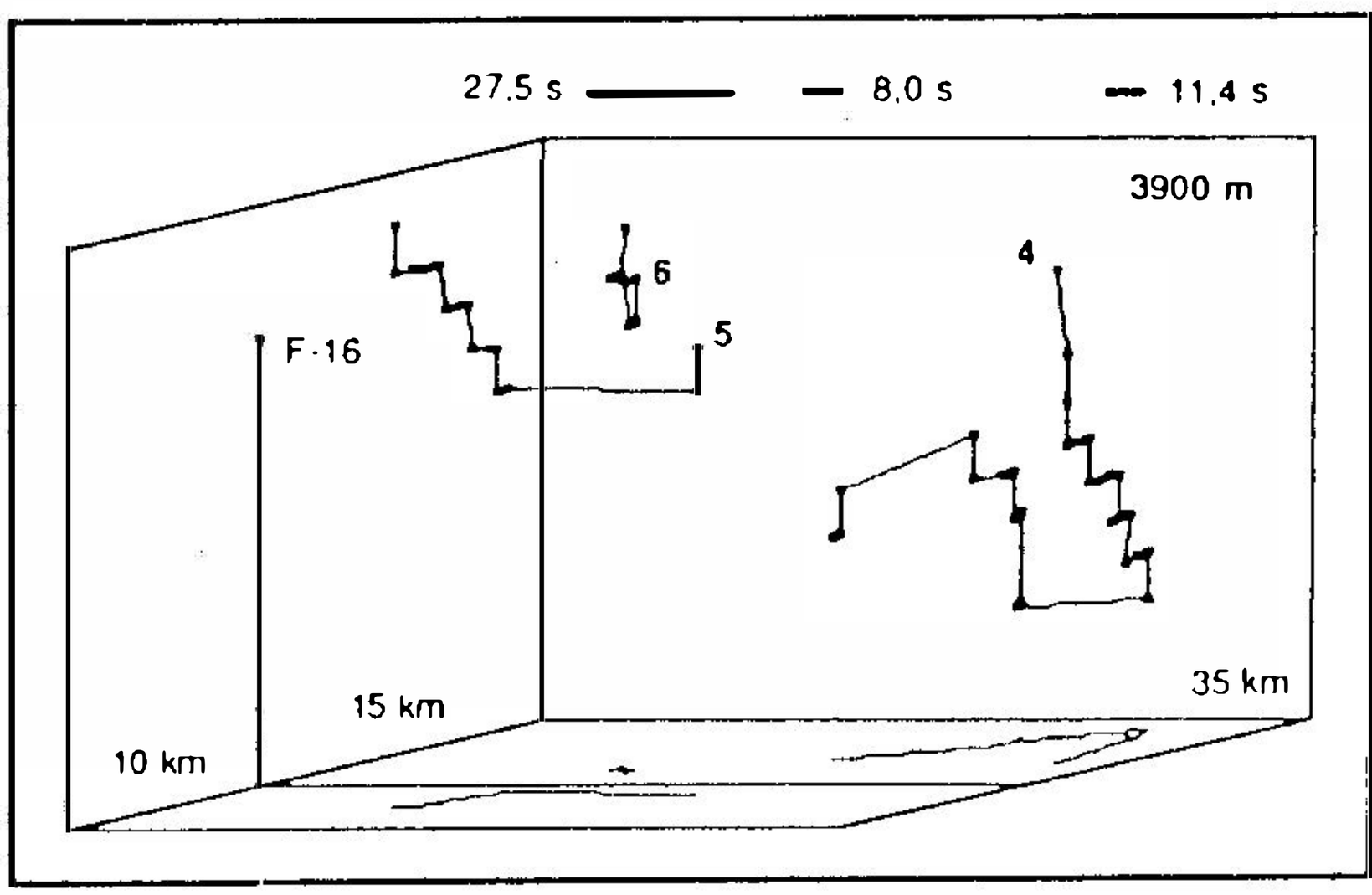
Figure 18: Geographical distribution of observations in Belgium from November 29, 1989, to March 12, 1991 (SOBEPS 1990).



Trajectories of objects 1 and 2.

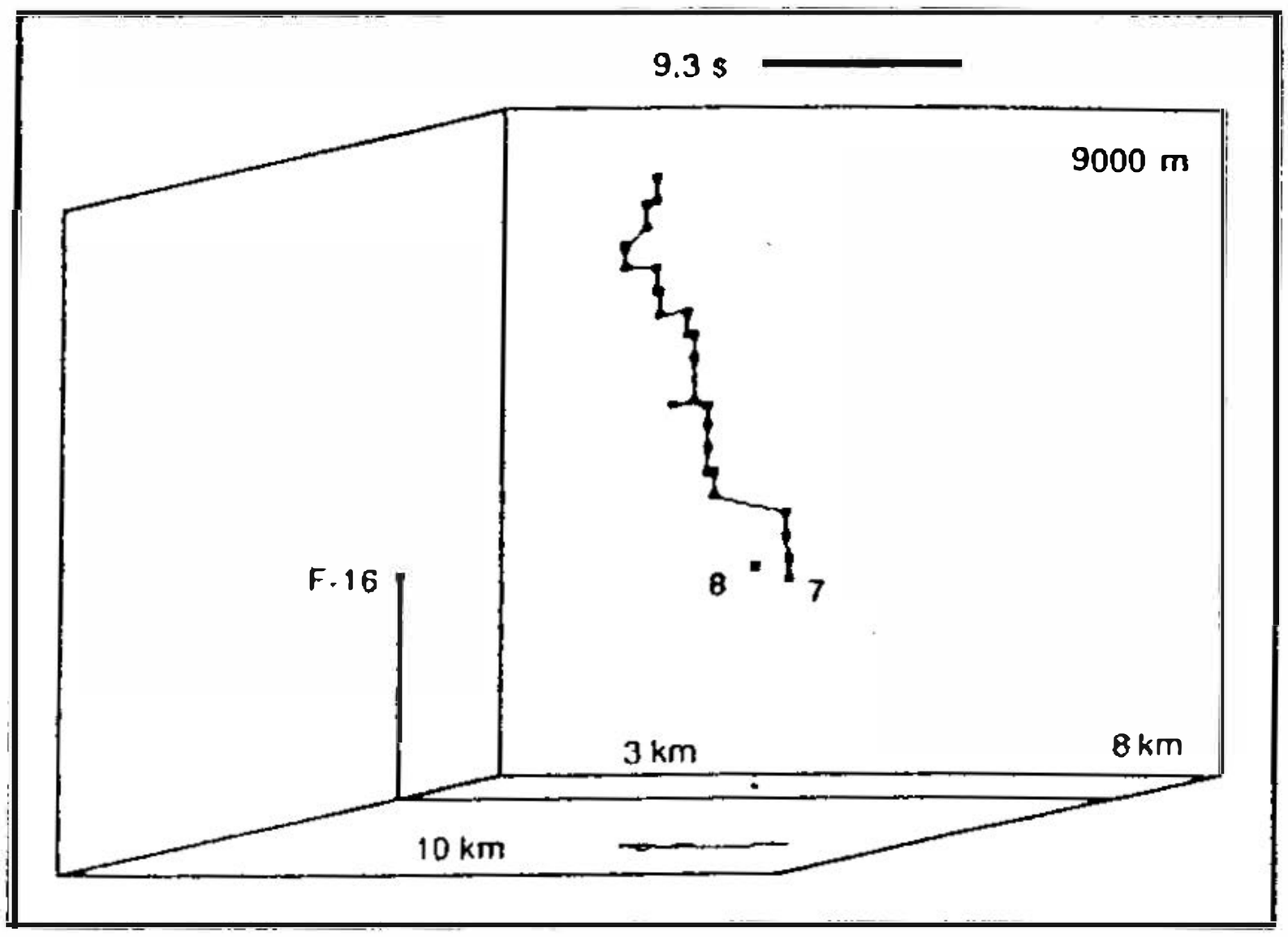


Trajectory of object 3.

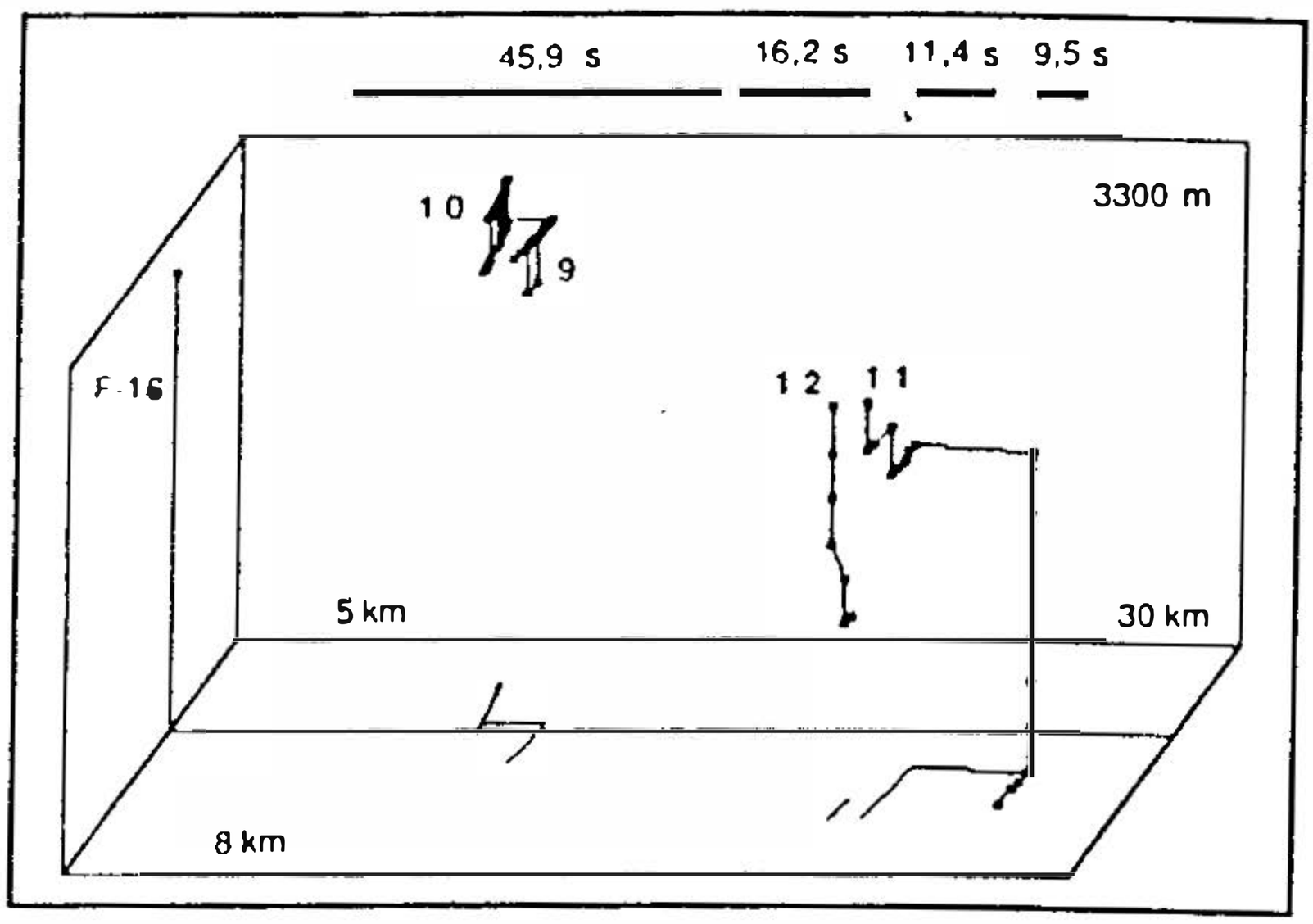


Trajectories of objects 4, 5, and 6.

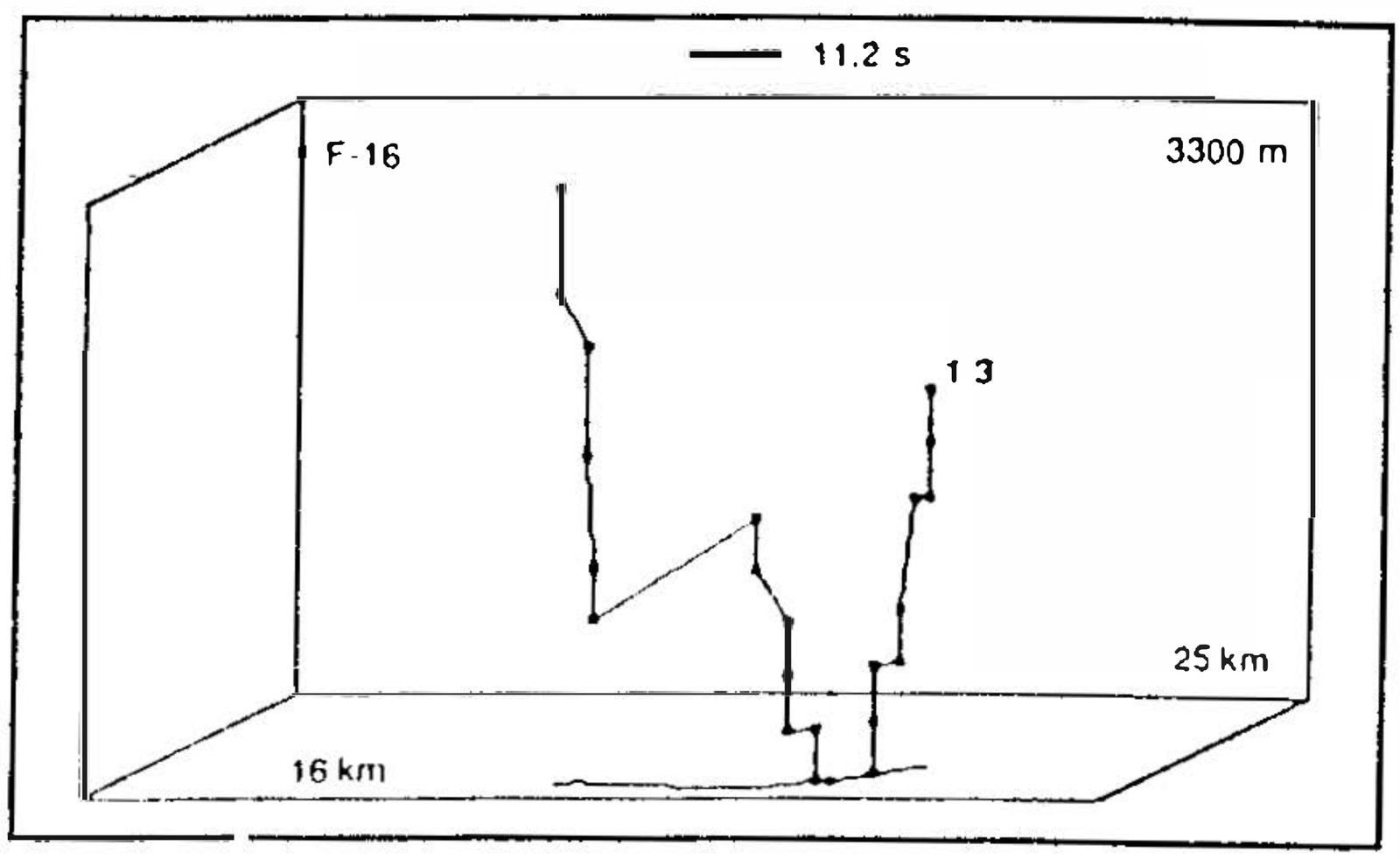
Figure 19: Three–dimensional radar traces registered by an F–16 on–board radar device near Brussels, March 30–31, 1990. The lines mark the lock–on times for objects 1–4.



Trajectories of objects 7 and 8.



Trajectories of objects 9–12.



Trajectory of object 13.

Figure 20: Radar traces of the unusual movements of UFOs as recorded by an F–16:

The Most Interesting Sightings of UFOs Over Germany Since 1989

by

Illobrand von Ludwiger

This is an account of UFO observations made over Germany since the publication of our last MUFON–CES Report No. 10 in 1989. Only the most interesting sightings will be presented in order to give the reader an impression of the most frequently observed UFO shapes. A summary of characteristic data is given on the following pages together with a short description of each sighting.

Numbers are assigned to the various shapes as shown in the table below:

No.	Shape
1	Sphere
2	Saturn shape
3	Hemisphere
4	Oval shape
5	Cigar shape
6	Domed disc
7	Triangle or boomerang
8	Geometrical shape
9	Unusual shape
10	Formation

The locations where objects were seen are indicated on the map of Germany. Numbers preceded by an A refer to similarly numbered abduction cases in the table on page 150.

The degree of confidence one can have in the credibility of a case investigation is characterized by the reliability index p_r:

Olsen in 1966 proposed that all UFO reports be given a reliability index in order to enable foreign investigators to estimate the trustworthiness of an individual case, since the interviewer usually is the only person in contact with the witness and thus able to estimate his credibility (cf. Olsen, 1966, in *Brilliantly Shining Objects and Strange Figures in Langenargen* in this volume). Characterization of a case by

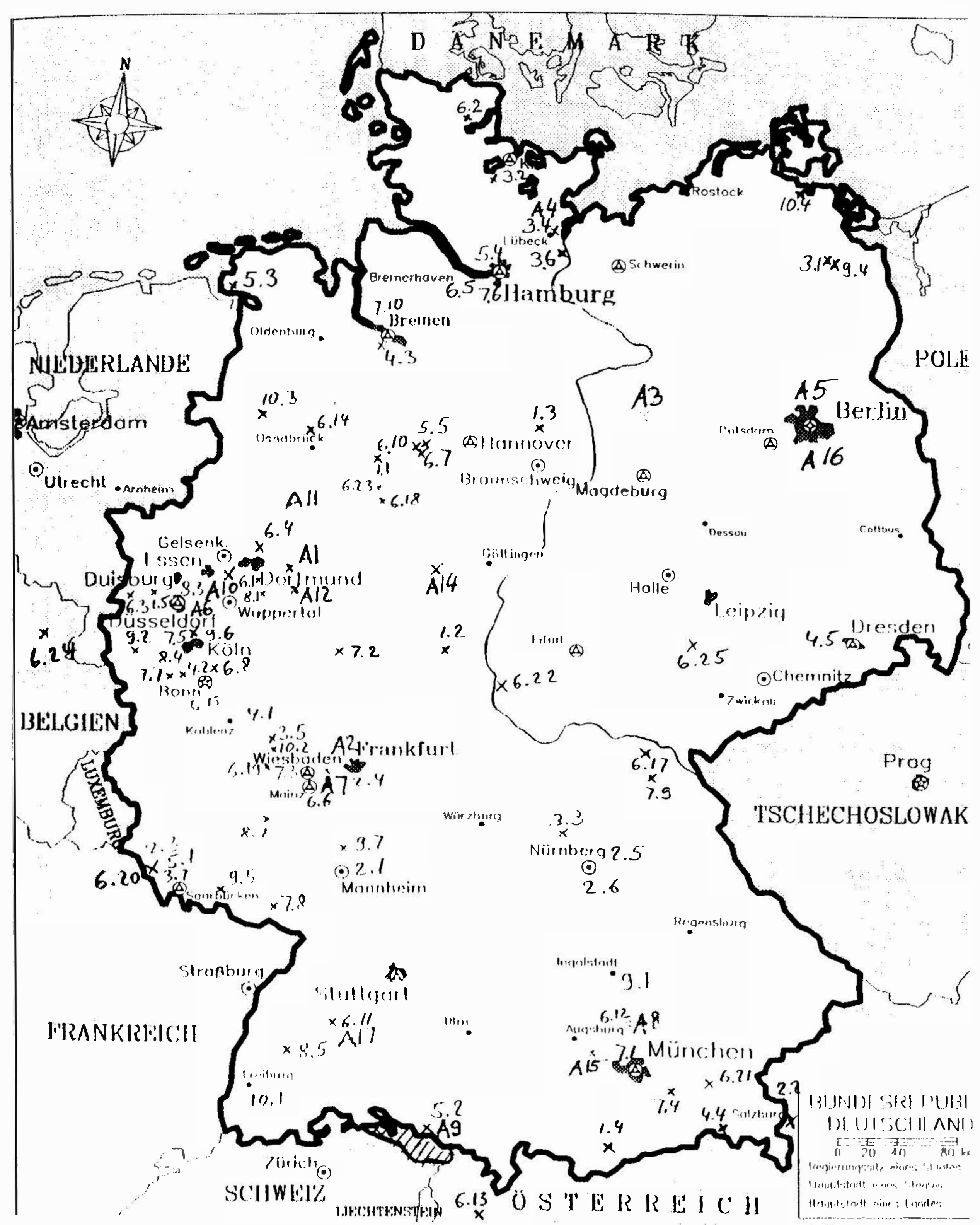
a reliability index is somewhat of an oversimplification, but we shall use it nevertheless, since several hundred investigations have already been evaluated in this manner.

The reliability index, p_r, allows sorting out reports that appear to be too untrustworthy, i.e. cases for which $p_r<50\%$. p_r–values of 90% are considered reliable "to some extent", values over 95% are "reliable", and values exceeding 98% are classified as "very reliable".

For any case not investigated by known researchers the formula for the reliability index yields values for p_r of not more than 50%, regardless of the quality of the report.

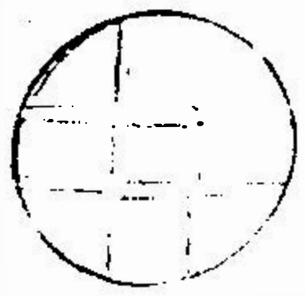
The definition of p_r may be too restrictive, since cases for which $p_r<50\%$ could include multiple witness reports, while direct investigations may be overemphasized.

Following are comments on several cases of special interest.


DÄNEMARK
N
Rostock
Lübeck
Schwerin
Bremerhaven
Hamburg
Bremen
Oldenburg
NIEDERLANDE
POLEN
Amsterdam
Utrecht
Arnheim
Osnabrück
Hannover
Braunschweig
Magdeburg
Berlin
Potsdam
Dessau
Cottbus
Göttingen
Gelsenk.
Essen
Duisburg
Dortmund
Wuppertal
Düsseldorf
Köln
Bonn
Halle
Leipzig
Dresden
Erfurt
Chemnitz
Zwickau
BELGIEN
Koblenz
Wiesbaden
Frankfurt
Mainz
LUXEMBURG
Prag
TSCHECHOSLOWAK
Würzburg
Nürnberg
Mannheim
Saarbrücken
Regensburg
Straßburg
Stuttgart
Ulm
Ingolstadt
Augsburg
München
Freiburg
Salzburg
Zürich
SCHWEIZ
LIECHTENSTEIN
ÖSTERREICH
BUNDESREPUBL
DEUTSCHLAND
0 20 40 80 km
Regierungssitz eines Landes
Hauptstadt eines Landes
Hauptstadt eines Landes

1. Spheres

1.3
Location: Peine
Time: summer 1990, 20:30-20:40
Object: ball
Distance: about 1 mile
Altitude: 20 yards
Size: 18-20 yards
Witnesses: 3
Peculiarities: high acceleration after hovering
Reliability index: 75%
Interviewers: MUFON-CES



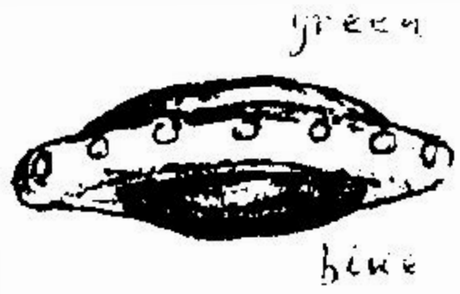
orange

2. Saturn shapes

2.1
Location: Hockenheim
Time: 7/6/1989
Object: Saturn-shaped object
Distance: ?
Altitude: ?
Size: ?
Witnesses: US Army Commander
Peculiarities: possible abduction case
Reliability index: <50%
Interviewers: information from E. Blashak

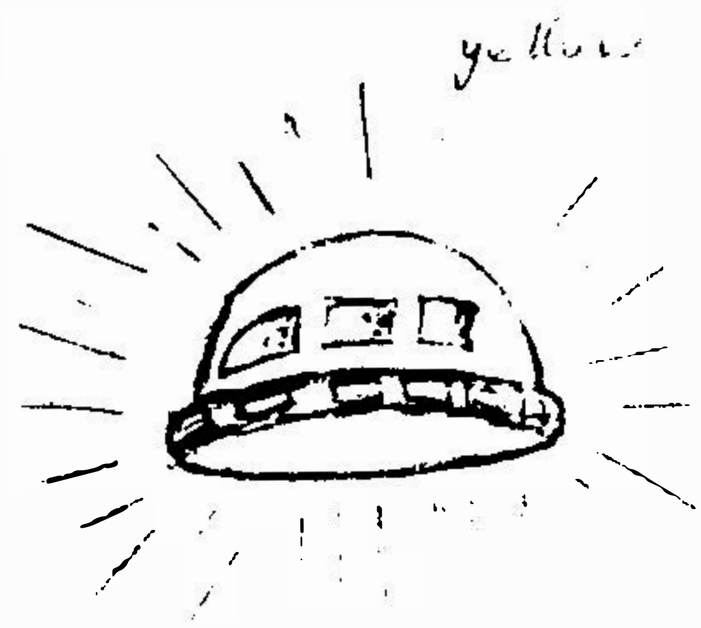
blue

2.5
Location: Nuernberg
Time: April 1991, 10:45 p.m.
Object: Saturn-shaped object
Distance: 100 yards
Altitude: 20 yards
Size: 1 degree
Witnesses: 2
Peculiarities: witnesses under shock
Reliability index: 75%
Interviewers: S.Auzins for MUFON-CES



3. Hemisphere

3.6
Location: Lüchow (Hamburg)
Time: 1/13/1989, >8:00 p.m., 4 min.
Object: hemisphere
Distance: <1 mile
Altitude: 20 yards
Size: 10-15 yards
Witnesses: 7
Peculiarities:
Reliability Index: 95%
Interviewers: GEP, JUFOF July-Aug., 1990



3.2
Location: Kiel
Time: 1/1/1991, 0:45-1:15 a.m.
Object: hemisphere
Distance: 2 miles
Altitude: 2 miles
Size: 1/4 degrees
Witnesses: 2
Peculiarities:
Reliability index: 75%
Interviewers: MUFON-CES

orange

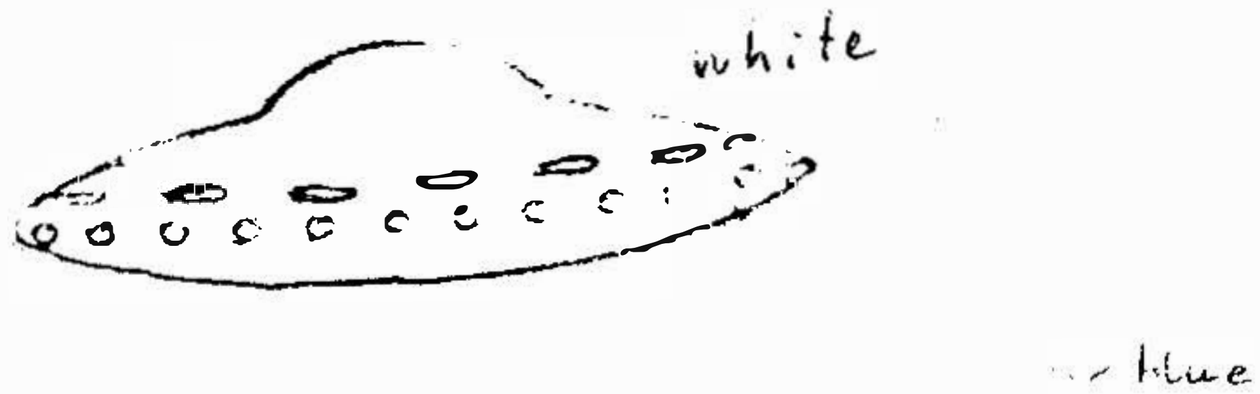
Case 9.3:

The witness in this case was Werner Utter, one of the most respected chief pilots of the German airline Lufthansa, who has transported several German chancellors in his plane.

9.3
Location: Atlantic; Newfoundland
Time: 11/21/1978, 9:55 GMT
Object: spider
Distance: < 1 mile
Altitude: 30000 ft.
Size: 20-30 yards
Witnesses: pilots of TWA and LH,
LH-chiefpilot Werner Utter
Peculiarities: moving rays
Reliability index: 99%
Interviewers: Rainer Holbe:
Phantastische Phaenomene, Munich: Herbig, 1993

Fig 1. Drawing of Utter's sighting as it appeared on television.

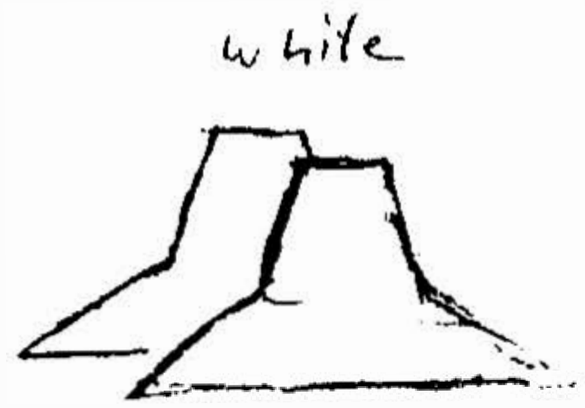
6.7
Location: Bad Salzuflen
Time: 11/3/1992, 8:25-8:45 p.m.
Object: lens shape
Distance: >500 yards
Altitude: >50 yards
Size: 6 degrees
Witnesses: >5
Peculiarities: solid light,
Reliability index: **99%**
Interviewers: MUFON-CES



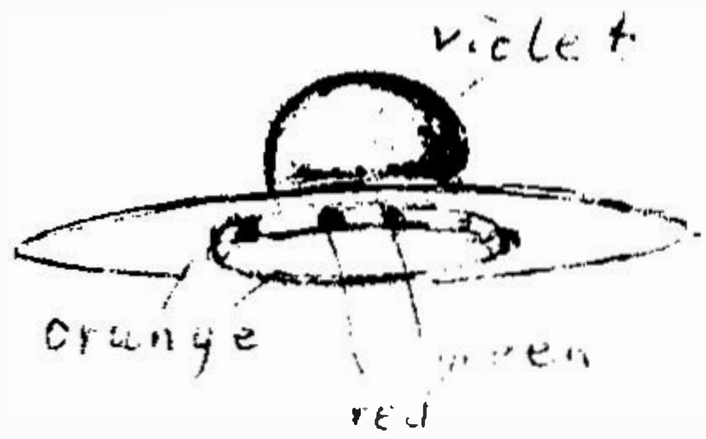
6.10
Location: Brackwede-Bielefeld
Time: 12/1/1992, 5:30-6:15 p.m.
Object: disc
Distance: >1 mile
Altitude: >100 yards
Size: 1 degree
Witnesses: 2
Peculiarities:
Reliability index: 50%
Interviewers: Neue Westfaelische, 12/4/1992

6.18
Location: Kassel
Time: May 1991, 11:30 p.m., 15 sec
Object: inverted domed disc
Distance: >100 yards
Altitude: 30 yards
Size: 30 yards
Witnesses: 2
Peculiarities: witness informed NASA
Reliability index: 75%
Interviewers: MUFON-CES

6.20
Location: Gerlfangen near Saarlouis
Time: 11/20/1991, 7:30 a.m., seconds
Object: 2 domed discs
Distance: < 1 mile
Altitude: <20 yards
Size: <10 yards
Witnesses: 1
Peculiarities:
Reliability index: 75%
Interviewers: MUFON-CES



6.24
Location: Eupen, Belgium (!)
Time: 12/2/1989, 6:10-6:45 p.m.
Object: domed disc
Distance: <100 yards
Altitude: <100 yards
Size:15 yards
Witnesses: 4
Peculiarities: observation after formation
radio report
Reliability index: **95%**
Interviewers: MUFON-CES



Case 4.5:

The object swooped down low and slowly flew over the car of the witnesses, who had the impression of driving through a dark tunnel. The underside of the craft was colored like the brown bark of a tree or like rusty iron. All of a sudden small blue lights began to flicker around the center of the object's bottom.

4.5
Location: Delitzsch near Dresden
Time: 2/9/1991, 5:15-5:20 p.m.
Object: oval shaped
Distance: 15-20 yards
Altitude: 15-20 yards
Size: 150-200 yards
Witnesses: 2
Peculiarities:
Reliability index: 95%
Interviewers: MUFON-CES

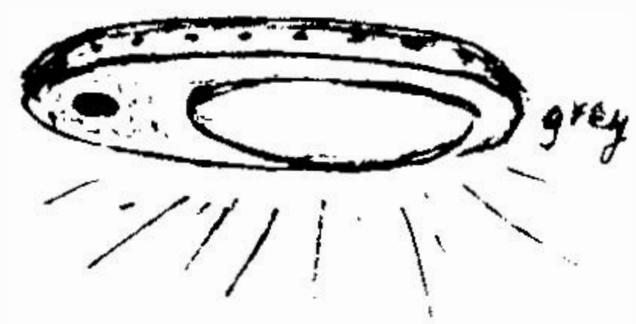


Fig. 2. Drawing of the unknown object flying low over the car of the witnesses.

7. Triangles

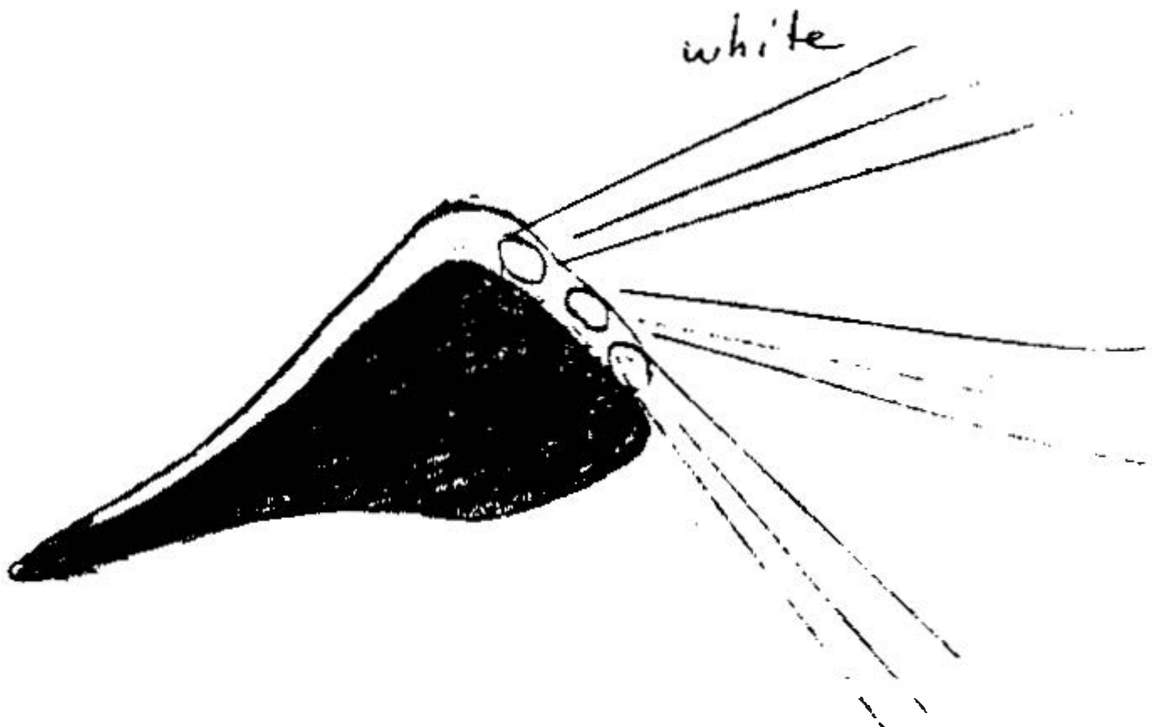
7.1
Location: Munich
Time: 8/31/1989, 10:00 p.m., seconds
Object: triangle
Distance: <100 yards
Altitude: < 50 yards
Size: 20-30 yards
Witnesses: 2
Peculiarities:
Reliability index: **99.9%**
Interviewers: MUFON-CES

7.2
Location: Bad Berleburg
Time: Winter, 1990, >6:00 p.m., 5 min
Object: triangle
Distance: > 1 mile
Altitude: < 100 yards
Size: 30-40 yards
Witnesses: 1
Peculiarities:
Reliability index: **95%**
Interviewers: MUFON-CES

7.3
Location: Kelkheim, Hessen
Time: 11/5/1990, 5:25-5:30 p.m.
Object: triangle
Distance: > 1 mile
Altitude: > 1 mile
Size: 1/4 degree
Witnesses: 2
Peculiarities: mass sightings 2 hours later
Reliability index: **99.75%**
Interviewers: MUFON-CES

7.4
Location: Taufkirchen-Ottobrunn
Time: August, 1991, 9:30 p.m., seconds
Object: triangle
Distance: <50 yards
Altitude: <50 yards
Size: 40 yards
Witnesses: 1
Peculiarities: humming sound
Reliability index: **99%**
Interviewers: MUFON-CES

7.5
Location: Bedburdyck
Time: 11/19/1982, 5:00-5:30 p.m.
Object: triangle
Distance: <50 yards
Altitude: <50 yards
Size: 10 yards
Witnesses: 2
Peculiarities: humming sound, 3 headlights
Reliability index: **99.9%**
Interviewers: GEP/MUFON-CES



7. Triangles

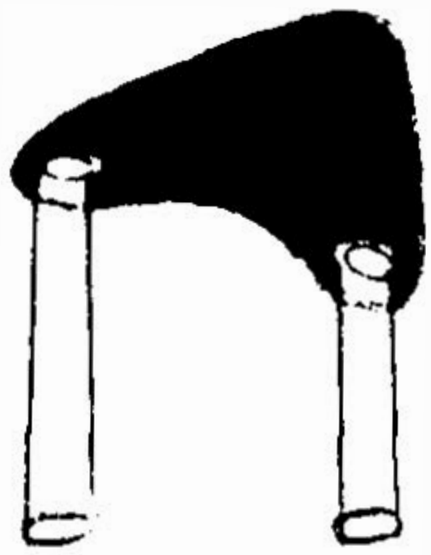
7.6
Location: Hamburg
Time: 2/2/1990, 1:15 a.m., 7 sec
Object: triangle
Distance: 0.5 miles
Altitude: 400-500 yards
Size: 60 yards
Witnesses: 1
Peculiarities:
Reliability index: **99.8%**
Interviewers: MUFON-CES

7.7
Location: Koblenz
Time: 2/21/1990, 8:30-8:50 p.m.
Object: triangle
Distance: <50 yards
Altitude: 25 yards
Size: 20 yards
Witnesses: 3
Peculiarities:
Reliability index: **99.88%**
Interviewers: GEP, JUFOF July/Aug. 1990

Case 7.7:

The object came so close to the witnesses that they could see metallic tube–like structures on the underside of the triangle. The craft hovered silently only 25 m above the ground. The German organizations of skeptics GEP and CENAP interpreted the object as being an ultra light motorized plane (this unlikely interpretation led us to reduce their investigative reliability index from $p_I = 1$ to $p_I = 0.75$).

7.8
Location: Landau; Pfalz
Time: 12/25/1992, 7:00 p.m., 1 min
Object: triangle/ boomerang
Distance: >100 yards
Altitude: >100 yards
Size: 100 yards
Witnesses: 1
Peculiarities: 2 light rays
Reliability index: **99.8%**
Interviewers: MUFON-CES



Case 2.3:

This object hovered at a distance of not more than 30 m from a control station recording temperature, air pressure, nuclear radiation, etc., near Cattenom, France, Europe's largest atomic power plant only 20 km away. We received the measurements recorded on the day of observation. Unfortunately, no significant signal could be detected among any of the recorded measurements (all values were integrated over a period of 10 minutes).

2.3
Location: Gerlfangen n. Saarlouis
Time: 12/6/1991, 6:10-6:18 p.m.
Object: Saturn-shaped
Distance: 100 yard
Altitude: 20 yards
Size: 20 yards
Witnesses: 2
Peculiarities: hovering near control station
Reliability index: 75 %
Interviews a: MUFON-CES

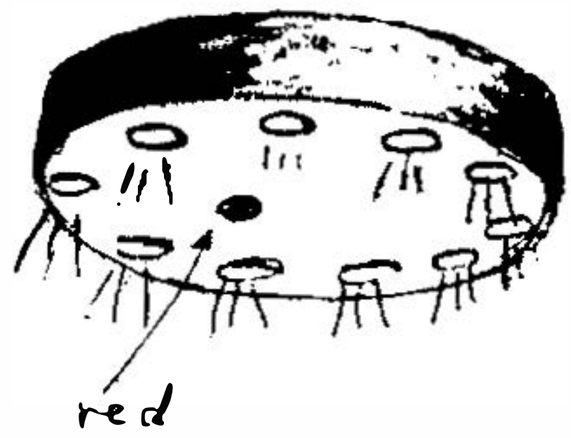
Fig. 3. The main witness, a police commissioner (left), in a photograph showing the control station and the position of the unknown object.

5. Cigar shape

5.1
Location: Gerlfangen near Saarlouis
Time: Oct-Nov., 1991, 10:00-10:10 p.m.
Object: cigar
Distance: 2 miles
Altitude: 200-300 yards
Size: 1.5 degrees
Witnesses: 2
Peculiarities:
Reliability index: 75%
Interviewers: MUFON-CES

6. Discs

6.25
Location: Waldenberg, Sachsen
Time: 6/22/1992, 10:15-10:16 p.m.
Object: plate
Distance: < 1 mile
Altitude: < 1 mile
Size: 1/4 degree
Witnesses: 4
Peculiarities: like Blue Book Case: 3/20/1950
Reliability index: 99.86%
Interviewers: MUFON-CES

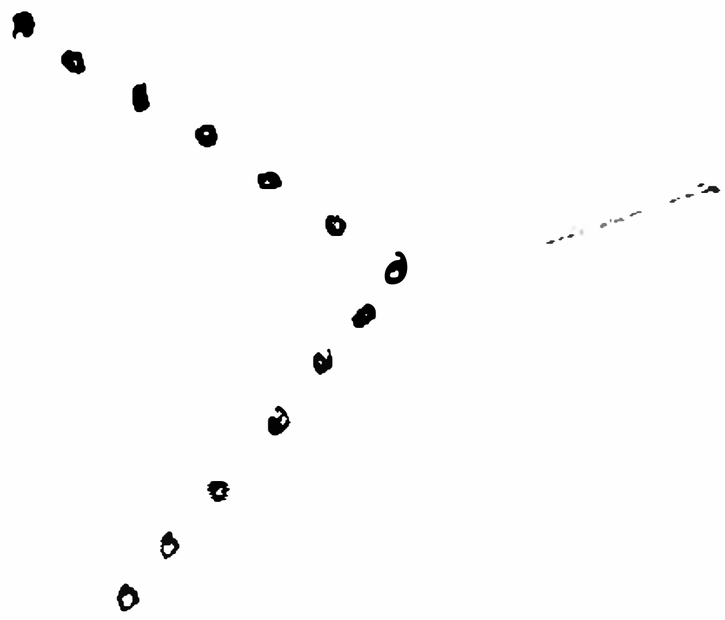


9. Unusual Shapes

9.4
Location: Zollchow near Prenzlau
Time: 1992, morning time
Object: flounder
Distance: >50 yards
Altitude: <50 yards
Size: 5-7 yards
Witnesses: 1
Peculiarities: like Blue Book case: Rogue River, Oregon, 5/24/1949, 9-10 yards
Reliability index: <50%
Interviewers: information to MUFON-CES

10. Formations

10.1
Location: Freiburg
Time: 7/1/1991, 0:42 a.m., 10-15 sec
Object: V-formation
Distance: > 10 miles
Altitude: > 10 miles
Size: 1 degree
Witnesses: 1
Peculiarities: like Lubbock lights
Reliability index: 90%
Interviewers: MUFON-CES



Case 3.7:

This sighting was the result of a field investigation campaign by members of MUFON-CES. We chose a place in Gerlfangen near Saarlouis close to the French-German border for observing the night sky, since UFOs of many different shapes had been reported in the area. A strange object did appear after 84 hours of observation, but it was impossible to locate the rapidly moving image in the viewfinder of the video camera. The event was witnessed by two MUFON-CES members.

3.7
Location: Gerlfangen near Saarlula
Time: 8/8/1992, 2:52-2:53 a.m.
Object: hemispere
Distance: 4 miles
Altitude: 4 miles
Size: 1/4 degrees
Witnesses: 2 MUFUN-CES members
Peculiarities: seen after 84 h nightwatch
Reliability Index: 99%
Interviewers: MUFON-CES

Fig. 4 MUFON-CES members during field investigation.

Analysis of German UFO Photos and Video Films

by

Manfred Kage and Rolf-Dieter Klein

1. Some Identified German Photos

Of the many UFO photos published in Germany, only few can lay claim to being genuine. As an example, none of the photos published by DUIST were ever submitted to an analysis by experts or to an examination by MUFON-CES.

Following are some samples of newspaper photos, allegedly showing UFOs, whose real nature could be clarified:

1. In 1980 a group of teenagers in a suburb of Nuremberg observed several yellow-white lights appear suddenly in a north-easterly direction in the sky near the horizon. They remained visible for 2-3 minutes and then disappeared, only to reappear again in another location.

   We found out that the lights originated at a distance of more than 40 km. They were due to luminous ammunition fired from Grafenwoehr, Europe's largest military training center. The ammunition was suspended from parachutes and slowly drifted to the ground. No motion was visible at a distance of 40 km (Fig. 1).

2. In 1982 a photographer made single shot pictures of the winter landscape with his Bolex 680 super-8 movie camera. The camera was mounted on a tripod. Since the eyepiece was not closed, the street lights behind the camera were projected onto the film and superimposed on the regular pictures (Fig. 2).

3. The landscape of the Black Forest was filmed out of the window of a moving car in 1983. Several frames of the developed film showed a reddish object and a metallic device that seemed to float in the air. This did not turn out to be a UFO but a post at the end of the street, carrying a traffic sign and a bell for warning cars of approaching trains. Due to the car's speed the post did not register on the film (Fig. 3) (see also I. Wieder, *The Willamette Pass Oregon UFO Photo Revisited: An Explanation*, Journal of Scientific Exploration, Vol. 7, 1993, 173-198).

4. Very bright lights are sometimes reflected by the rear lens surfaces, producing images on the film (catadioptric effect). This is the way a signal light on a police car was superimposed on the image of the Michaelis Church in Hamburg, producing the image of a red, transparent "domed disc" (Fig. 4).

5. During sunset a photographer took pictures of the landscape. The film was not transported between shots, resulting in a quadruple exposure of the sun. On the developed film this gave the impression of four "luminous landed spherical UFOs" (Fig. 5).

The five cases above are examples of "UFOs in the broader sense", printed in German UFO–jounals and purporting to show true UFOs. Following is a summary of 3 cases in which photos and video films have been analyzed with care and stand a reasonable chance of being genuine.

2. The "Wedel" Photo

On March 7, 1977, Walter Schilling of Hamburg photographed a flying disc at about 2 p.m. in the vicinity of Wedel, near Hamburg. His camera was a 28 × 28 mm Kodak Instamatic 133–X with a 43 mm objective, loaded with Kodacolor X–126, 20 DIN film. The aperture was f:11 and exposure time was 1/80 sec.

He was about to take a picture of the landscape when a violet–colored rotating flat disc at an altitude of 30–40 meters hissed past him with a speed of about 100 km/h, emitting a loud whining sound. Schilling succeeded in getting the object on film. By following it with his camera, the background turned out blurred, but the object itself was in focus. It cast a shadow on the pasture. Inspection of the site four months later showed that no dark spot or object was responsible for the dark area on the film (Figs. 6 and 7).

At 2 p.m. the sun was at an altitude of 26.8 degrees above the horizon. Its azimuth was 206.7 degrees. The camera's line of sight pointed west at an azimuth of 270 degrees.

The photograph was thoroughly analyzed in 1977 by Adolf Schneider (A. Schneider in *Strahlenwirkungen in der Umgebung von UFOs*, MUFON–CES, 1978, p. 84–105). The shadow in the photograph agrees with the position predicted on the basis of the time of observation (Fig. 8).

The upper edge of the shadow is located at a distance of 150 ± 50 m, the front edge is 80 ± 20 m away. The spread of the shadow is due to the UFO's movement and the swinging motion of the camera. From the blurred appearance of the grass, Schneider concludes that the camera was swung through a horizontal angle of 72 degrees. The height of the object above ground was estimated at 29 ± 13 m, and its size at 9.5 ± 3 m. The witness had estimated the object to be 15 m in diameter. Whatever the object was, it was so large that its construction would have exceeded the financial means of a hoaxer.

W.H. Spaulding of Ground Saucer Watch has also evaluated the Wedel photo. He had at his disposal only a small section of the picture, showing the object in full but only a very small portion of the background. Since the UFO was sharp and the background blurred, he concluded that the photo was a hoax. This combination is indeed typical of a small, nearby object, on which the camera is focussed while everything else is out of focus. The complete photo, however, shows very clearly that the blurring of both foreground and background is due to camera movement and not to poor focussing.

3. The "Lucifora" Photos

Guiseppe Lucifora lives in Solingen, Germany. On June 19, 1987, he was on a visit to Comiso, Sicily (Fig. 9). He owns a Polaroid camera with which he took pictures of his house under construction. In the distance he noted a slowly moving object in the sky that was neither a balloon nor an airplane. Lucifora looked through the viewfinder of his camera and took a picture of the object. As the craft approached, he followed it in the eyepiece and took five more pictures during the next 2–3 minutes without taking his eye off the camera (Figs. 10 and 11). Finally, without making a sound, the object disappeared behind the roof of his house.

Lucifora sent the film to the Polaroid Company in Offenbach, which did not detect any irregularities in the 600 ASA/29° DIN film material. Subsequently, he sent the 6 pictures to the organization of UFO skeptics CENAP, who judged the authenticity of the pictures "by feel". Klaus Webner of CENAP estimated the object's size to have been several centimeters and threatened the witness with "public prosecution" because of the hoaxed photos and the "commercial interests of exploitation". Webner urged Lucifora to write an apology!

In spring of 1993 we received the photos for analysis. The first author, who heads an institute for scientific photography, found a ratio of

blurred edge to image size indicating a large object at a great distance. The picture of a small (less than 1 m) nearby object would have had a sharp edge.

An additional photo analysis of the pictures was performed by the second author (Figs. 12 and 13). This showed that the color shift in the processed photos is also visible in the original polaroid pictures and is consistent with the environment. The inside of the object is darker than the sky, so that a double exposure is excluded. Furthermore, the lighting is consistent with the sun's position. The distribution of shadows on the object's surface indicates a large size and not a small one. Contrast enhancement and highpass filter analysis reveal scratches but no trace of a supporting string or wire. Regrettably, it was too hazy for shadows of the object to be seen either in reality or on the photos.

A 3-dimensional computer-aided reconstruction of the object is presented in Fig. 14. To our knowledge, there exist no other reports on objects of this shape. Work on producing an animated film of the reconstructed object's movement is in progress.

4. The "Greifswald-UFOs" Filmed by Three Independent Witnesses

Five weeks before the German unification, several hundred German and Russian experts at the Greifswald atomic power plant near Rostock (Fig. 15), saw two groups of bright objects in the sky at 8:40 p.m.

Ludmilla Ivanova (Fig. 16), a medical doctor, and her husband, the project engineer Nicolai Ivanov, filmed the objects from their third floor balcony with an Orion video camera (LP 11.7 mm/sec, Fuji Super HG EF-30, VHS-PAL).

The interpreter Valery Vinogradov (Fig. 17) took a photo from the second floor at the moment a fourth (Fig. 18) and fifth object joined a formation of three lights already present (Camera: Zenit-E; objective: Industar 50 mm; film: SweMA-G5Gost, 18^0 DIN).

Group (A), Figs. 19 and 20, formed a ring of 5 luminous spheres. Another group (B) of 4 lights was higher up and much farther away. In the beginning it was not clearly visible. Goup (A), which was clearly visible, disappeared after a few minutes in a northerly direction with extreme rapidity. At the same time, group (B) became sharp and clear. Ludmilla Ivanova filmed for about 4 minutes (Fig. 21). Group (B) was visible for a total of about 10 minutes, after which it flew out to sea in a north-easterly direction. The objects seemed to rotate about their

axes.

At first, there were only 4 objects in group (B), forming a cross. Then 2 more came shooting towards it. A iittle while later a 7th object made its appearance between two of the upper lights. During the time of observation a flash appeared about 100 m to one side of the formation, most likely resulting from a shot fired by the Russian military (Figs. 22 and 23).

Now Valery Vinogradov also took out his new video camera (a Sony 225; zoom 8.5–68 mm; 4 lux; 1/50 sec; VHS–PAL) and filmed this second group of objects (Fig. 24). We received his video film in August, 1992, when he came from Nizhniy Novgorod to visit us. A third movie was taken by the married couple Mr. and Mrs. Kaiser of Putbus on the Isle of Rügen, about 30 km to the north of Greifswald (witness Nr. 3) (Fig 25).

This is the first time, as far as we know, that the same group of UFOs was filmed by three independent witnesses from three different locations (Fig. 26). Still photographs of the UFOs were also taken. Triangulation revealed that the objects hovered 5–8 km north of Peenemünde, the former production facility of V–2 rockets and now a Russian military base.

Group (A) was at a height of 5 ± 0.5 km and 24 km away from Greifswald. Group (B) first hovered at a height of 7 ± 0.8 km and then came down to 5.6 ± 0.6 km. Its distance from all who filmed was 25 km.

In addition to the observers mentioned, a group of 40 schoolboys and teachers saw the UFOs from a distance of about 30 km. The boys were spending their vacation in Murkau on the Isle of Rügen. Objects in group (B) were not stationary but performed movements of their own. One of the boys confirmed that some objects had moved back and forth between groups (A) and (B) (Fig. 27).

Assuming no blurring of the images on both the photos and the video films, one can estimate the diameter of the objects to have been 18 ± 1.3 m.

We have contacted the meteorological institutions and police stations in Rostock and Greifswald. None of them knew who was responsible for the display of lights. Detlef Menningmann (Hamburg) contacted the Greifswald People's Police and also army headquarters. They informed him that no military maneuvers had been scheduled in the area on the

date in question. Neither German nor Russian military personnel admitted to having fired at the unknown objects, although this is clearly seen in Ludmilla Ivanova's video film. A former high-ranking army officer informed us that the objects were tracked on radar.

We received 4 photographs from Mr. Rainer L., taken on August 24, 1990, at Trassenheide (Isle of Usedom) showing the objects. The photos prove that both groups were located below the cloud cover. Figure 28 shows the two groups photographed free-hand at about 9 p.m. The photo in Fig. 29 was taken at about 9.30 p.m. The lights of group (B) are reflected in the water.

We are presently at work combining the 3 films into a single one, bridging the gaps resulting from pauses and from taking pictures at different times. Interestingly enough, the combined film shows that objects approaching groups (A) or (B) or receding from them disturb the formation of these groups. A possible cause of this effect might be a field of force surrounding each object and interacting with the other luminous spheres.

A comparison of the Greifswald photos with those of the well-known Utah film leads to the conclusion that in both instances the same kind of objects may have been filmed (Fig. 28):

At 11:10 a.m. on July 2, 1952, Delbert C. Newhouse, chief petty officer of the US Navy and an experienced aerial photographer was driving down a highway 11 km north of Trementon, Utah, when suddenly his wife called his attention to something strange in the sky. Newhouse stopped the car, stepped outside and watched 12 to 14 (!) objects "milling around" at an estimated distance of 3000 m, forming a loosely clustered group (Jerome Clark, *UFO Encyclopedia, Vol. 2*, Omnigraphics Corp., Detroit, 1992). He took 75 seconds of 16 mm film. At one point a single object left the formation and headed east. Newhouse held the camera fixed so that the UFO crossed the field of view. He repeated the procedure three or four times. After the last departure the object disappeared in the east while the rest was lost from sight over the western horizon.

An analysis by Ground Saucer Watch (GSW) revealed that the objects were about 8–11 km away and had a diameter of about 15 m. They were thus half as far away as the Greifswald objects and Newhouse could clearly make out their shape, although the film only shows bright spots. They looked like "two pie pans, one inverted on top of the other". It is possible that the Greifswald objects had the same shape.

Fig. 1:

"UFO" over Grafenwoehr: Luminous ammunition visible from a distance of 40 km (in this photo the distance is about 5 km).

Fig. 2:

"UFO lights", filmed with a super-8 camera: The bright blobs are street lights behind the camera projected onto the film through the open eyepiece.

Fig. 3. "UFO" filmed from a moving car: The object turned out to be a traffic signal (cf. Willamette Pass UFO photo).

Fig. 4. "Domed disc", photographed in Hamburg: The object next to the church tower is a lens reflection of the light on top of the police car.

Fig. 5. "Landed UFOs": Multiple exposures of the sun during sunset.

Fig. 6. Photo by Walter Schilling at Wedel near Hamburg, March 7, 1977, at about 2 p.m.

Fig. 7. Picture taken on July 17, 1978, from the same place from which the Wedel photo was taken 16 months earlier.

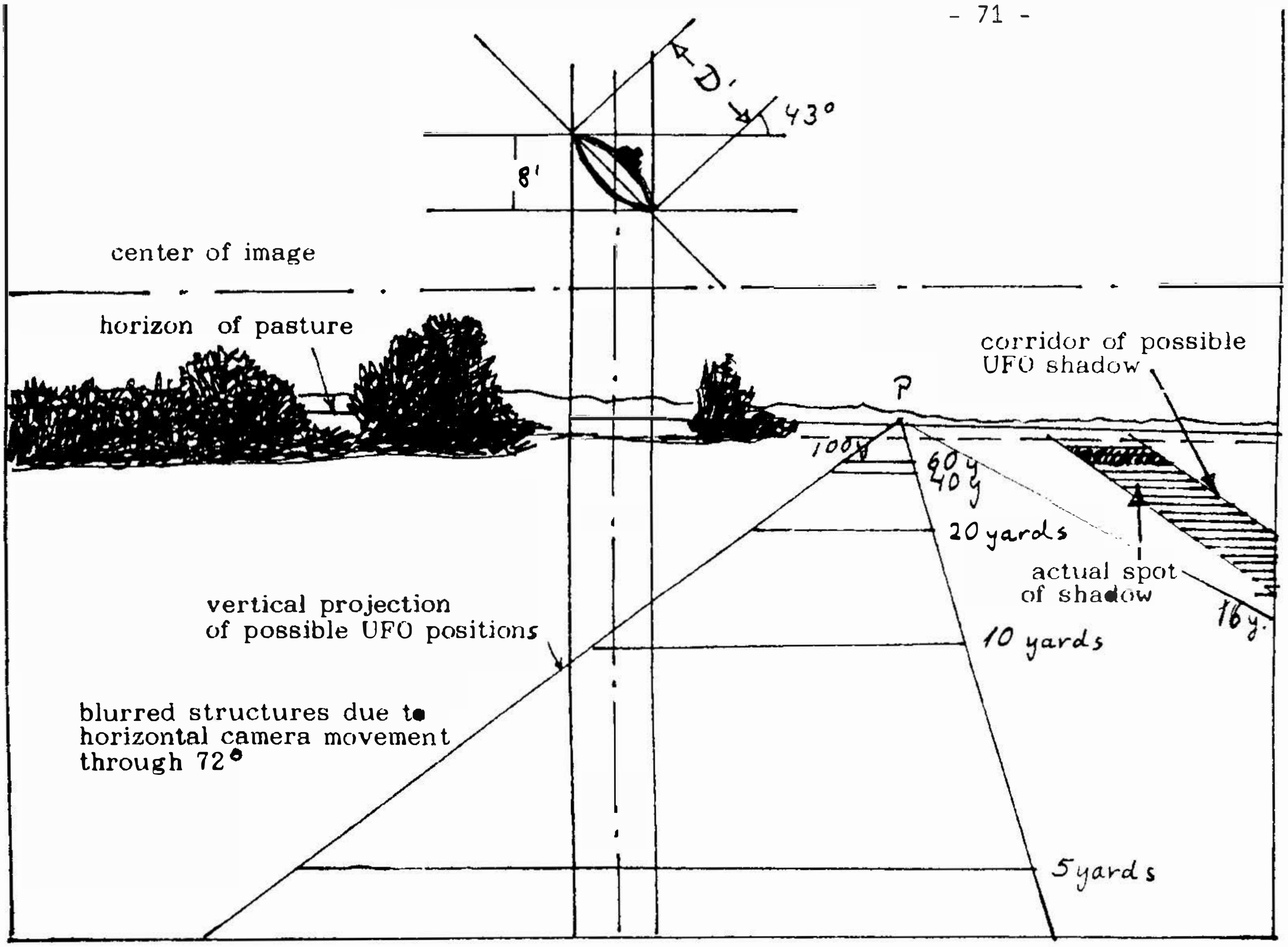


Fig. 8a. Corridor of possible shadow zones.

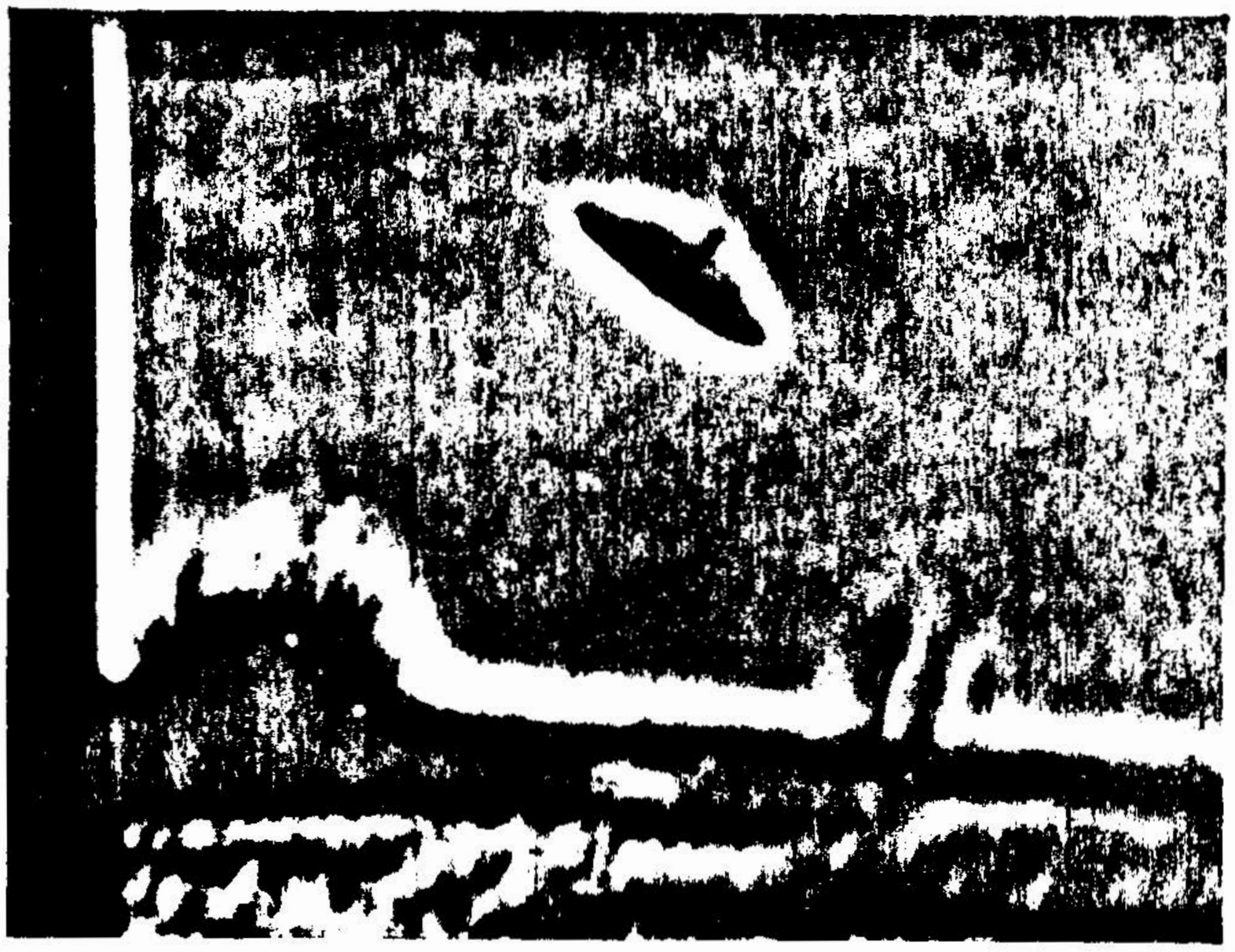


Fig. 8b. Small section of the Wedel photo given by von Kevicky to William H. Spaulding of Ground Saucer Watch for analysis.

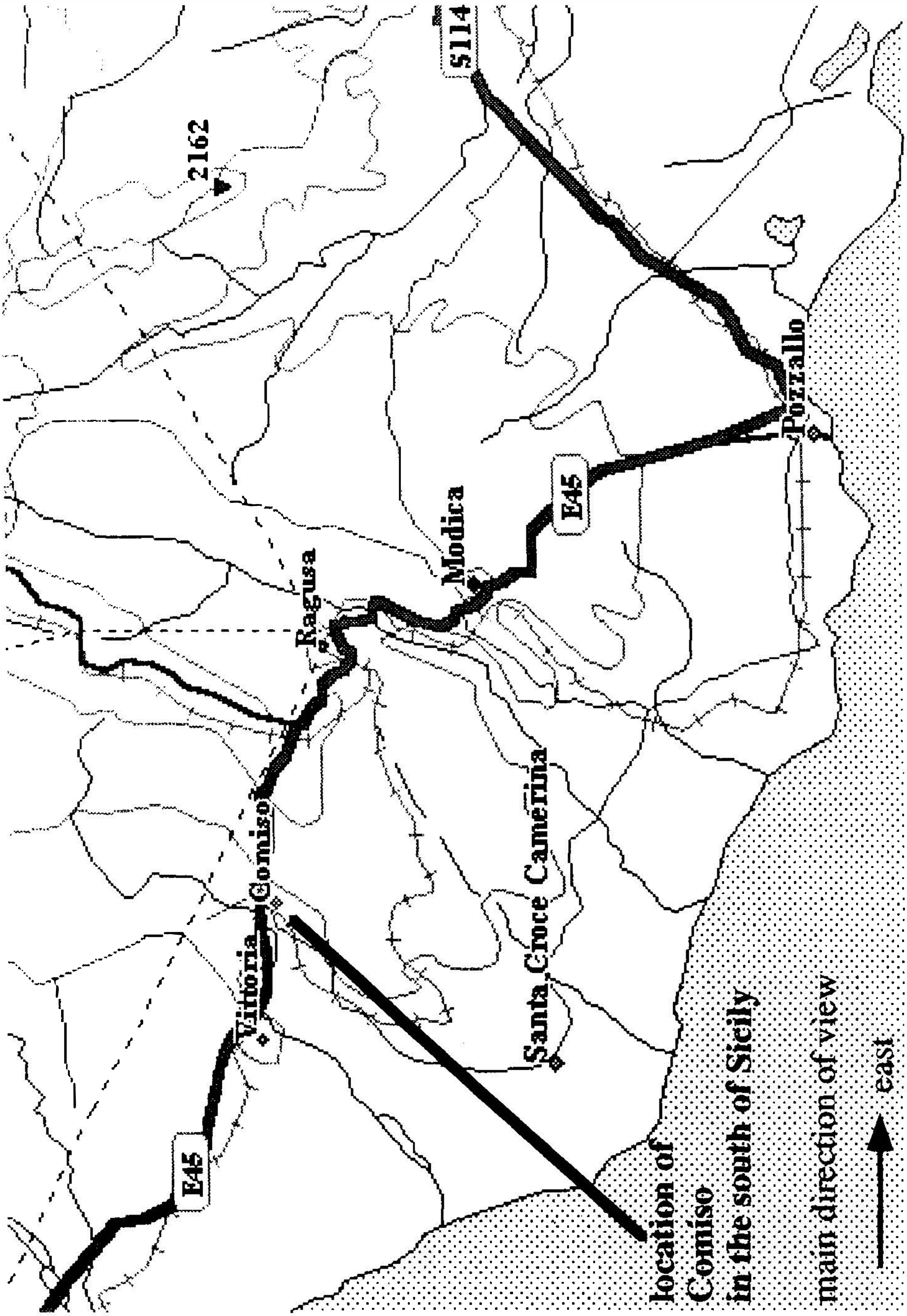
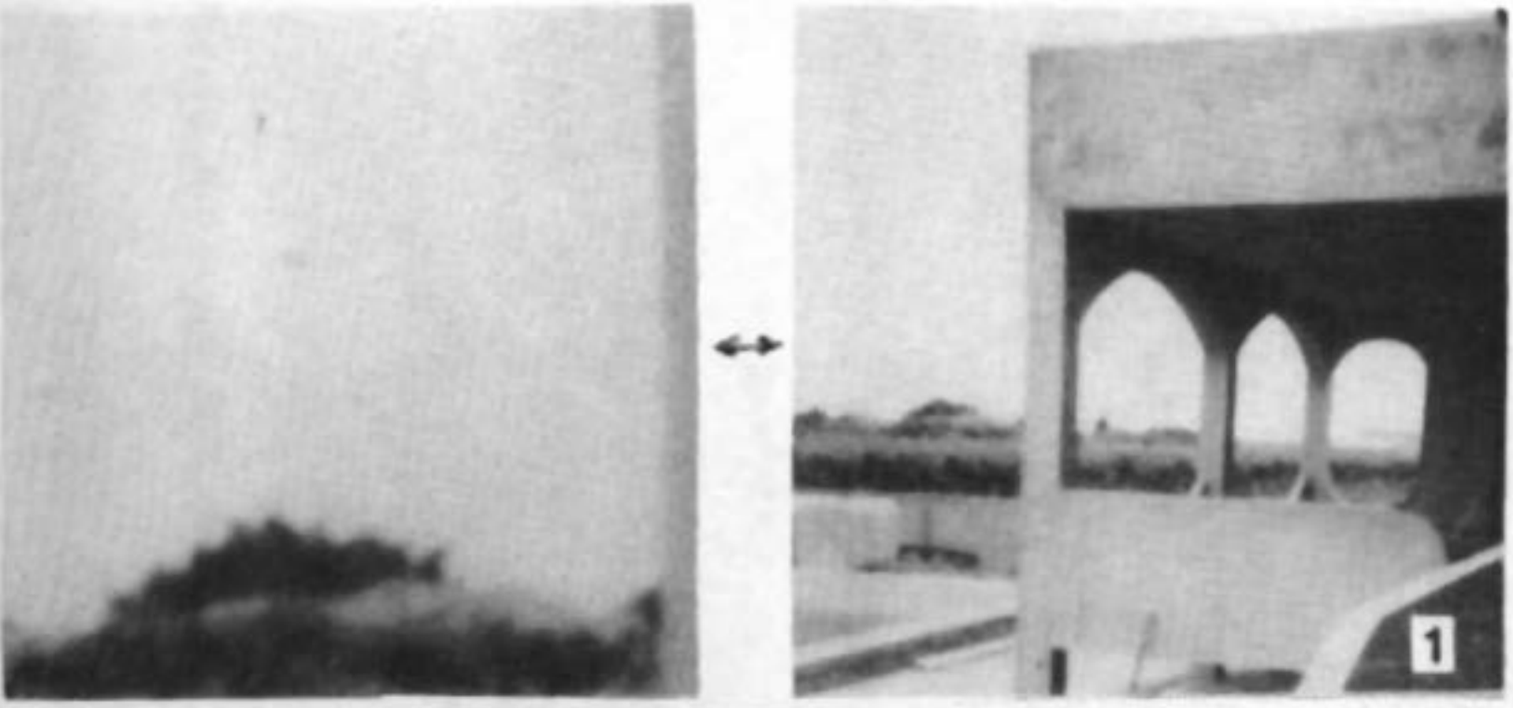
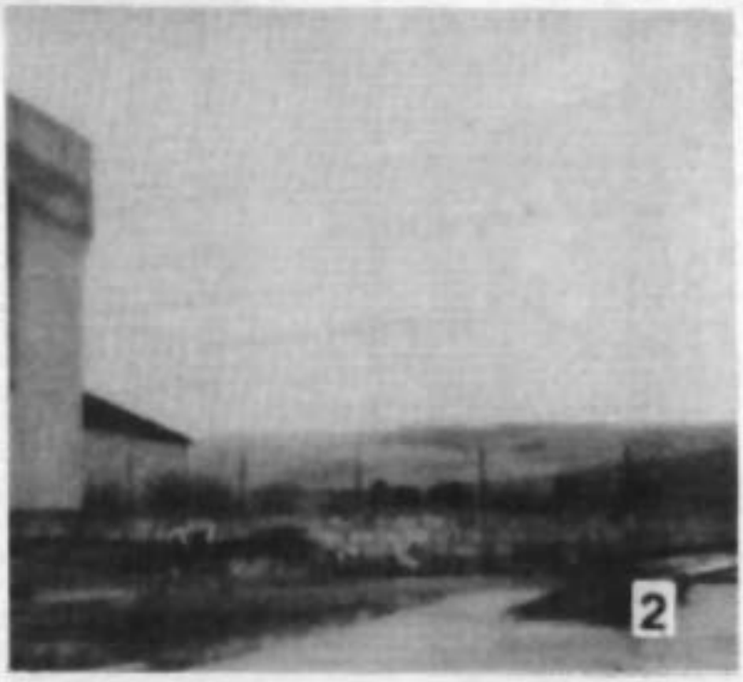


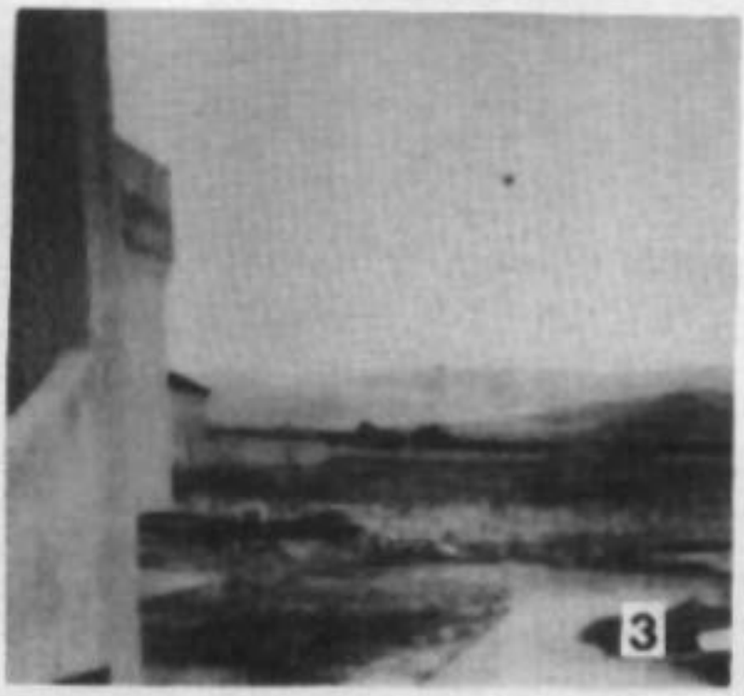
Fig. 9. Map showing Comiso and its sourroundings



Enlargement



Enlargement



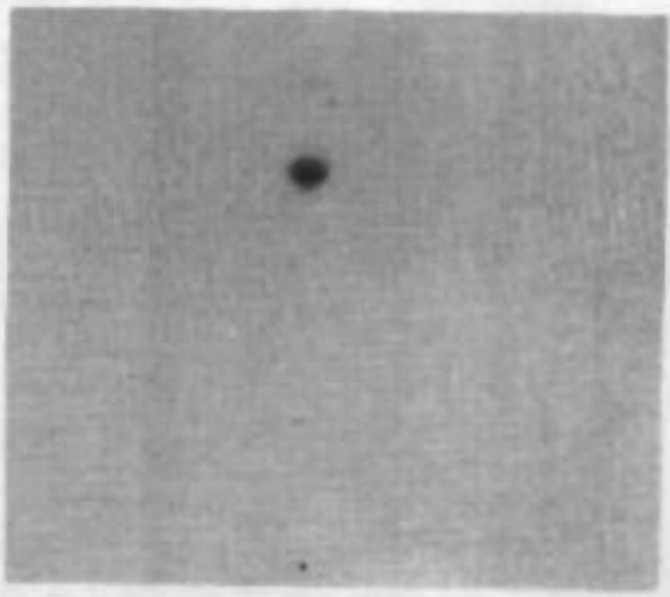
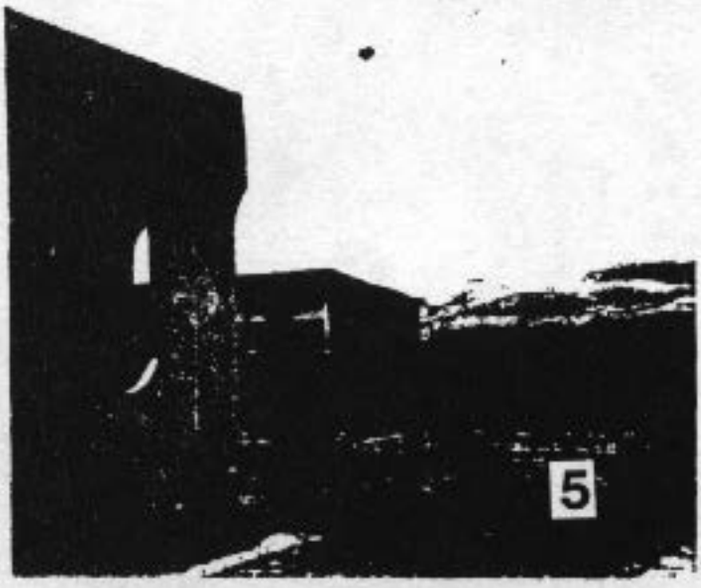
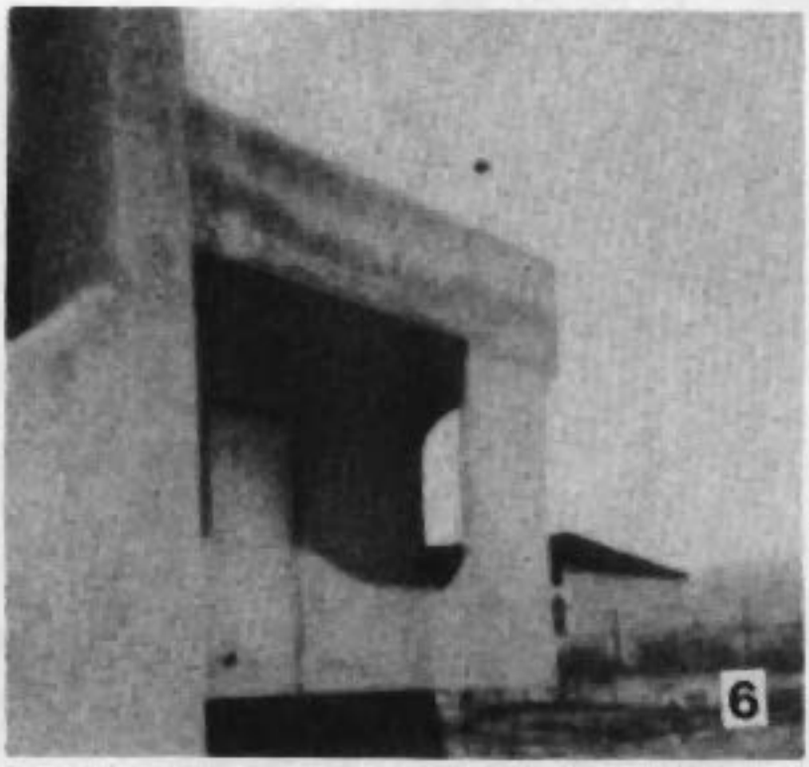
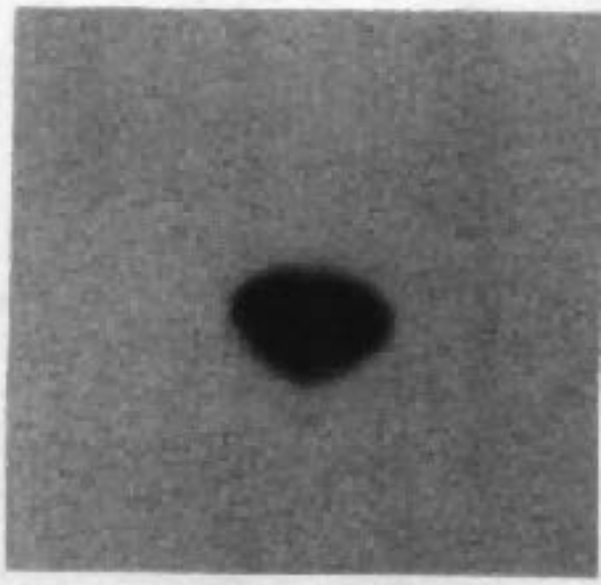


Fig. 10. Three of the 6 pictures of an unidentified flying object Guiseppe Lucifora took in Comiso, Sicily, at 2:30 p.m. on June 19, 1987. He followed the object by looking through the eyepiece of his Polaroid camera.

Enlargement



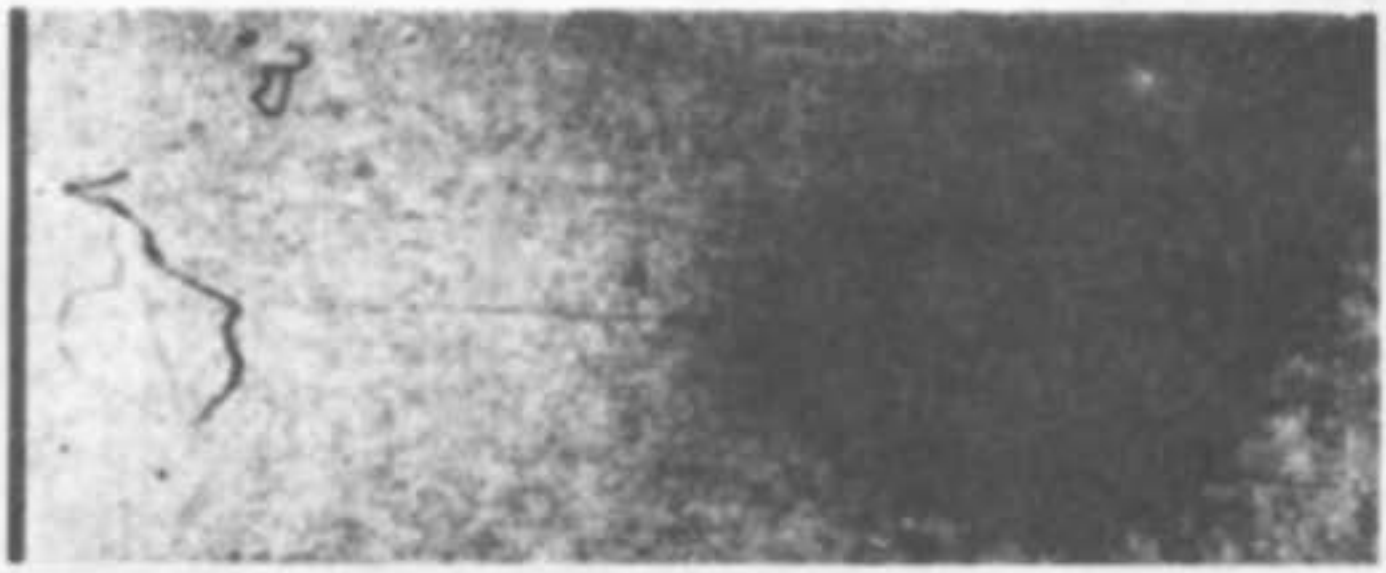




Enlargement

Fig. 11. The last 3 Comiso photos. Only a printed copy exists of photo No. 5; the original has been lost.

1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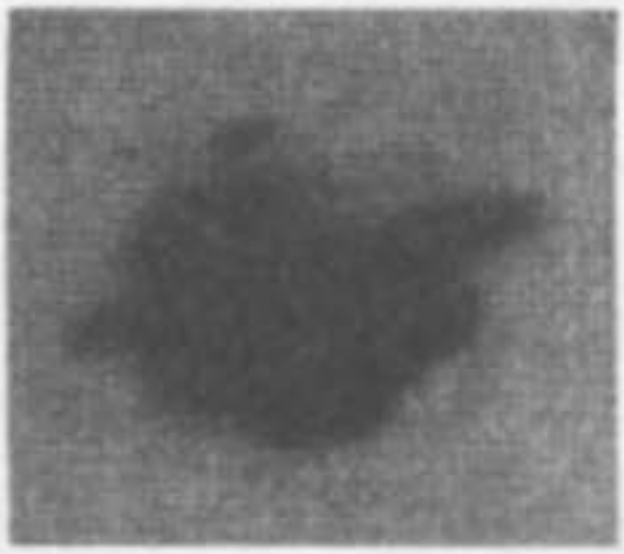
2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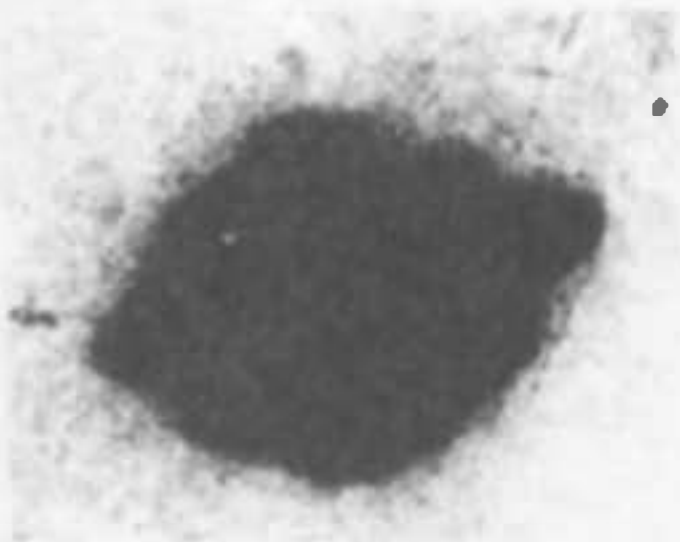
6

Analysis by
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930618

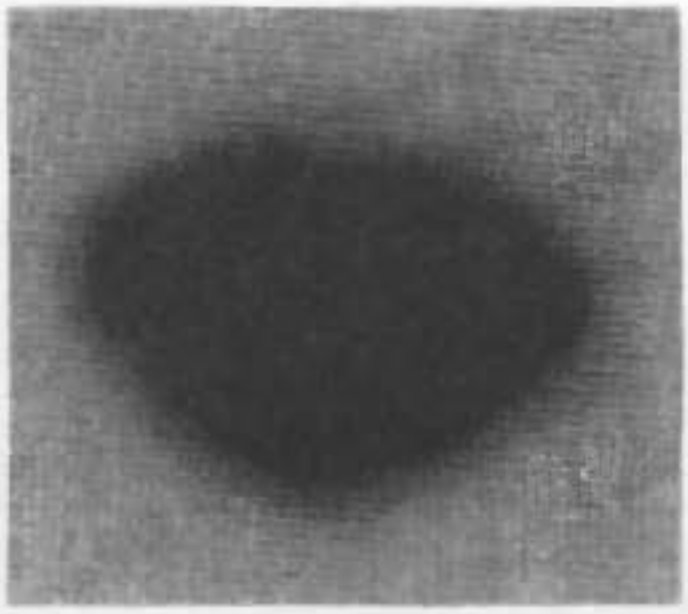
8

9

Fig. 12. Analysis of the Comiso photos (with use of Quadra 950, with Adobe Photoshop®, version 2.5 + photo CD plugin).

1. Polaroid photo No. 4 Fig. 11, transferred to a photo CD from a 35 mm slide.
2. Enlarged portion of (1).
3. Enlarged portion of (2). The color shift in the picture is also seen in the original polaroid pictures and is consistent with the environment.
4. Contrast enhanced version of (3).
5. False color representation of (3) and contrast enhancement.
7. Scratches and the sourrounding area.
8. Relief processed pictures.
9. Picture run through a highpass filter and contrast enhanced.
6. Scratches on the photographic surface. All polaroid photos are slightly scratched.

1



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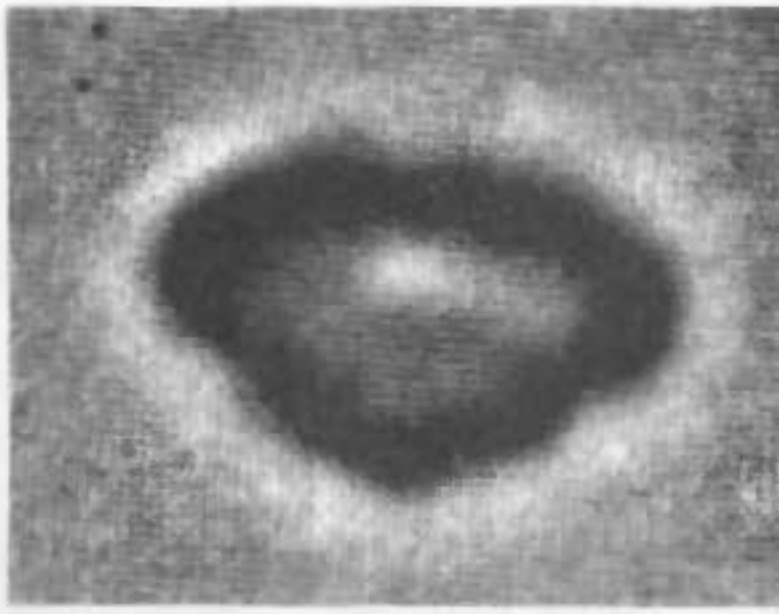

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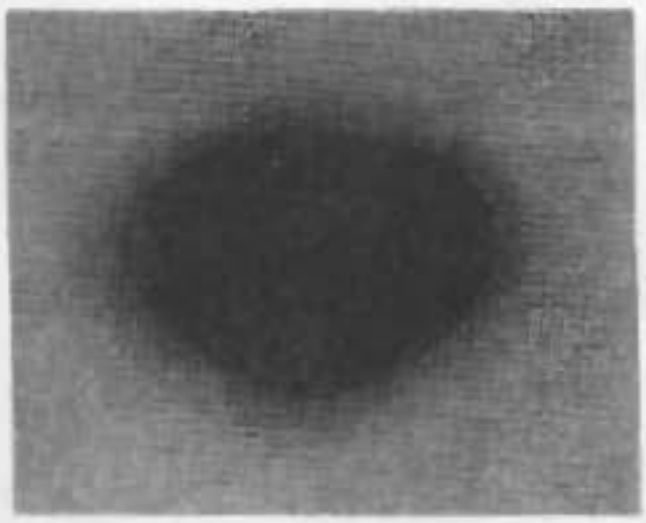
2



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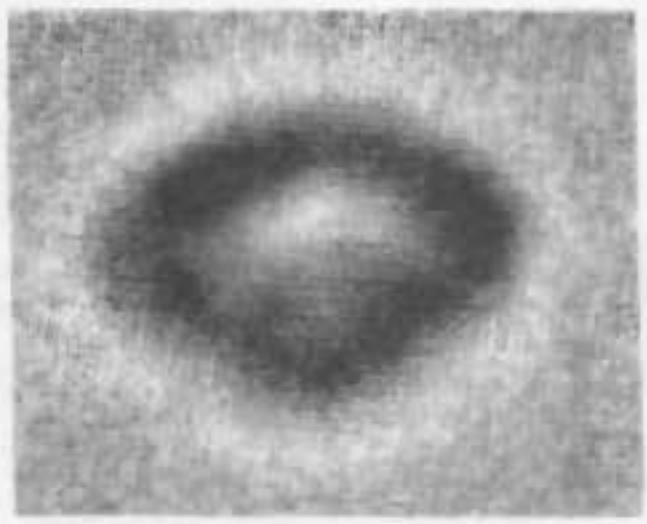

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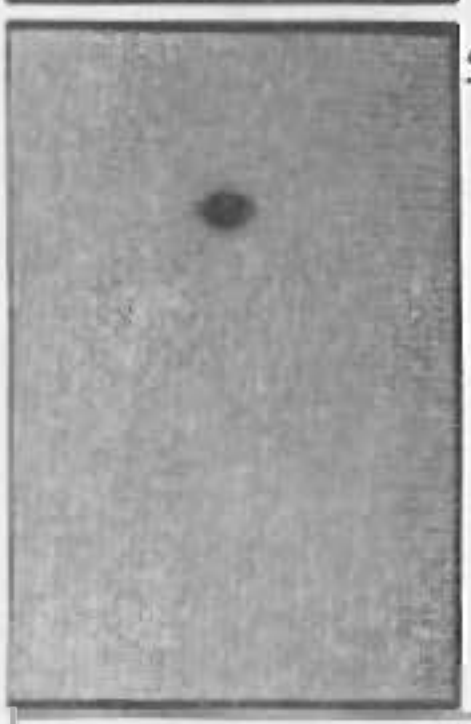
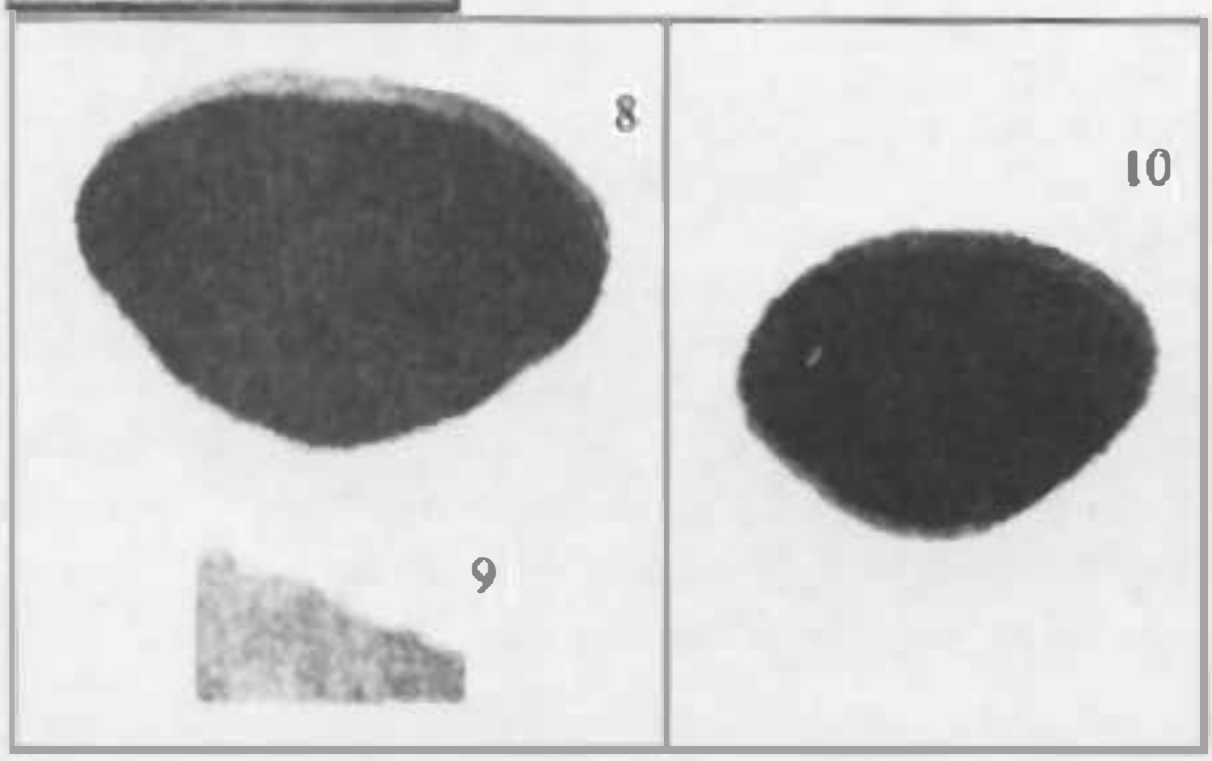


5

Fig. 13. Analysis of the Comiso photos (same equipment as in Fig. 12).

1. Polaroid No. 6. Fig. 11, showing the object over building after transfer to a photo CD from a 35 mm slide produced from the original photo.
2. Enlargement of (1).
3. Enlargement of (2).
4. Picture run through a highpass filter and contrast enhanced.
5. Polaroid showing the object in a different position.
6. Enlargement of (5).
7. picture run through a highpass filter and contrast enhanced.



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10

8. Color shift of polaroid No. 6 shown by changing gradation.
9. Color shift also visible on the top of the building. The same enlargement shows the same amount of color shift.
10. Color shift of the object in (5) is the same as that of polaroid No. 6.

1

Fig. 14. 3-dimensional reconstruction of the Comiso flying objects (with use of Infini-D™ 2.0 on Quadra 950).

1. Originial enlarged picture
2. Wire frame showing the object in different positions.
3. Ray-traced, flat shaded pictures of the object.

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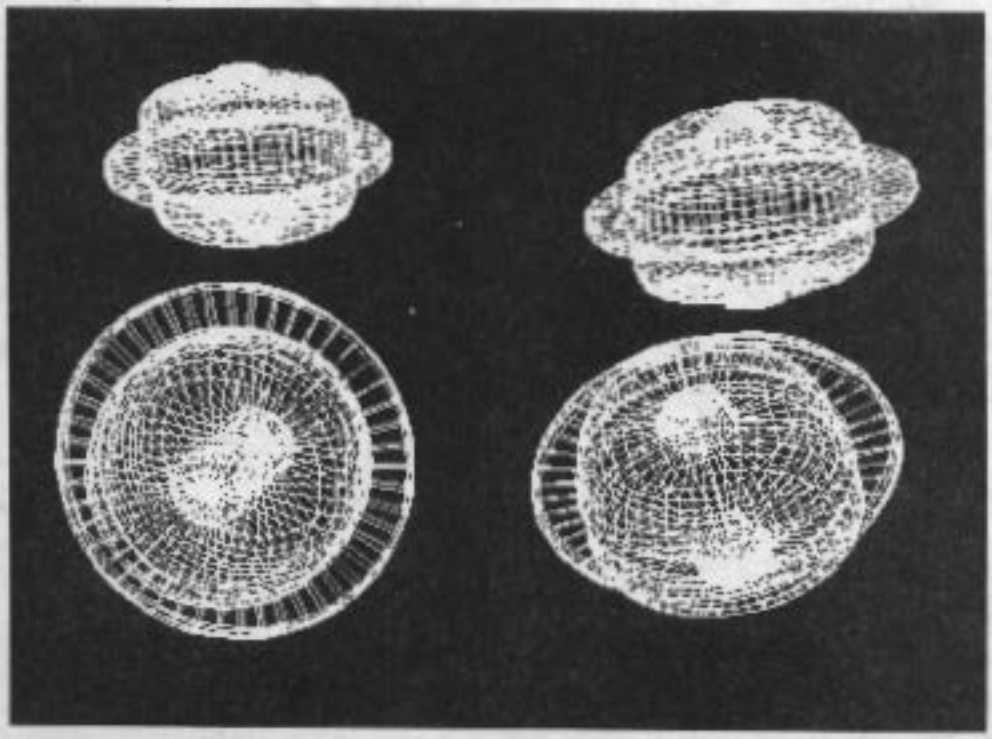

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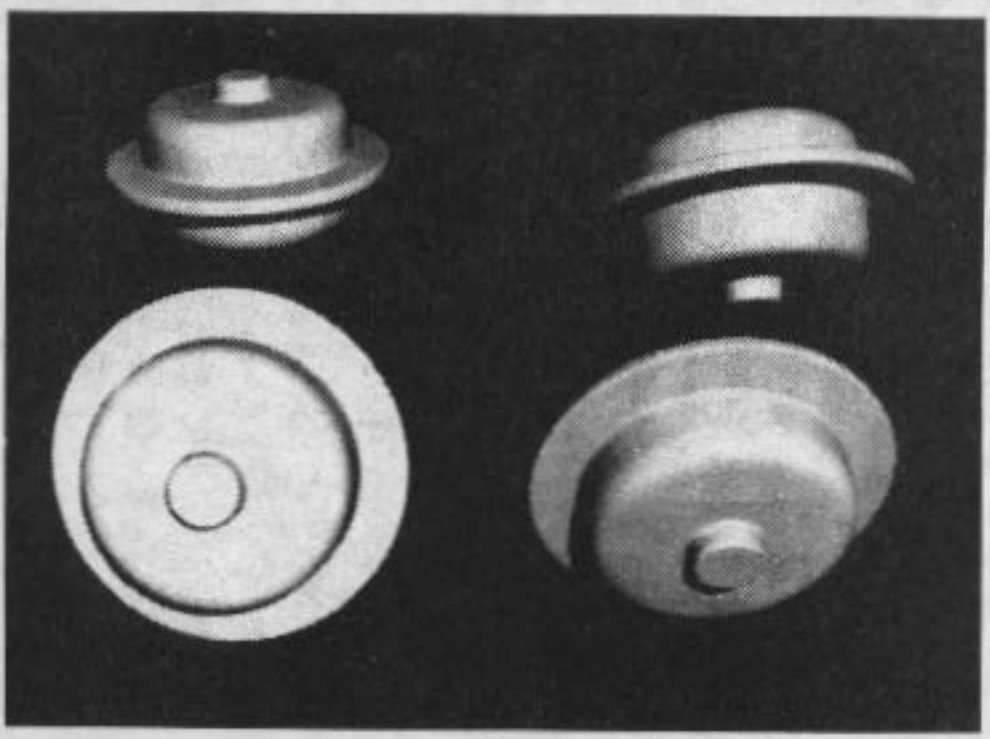

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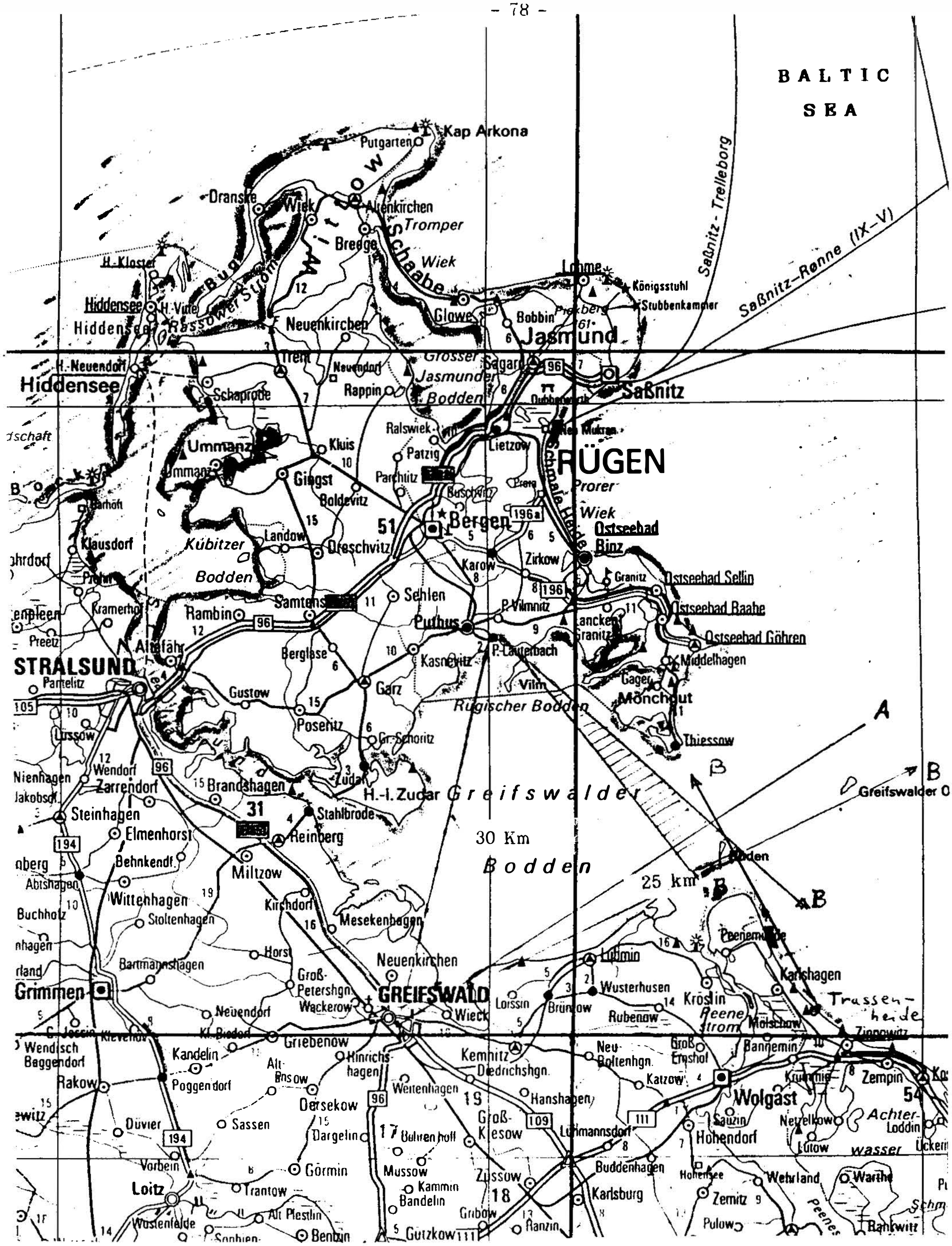

Fig. 15. Map of Greifswald and surroundings.

Fig. 16. Some of the witnesses who saw two groups of lights in Greifswald on August 24, 1990, at 8:45 p.m. [1] Dr. Ivanova (now living in Moscow), who took 4 minutes of video film of the objects. [2] Mr. Mennigmann who investigated the case.

Fig. 17. Valery Vinogradov (now living in Nizhniy Novgorod), right, during a visit to Germany. He took a photo of UFO goup (A) and filmed group (B).

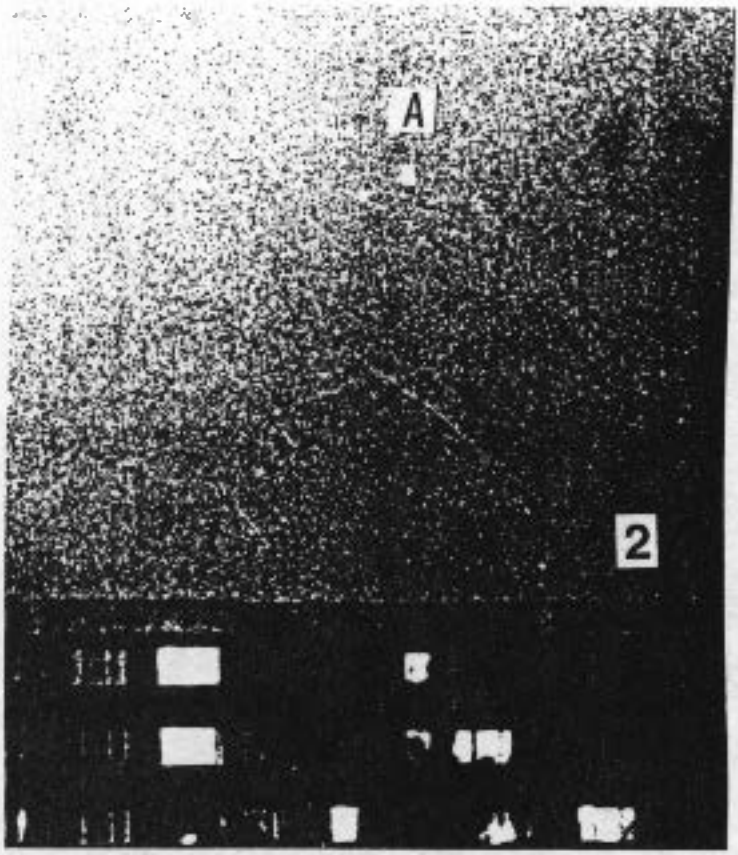

Fig. 18. Photograph of 4 luminous spheres in group (A), taken by Valery Vinogradov.

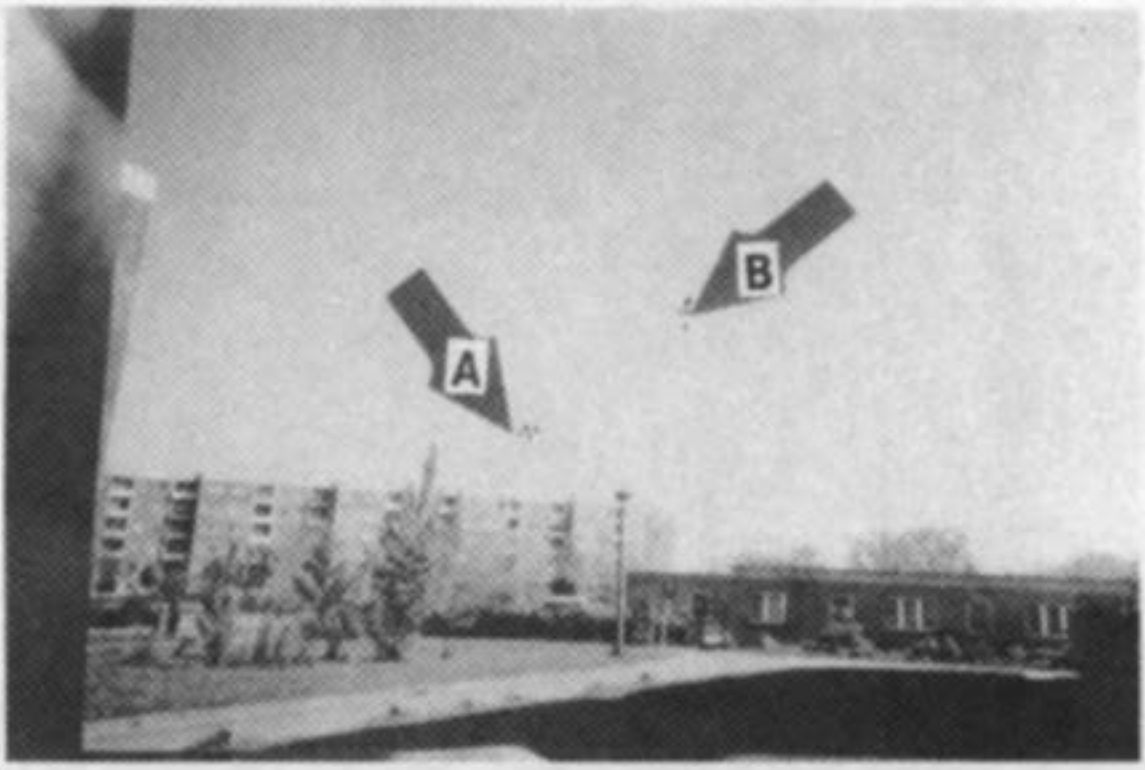

Fig. 19. Position of UFO groups (A) and (B).

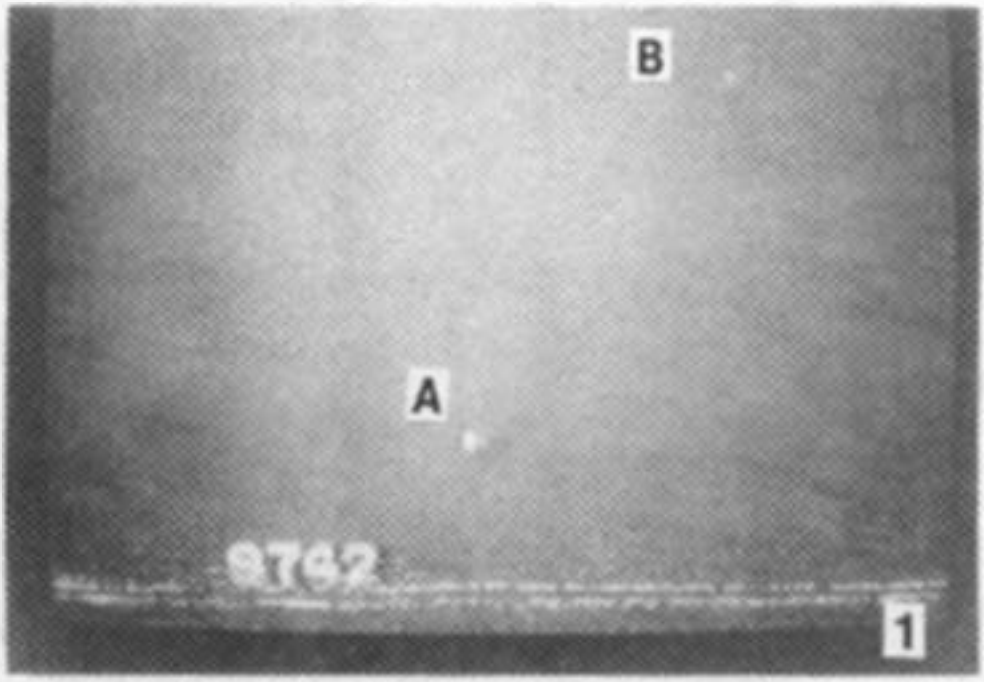

Fig. 20. Position of UFO groups (A) and (B), reproduced from a TV-screen.

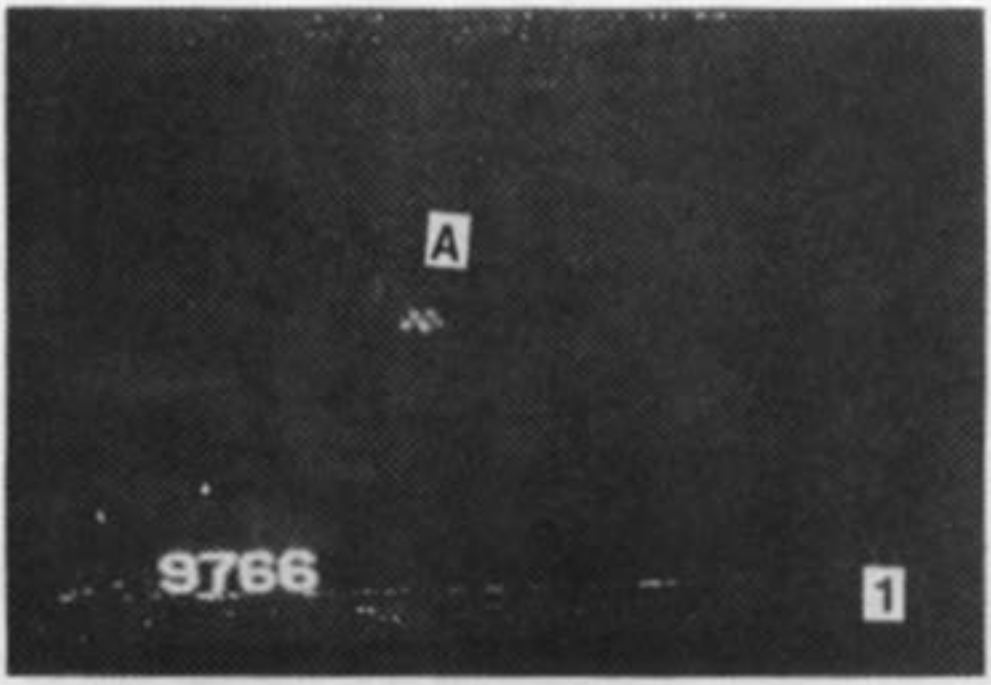

Fig. 21. Photo of 5 luminous objects in group (A), video filmed by Dr. Ivanova and reproduced from a TV-screen.

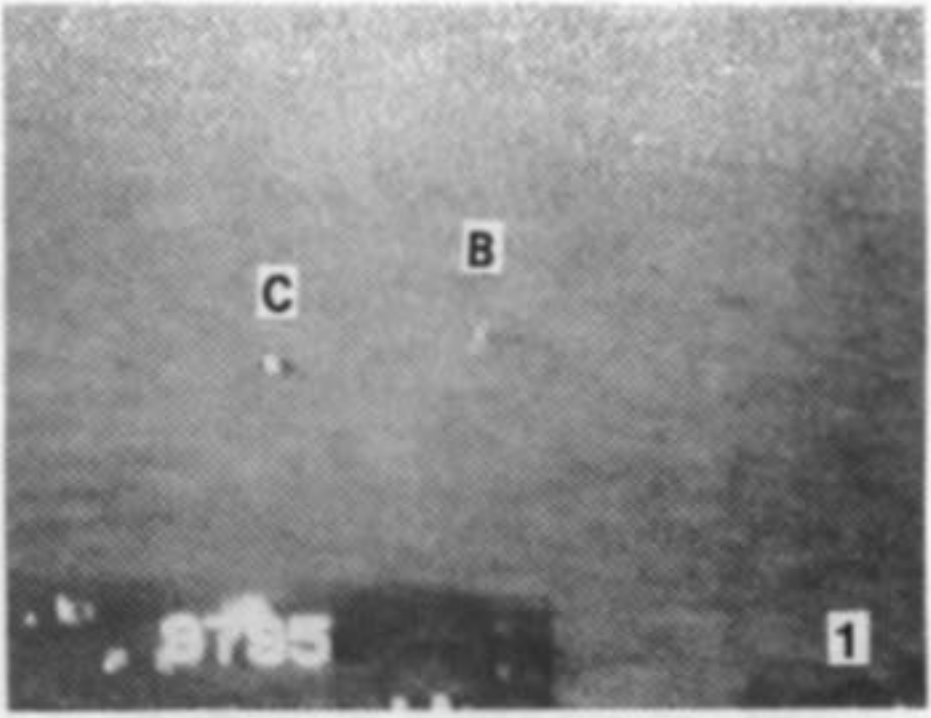

Fig. 22. A small explosion near group (B). The flash (C) lasted for 1/8 of a second. Reproduced from a TV-screen.

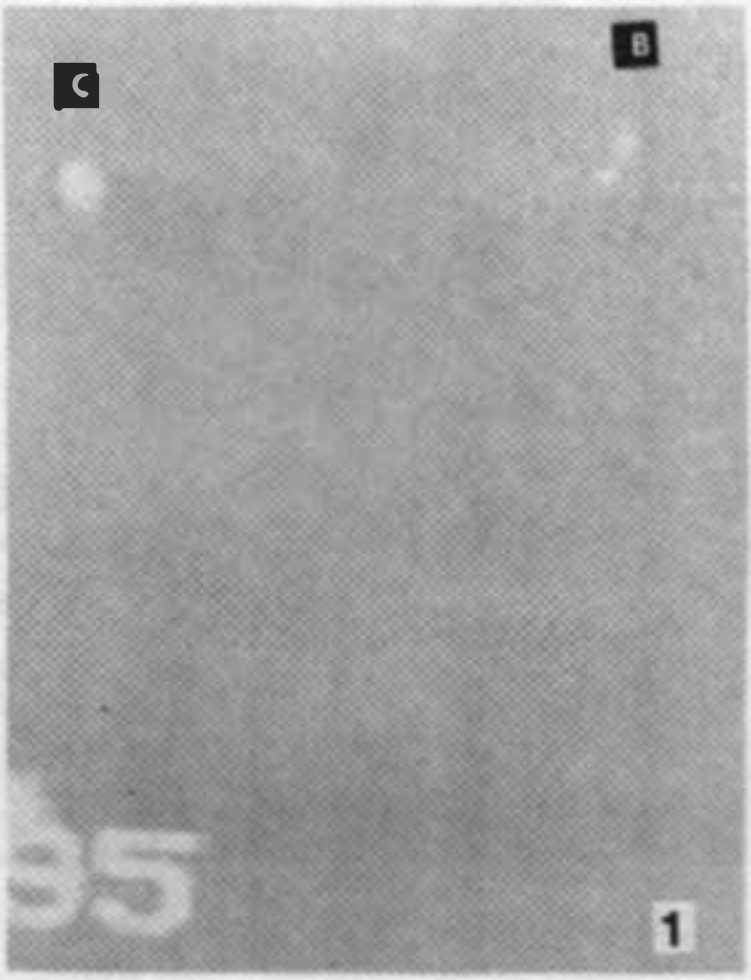

Fig. 23. Enlargement of the flash and UFO group (B) shown in Fig 22.

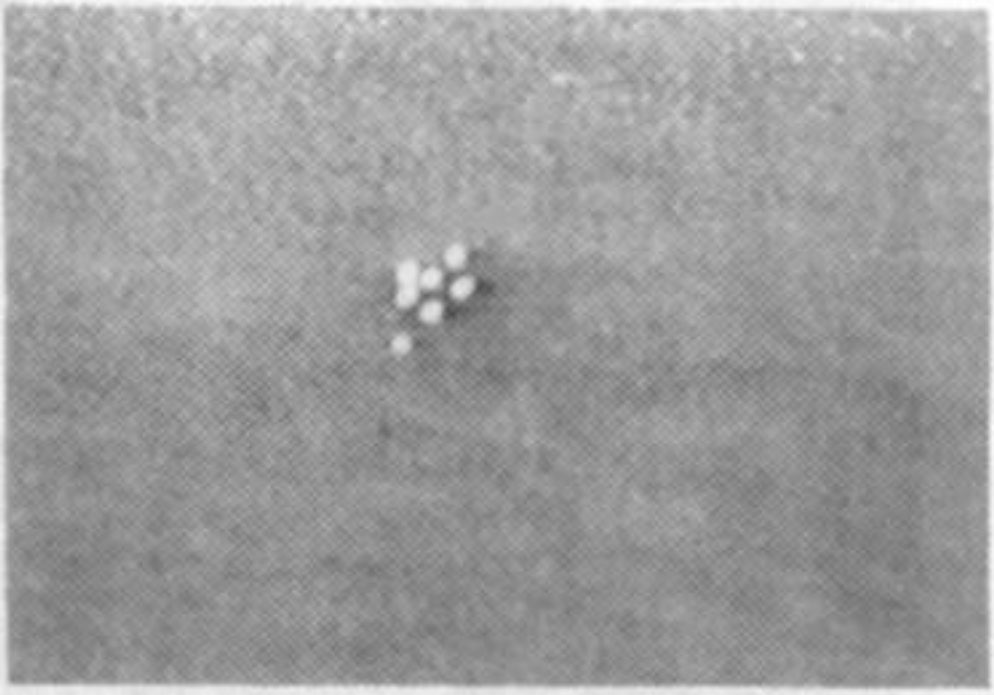

Fig. 24. Configuration of 7 objects in group (B), filmed by Valery Vinogradov.

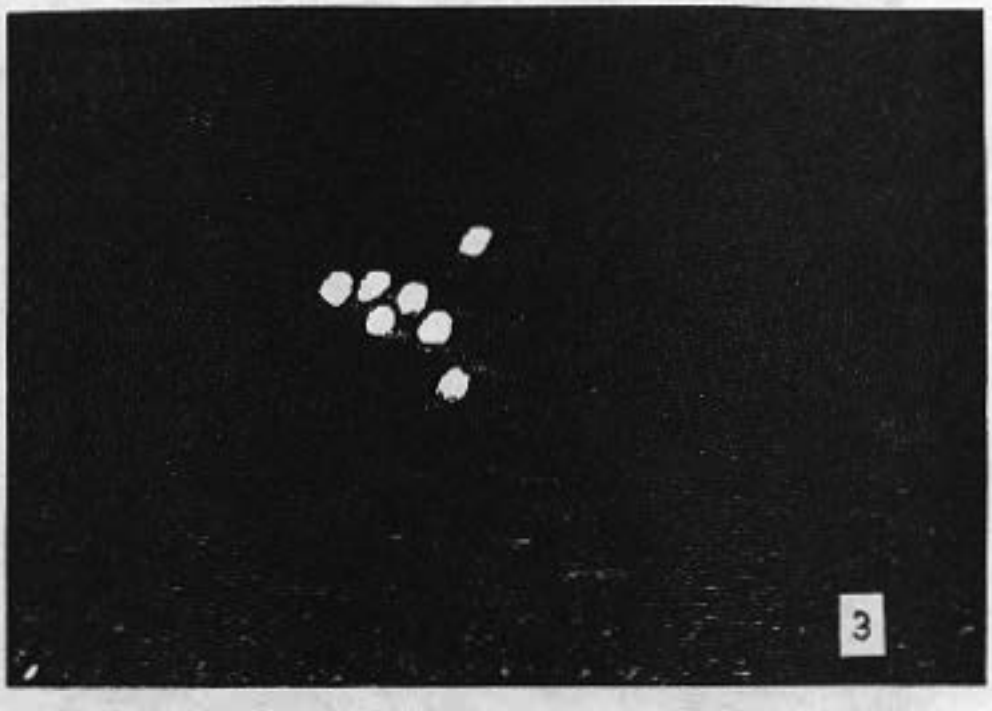

Fig. 25. Configuration of the same group of 7 objects as in Fig. 24, seen and filmed by Mrs. Kaiser in Putbus (cf. Fig. 15).

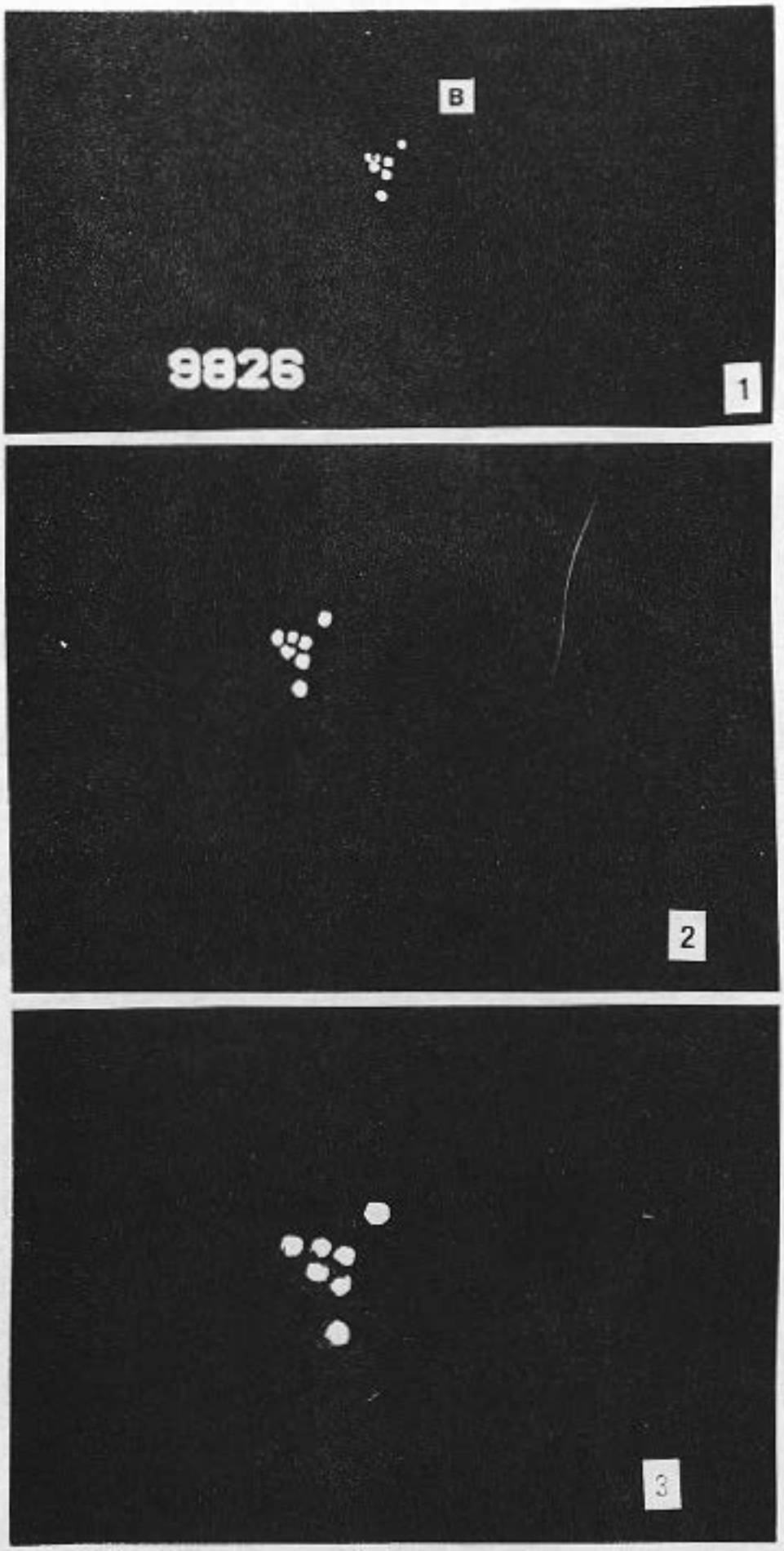

Fig. 26. The same formation of 7 objects in group (B) as shown in Figs. 24 and 25, filmed by 3 independent witnesses. [1] and [2] filmed from Greifswald, [3] filmed from Putbus.

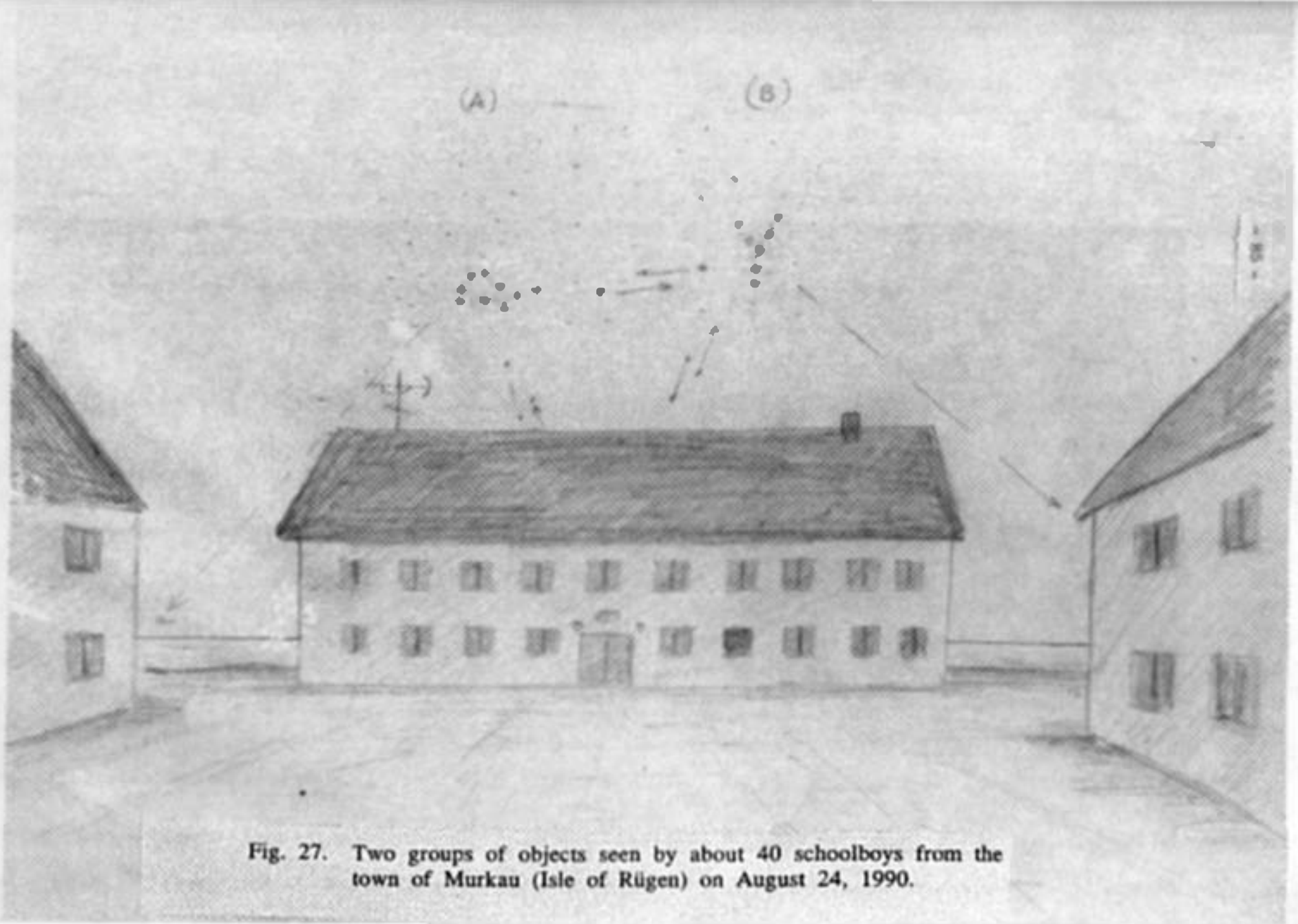

Fig. 27. Two groups of objects seen by about 40 schoolboys from the town of Murkau (Isle of Rügen) on August 24, 1990.

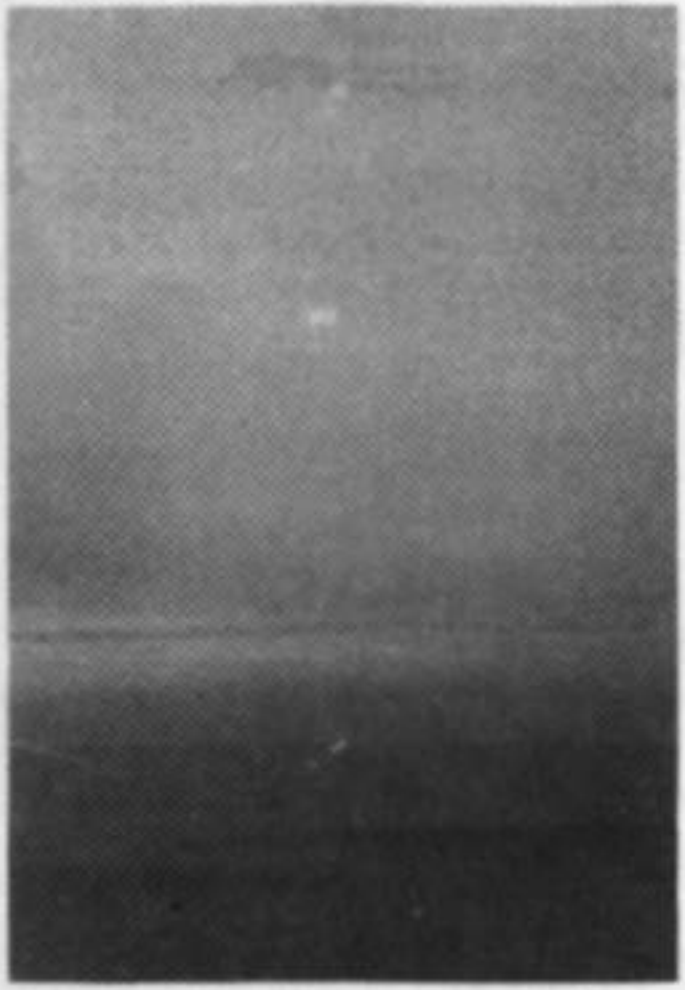

Fig. 28.

Both groups of objects photographed from Trassenheide (Isle of Usedom) at about 9 p.m.

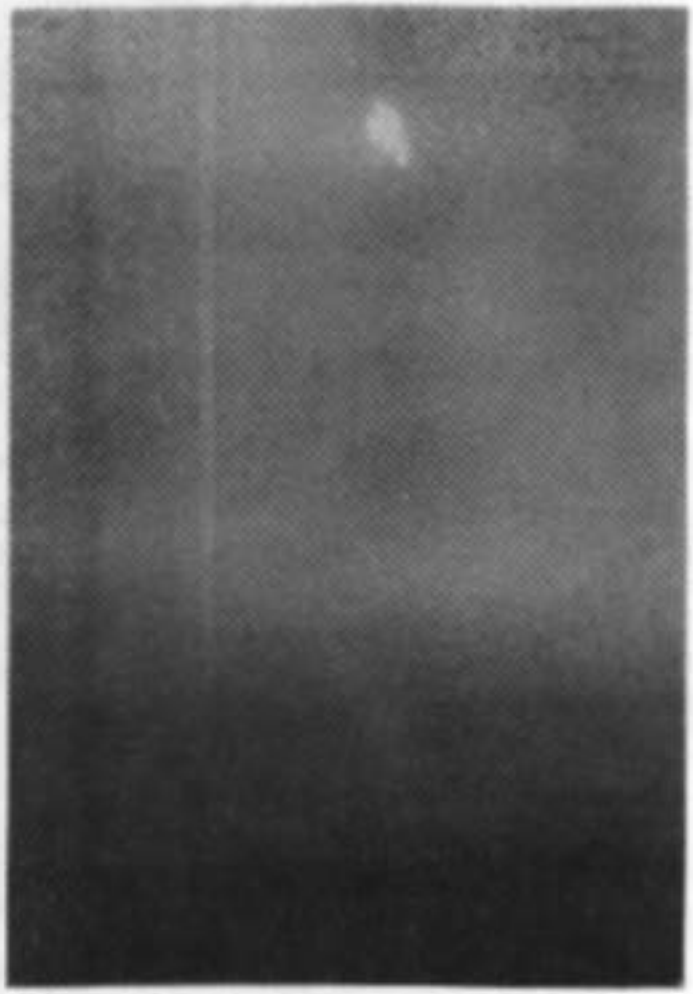

Fig. 29.

Free-hand photograph of group (B) taken at about 9.30 p.m. The light is reflected in the sea.

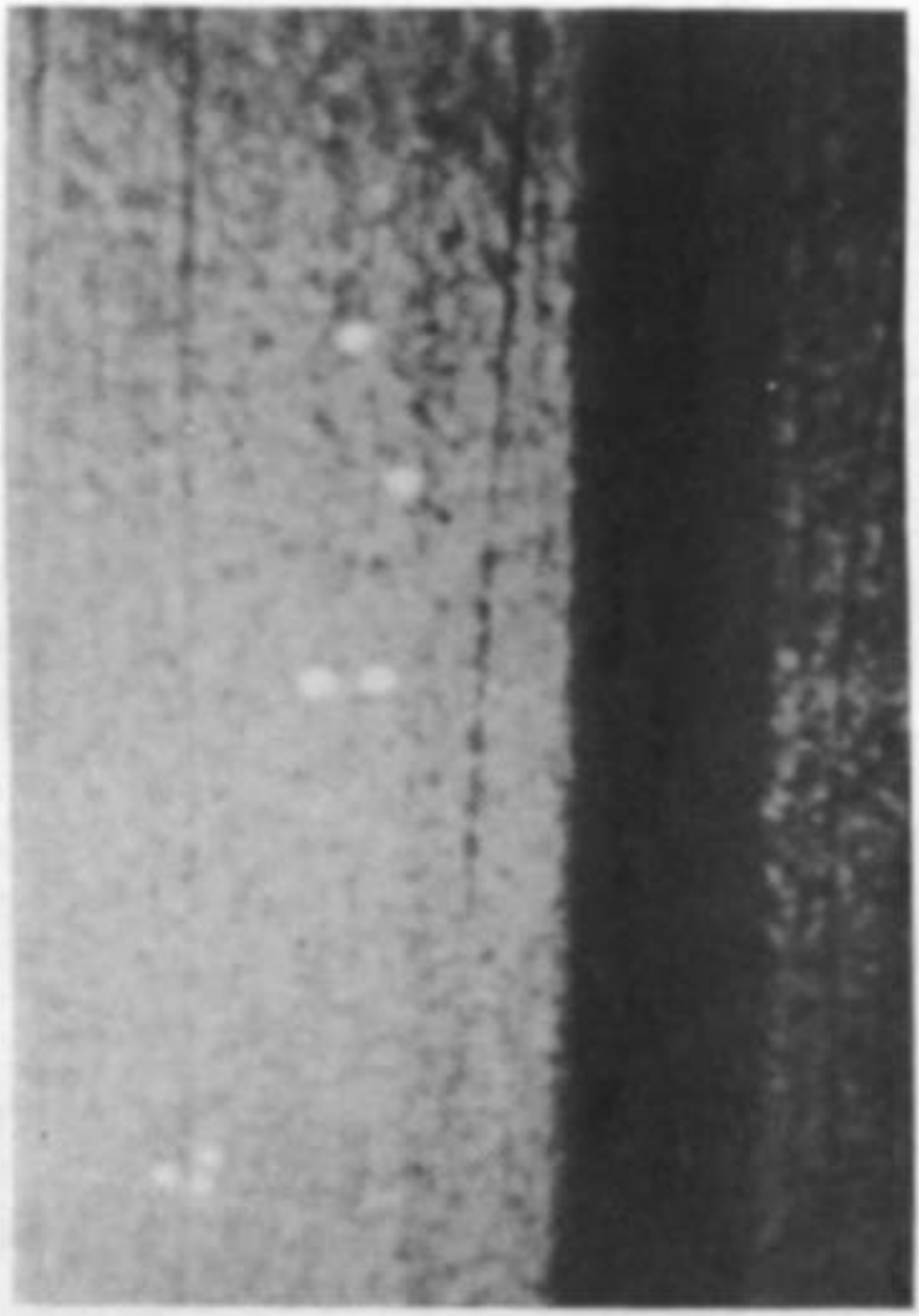

Fig. 30. Two groups of objects filmed by D.C. Newhouse near Tremonton. Utah. There is a remarkable similarity between these objects and the ones filmed in Greifswald.

Abduction Cases in Germany

by

Illobrand von Ludwiger

Introduction

MUFON–CES came across abduction cases quite by accident, since we did not publicise our activities prior to 1992, while our MUFON–CES Reports had mainly come to the attention of interested specialists in the UFO field.

Until 1992, only supporters, like the painter Karl Veit (DUIST) *) and the journalists Michael Hesemann and Johann von Buttlar, or organizations of skeptics, like CENAP/GWUP *) and GEP *), made propaganda or produced publications for or against the UFO phenomenon. However, since no experienced therapeuts were available to them, abductees remained without help. Since publication of my book *Der Stand der UFO Forschung* (The State of UFO Research) in 1992, and as a result of interviews in newspapers and on radio and television, our group has become more widely known and CE–IV witnesses have contacted us with requests for help.

On May 23, 1993, the second largest German television station (ZDF) presented a 45–minute documentary about the abduction phenomenon, produced by Christian Bauer of Munich (winner of the *Adolf Grimme Award*, 1993, Germany's highest TV award). Both the TV station and MUFON–CES made arrangements for people to report their own abduction experiences. The studio was swamped by more than a thousand calls. None of these cases is included in the abductions discussed below.

At present two therapists are offering their services free of charge to patients recommended by us.

Priority treatment is given to persons suffering from posttraumatic stress disorder (PTSD). Second in line of consideration are individuals who

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*) DUIST = German Society for UFO/IFO Studies; GEP = Society for the Research of the UFO Phenomenon; CENAP = Central Net for the Research of Unusual Phenomena in the Sky; GWUP = Society for the Scientific Investigation of the Parasciences.

wish to be hypnotically regressed in order to recollect events following a UFO encounter, but who do not seem to suffer from psychosomatic disorders.

Up till now, almost 20 persons have come to our attention who probably have undergone an abduction. Some of them have contacted us directly, while others were contacted as a result of information received from friends, relatives, or colleagues of the witnesses. Among the latter are many who resist psychological investigation and who reject hypnotic regression.

Based on our investigations, some of which are completed while others are still continuing, we can divide the witnesses into four categories:

1. abductees
2. probable abductees
3. possible abductees
4. pseudo–abductees.

The reports of witnesses who refused to be examined by psychologists cannot be classified as either subjective or objective events. Nevertheless, their stories should be collected for possible research into their narrative content.

Quite a number of cases only came to our attention in 1993 and are awaiting further examination.

Several reports have come from visitors and foreigners in Germany:

Philip Mantle of BUFORA informed us of a letter he received from an Englishman living in the vicinity of the town of Bielefeld, who claimed to have had an abduction experience. The witness never answered a letter written to him by MUFON–CES.

A German lady asked us for help in connection with her Finnish friend who, together with her son, had had an encounter with a "blue light" in her bedroom. We have not yet received an answer to our letter.

One of our members is acquainted with a Rumanian lady, who has had an abduction experience while she was living in Rumania, but who declines to be psychologically tested.

Mark E. Blashak gave us the report of a U.S. Army commander living in Mannheim, who experienced an abduction in that city in 1989.

In his collection of abductions, Ed Bullard mentions the case of two soldiers from the U.S.A., who were abducted in Wiesbaden in 1952.

Finally, Christian Bauer and I received a phone call from a Kroatian lady now living in Diefenbach near Heilbronn, who had had an encounter with 7 UFO occupants before 1974 while living in Germany. This also is a missing foetus case.

In the following list, the present stage of investigation is denoted by the letters a–f:

a) Witnesses unwilling to have their personalities investigated.

b) Investigations carried out by unknown psychologists, psychiatrists, or hypnotists, for instance by STASI personnel in former East Germany before 1989, where the respective documents are not yet available.

c) Examination of witnesses has not yet been carried out by our psychologists.

d) Witnesses have been examined by a psychologist.

e) Witnesses have undergone psychological investigation and independent hypnotic treatment, but still lack final hypnotic analysis.

f) Cases where witnesses have completed their hypnotic treatment.

The list of 17 witnesses on the next page gives an overview of the cases that have so far been investigated. In cases 9 and 13 hypnotic regression was carried out by Prof. C. Bick (Hypnosis Clinic, Dahn), case 3 was treated by STASI medical personnel in Stendal, and in case 16 Dr. K. Widhalm (Feldkirch, Austria) conducted a 6–hour hypnotic session. The following case histories, with the exception of the very first one, are numbered in accordance with the table. Cases No. 5, 7, and 13 are detailed in the article *The Application of Rorschach Tests to Possible UFO–Abductees* in this volume. Case No. 9 is discussed in the article *Brilliantly Shining Object and Strange Figures in Langenargen*, also in this volume. These four cases are not summarized below.

Possible Abductees in Germany

No.	Name	Pseudonym	Year of Event	Year of Info.	pers. inquiry	real abductee 1	prob. abductee 2	poss. abductee 3	pseudo-abductee 4	Object	Entity [m]	radiation injuries
1	Ernst-August R.	P	1948	1985	-			c			1.0	x
2	K.-D. Kaufmann	P	1960	1993	x		c				1.6 1.0	x
3	Norbert Haase		1962	1980	-			b			1.80	x
4	N. Schuster	P	1963	1973	x			a			?	x
5	Pia Mosbach	P	1965	1983	x		d				1.3	x
6	Manfred Haus	P	1972	1993	x			c				
7	A. & B. Nitsch	P	1974	1986	x			d			?	
8	Gabriele Maier	P	1974	1989	x			d			?	
9	R. Schaefler		1977	1977	x	e					1.2	
10	H. Wirtz		1981	1993	x			a			1.6	
11	A. & B. Fried	P	1982	1993	-			d			?	
12	Rolf Kaster	P	1986	1993	x			d			4.0	
13	H. Jürgens	P	1989	1989	x				f			
14	R. S. Korbach	P	1990	1990	-		a				1.6	x
15	Christiane König	P	1990	1990	x		a				?	x
16	Ch. Müller-B.		1992	1993	x	f					1.6	
17	Rolf Fuller	P	1992	1993	x		d				1.4 1.6	

a) psychological investigation by MUFON-CES refused
b) psychological investigation by former Eastern German Secret Service STASI
c) psychological investigation not yet carried out
d) psychological investigation carried out, hypnosis regression planned
e) psychological investigation and hypnosis regression carried out, treatment not yet finished
f) psychological investigation and hypnosis regression carried out, treatment finished

Sources:

Case No.	Author	Publication
1	J. Fiebag	Die Anderen, 1993, Munich: Herbig
2	R. Holbe	Phantastische Phänomene, 1993, Munich: Herbig
3	K.-L. Veit	UFO-Nachrichten, No.266, Nov/Dec. 1980, Wiesbaden
4	MUFON-CES	1, 1975, Die Erforschung unbekannter Flugobjekte
5	M. Hesemann	Magazin 2000, No.92, Feb/March 1993, Duesseldorf
6	M. Hesemann	pers. information 1993
7	GEP & MUFON	JUFOF, 4, 1984; 5, 1985 & MUFON-CES report No.10, 1989
8	MUFON-CES	pers. information 1989
9	MUFON-CES	4, 1978
10,11,12,13	MUFON-CES	pers. information 1993
14	GEP	70, July/Aug 1990, Luedenscheid
15,16,17	MUFON-CES	pers. information 1990, 1993, 1993

Short Summaries of Reports

The First Cases

The first observation of a flying object and its occupants coming to our attention dates from the year 1914. In May or June of that year Mr. Gustav Herwäger, who worked in a bakery at the outskirts of Hamburg, had gone outside at 4 in the morning when he observed a cigar–shaped object a short distance away, hovering close to the ground. It was illuminated from within and was surrounded by a halo of light.

A series of illuminated windows were arranged along its rim. Four or five little "humans", at most 1.20 m tall, and all of them wearing the same kind of suit, stood next to the object. When they noticed the witness they rapidly ran towards the spaceship and entered it by means of a ladder. After the ladder was withdrawn the sliding door closed noiselessly. The object rose vertically without making a sound and dis–appeared. The witness died in 1933, but his children submitted the re–port to the publisher of the UFO–Nachrichten (UFO–News), where it appeared in April, 1962, issue No. 68.

Forty years later at a spot about 200 km southwest from the first site another landed "cigar" with 4 occupants was observed.

Case 1. A Shepherd from Hemer (Sauerland) in Summer, 1948

Our first case of a possible abduction in Germany comes from a story in the book "Die Anderen" (The Others) by J. Fiebag (Munich, Herbig) in 1993. In this book the author quotes a report by the shepherd and forest inspector Ernst–August R. of Hemer in the province of Sauer–land, published already in 1985 in "Mysteria" under the title *Begeg–nung der 3. Art in Hemer*, 5/57, p. 18).

According to the article, one day in summer, 1948, the witness was looking after his flock of sheep on an isolated grassy area in the woods. All of a sudden the sheep scattered in panic. R. heard a rush–ing sound and saw an object, 30 m long and about 3 m high emerge in front of him from what looked like an "artificial fog". The object landed on the grass.

After a few moments of puzzlement, waiting for things to happen, the shepherd slowly approached the object and touched its smooth, metallic

surface. Instantly a strong electric shock knocked him to the ground, where he lay unconscious for some time.

When Ernst–August R. came to, he noticed that he was about 80 meters away from the point where he had collapsed. All around him stood small entities, about 1 m tall with large heads and big, slanting, almond–shaped eyes, narrow mouths and small noses. They had bulging foreheads and short, stubbly hair. In front of their chests they carried boxes with tubes hanging down from them. These probably were oxygen containers, for from time to time they grasped the tubes in order to draw from them air for breathing. They gesticulated and spoke to each other in a language that R. could not understand. Next to the object 80 meters away, which was still enveloped in mist, stood another four or five humanoids. They examined the soil or the grass and collected samples into large containers.

Fig. 1. One of the entities encountered by the shepherd.

Finally, all beings entered the object. It emitted a high, whining sound and flew rapidly away in a southerly direction. The time was 10:40 a.m., but to the shepherd it felt as if no more than 30 minutes had elapsed.

In the place where the craft had landed he discovered 6 to 8 round spots of burnt grass in a line, 2–4 meters apart, and about a meter in diameter. An acquaintance, who passed the site later on, expressed the opinion that the shepherd had set up fire places. For several days R.

suffered from pains in his face when he exposed it to the sun, as if suffering from a sunburn.

During the summer months of 1948 cylindrical flying objects were observed repeatedly in other areas as well. According to reports by the Air Force investigative team SIGN, such an object was seen on July 30 over Worthington, Ohio. On August 3, an American newspaper reporter could see a "long, narrow" object fly across the sky northwest of Moscow. It was "very bright, probably due to reflected sunlight" (L.E. Gross, *UFOs: A History, Vol. 2, 1948*, Fremont, Calif., 1988).

Six years later, on the night of October 10, 1954, while sightings in France had reached a peak, another cylindrical craft landed only 50 km exactly north of Hemer.

Willi Hogl, a 42 year old movie projectionist from the city of Münster, was in the vicinity of Rinckerode (near Münster) on his way home from a late performance on the night of Sunday, October 10, when he noted a brilliant light in an adjacent field. Approaching it to within 60 m he observed a cigar-shaped craft hovering about 1.50 m above ground, surrounded by a blue glow. Four humanoid figures, about 1.20 m tall or smaller, were busying themselves underneath. They wore rubber-like dresses and worked in complete silence. Hoge observed the scene for about 10 minutes, but did not dare to approach closer. The entities had thin legs, a broad chest, and an oversized head.

The humanoids re-entered the object by means of a ladder. The craft tilted to one side and shot upwards at an angle. A few seconds later it had assumed the shape of a bright disc (Basler Nachrichten, Oct. 11, 1954, quoted in: Weltraumbote, July/August, 1956, Zurich).

It turned out that a few hours earlier a car near Cuisy (Seine-et-Marne) had apparently been brought to a halt by just such an illuminated yellow-orange cigar-shaped object (Fate, January, 1958, p. 73 *et seq.* quoted in: Aimé Michel, *Flying Saucers and the Straight-Line Mystery*, New York, Criterion Books, 1958).

At about 8.30 p.m. three occupants of a car driving down a country road near Briatexte (Tarn) in France, saw two small beings crossing the highway (route N-631) and running towards a glowing red disc on the ground. A short time later the disc lifted off into the sky and disappeared within seconds (A. Michel, *Flying Saucers and the Straight-Line Mystery*, New York, Criterion Books, 1958, p. 154).

None of the witnesses knew of the experiences of the others. It is very

unlikely that these observations are the product of pure imagination, because the vehicles all had the same shape and the entities did not conform to the description of UFO occupants as handsome humans with long hair then in vogue. Furthermore, the sightings took place within a small area (Rinckerode – Hemer) and at about the same time (8.30 p.m. on Sept. 10 and on the morning of October 10, 1954).

Today, in retrospect, we realize on the basis of statistical material gathered in the meantime that the observation made by the shepherd Ernst–August R. in 1948 agrees with descriptions received in subsequent decades from all parts of the world. (The "oxygen container" may have been needed for safety reasons during the first years of UFO landings, until the atmosphere was more fully examined).

Case 2. Klaus–Dieter Kaufmann, Frankfurt, in Spring of 1960

In the spring of 1960, Klaus–Dieter Kaufmann, then 14 years old, was on his way home at 8:30 p.m. after a visit to the movies. He lived on the western outskirts of the city of Frankfort. Arriving at a spot between the Ackermann–School and the athletic field near the Friedrich–Ebert–Settlement, he noticed a Saturn–shaped "star" in the sky next to the moon. The star was about one third of the moon in size. Through the view–finder of his box camera, which contained no film, he first looked at the moon and then at the Saturn–like object. The ring, or disc, was subdivided into several rings. The device glistened like "iridescent metal" and seemed to be hovering above the terrain between the freight yard and the river Main.

While he was standing there looking at the sky, a whitish mist began to form behind the high wire fence on his right and to emit strongly focussed beams of light. One of the bright "searchlights" was directed at the witness. The glare was so strong that he could not protect his eyes with his hands and lost consciousness.

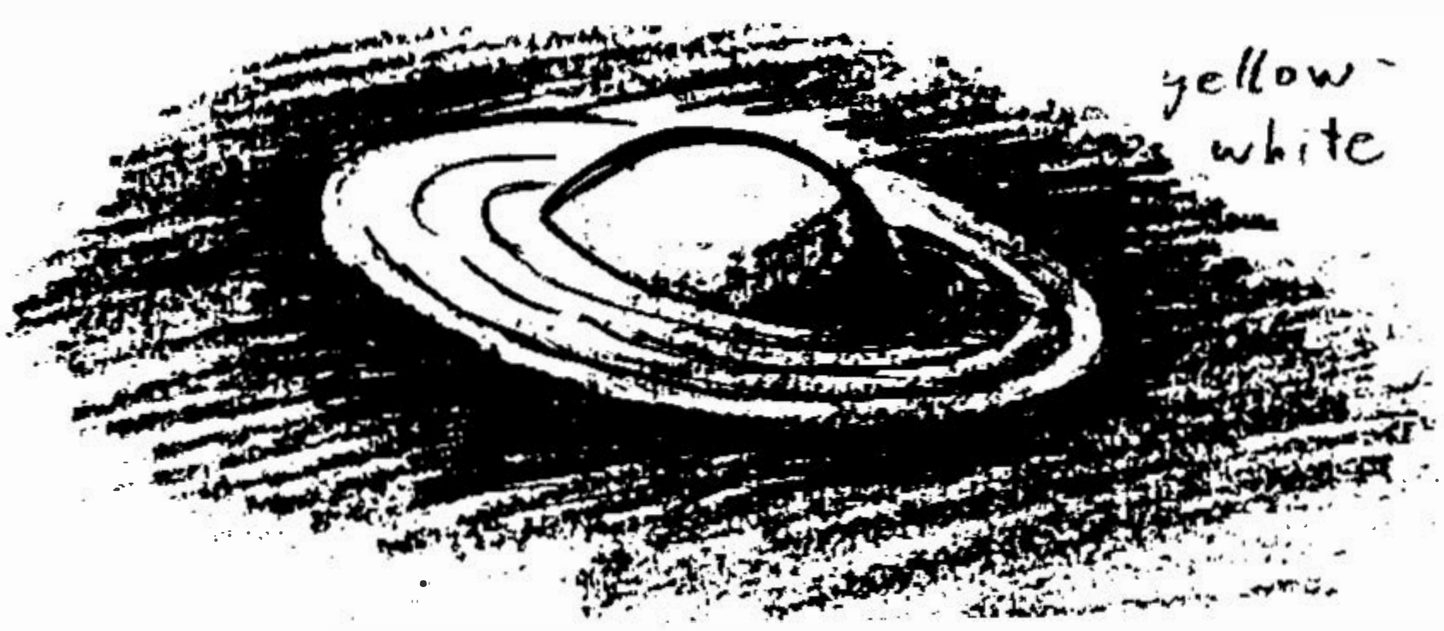
When Klaus–Dieter Kaufmann woke up, both the light and the mist had vanished. A few entities on the run were seen in the distance. The witness recovered his camera. The Saturn–shaped craft in the sky had remained in the original position, but the moon had made a "jump to one side". Klaus–Dieter didn't feel well and wanted to return home to his parents as fast as possible. His watch still showed 8:30 p.m. when he reached home. His parents had not yet returned. His brothers and sisters were already asleep, and on the radio he heard the midnight news. Looking out of the window he saw the Saturn–shaped craft emit a short, white beam of light which moved up and down. All of a sud–

den the object's color changed to dark orange. It became darker and darker until it vanished completely.

For 3 days Klaus–Dieter suffered from a strong headache and inability to concentrate. He had a sore spot on his spine near the pelvis with a wound that seemed to be the result of a puncture.

Eventually, Klaus–Dieter Kaufmann forgot his sighting and his fainting spell, but the wound on his back continued to hurt from time to time.

In 1990 an operation on Mr. Kaufmann's spine had to be performed for the first time at the hospital of Offenbach. For reasons the witness failed to understand the physician assumed this to be the second operation and asked his patient about the date of the first one. Although Mr. Kaufmann replied that no previous surgical treatment had taken place, the X–rays clearly showed an operation channel at the point in question. This made Mr. Kaufmann try to recall once again the circumstances under which the pain in his back had first occurred, and as he did so, his memory of events 30 years ago, when his watch had been 3 to 4 hours slow, gradually began to return.



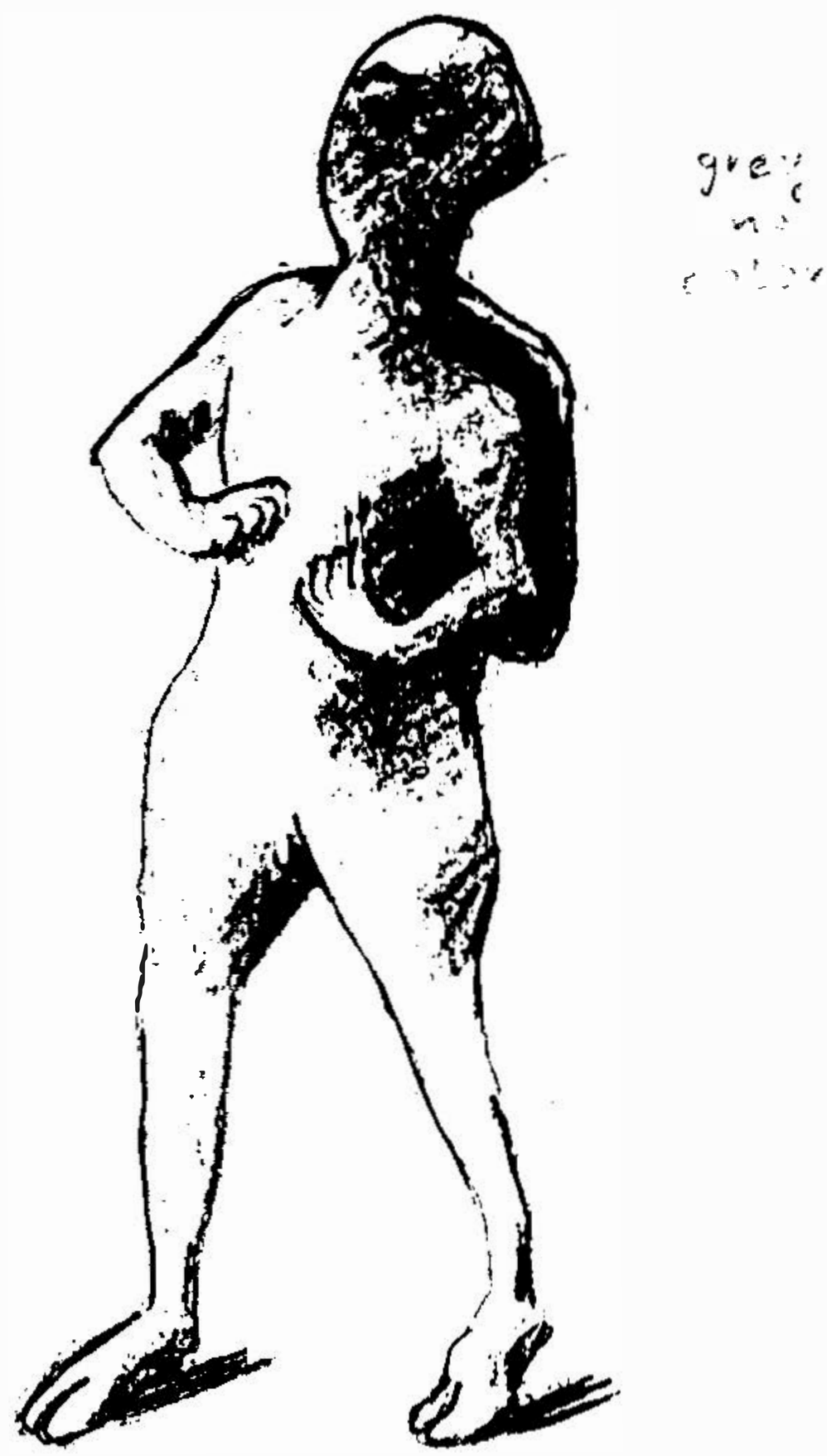
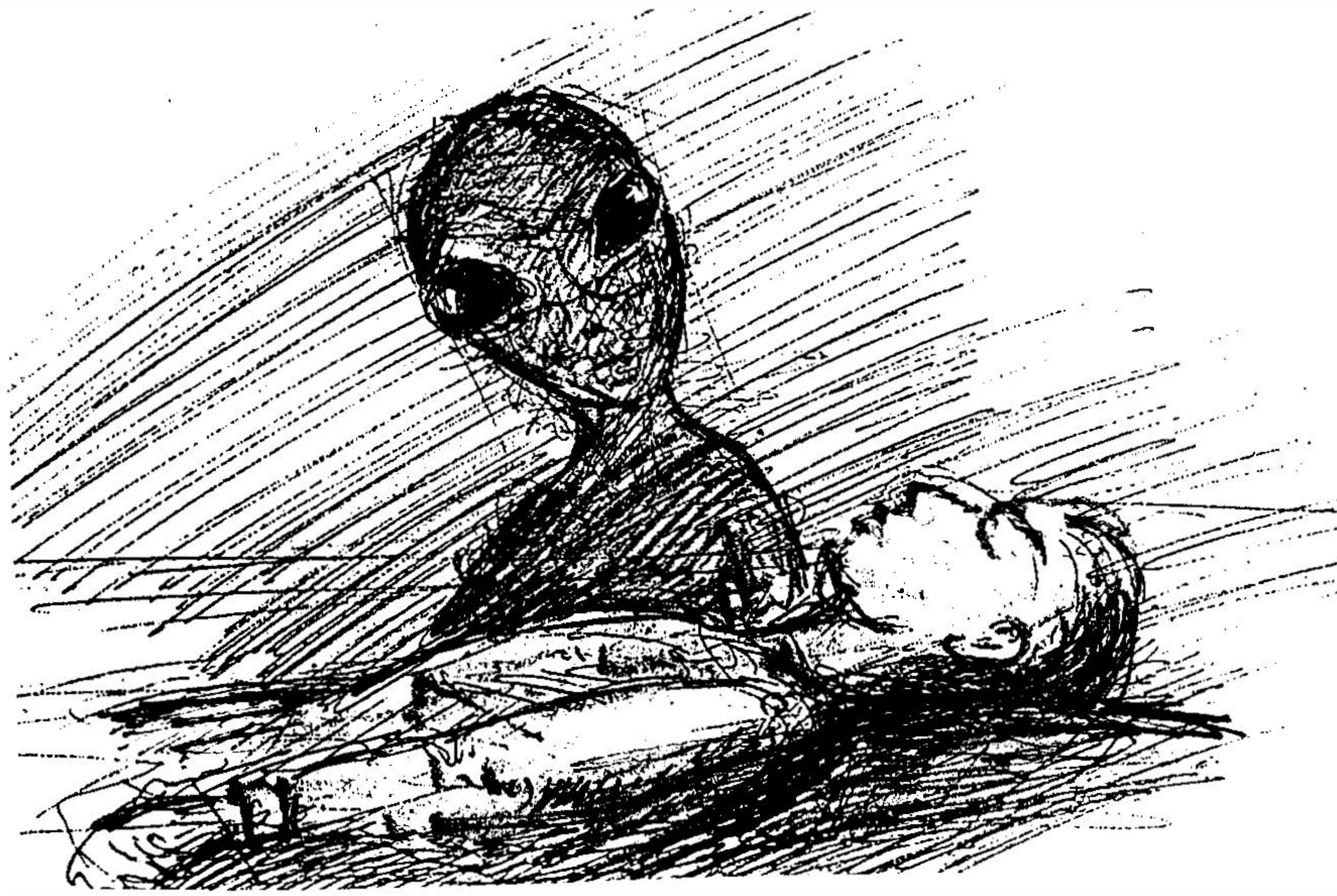


Fig. 2. Sketch of the UFO and its occupants drawn by K. D. Kaufmann in 1993. In the spring of 1961 these entities took him into their Saturn–shaped craft.

The light which had come out of the mist and blinded him had not immediately caused him to faint, but had put him into a trance–like state. Several small, stocky individuals, about 1.50 m tall, wearing close–fitting diving suits and carrying silver–colored boxes on chest and back, had stepped out of the mist. Their feet and necks were relatively long. Their heads were small and bald, and the backs of their heads merged with their necks. Chin, nose, and mouth were not strongly de–veloped, but they had prominent eyes and muscular arms and thighs. Their feet resembled flippers and seemed to have only two large toes. Some of the entities were females, since they possessed large bosoms, but they, too, were bald. They walked fast and purposefully, but their gait was jerky, and they carried their arms at an angle, like soldiers.



The witness remembers having been examined 30 years ago by small entities aboard a UFO.

Still blinded, Klaus–Dieter felt an embrace and sensed that one of the beings asked him to come closer. But he also felt that he did this of his own free will. He felt great affection for this individual. Since the wire fence separated the two, he next tried to climb over it. He thought he heard the suggestion that he should come down and stand next to the fence. He did this and was lifted up – or was he able to float? Up in the air a glowing sphere, covered with a net–like struc–ture, kept growing larger as it approached him (he did not notice a

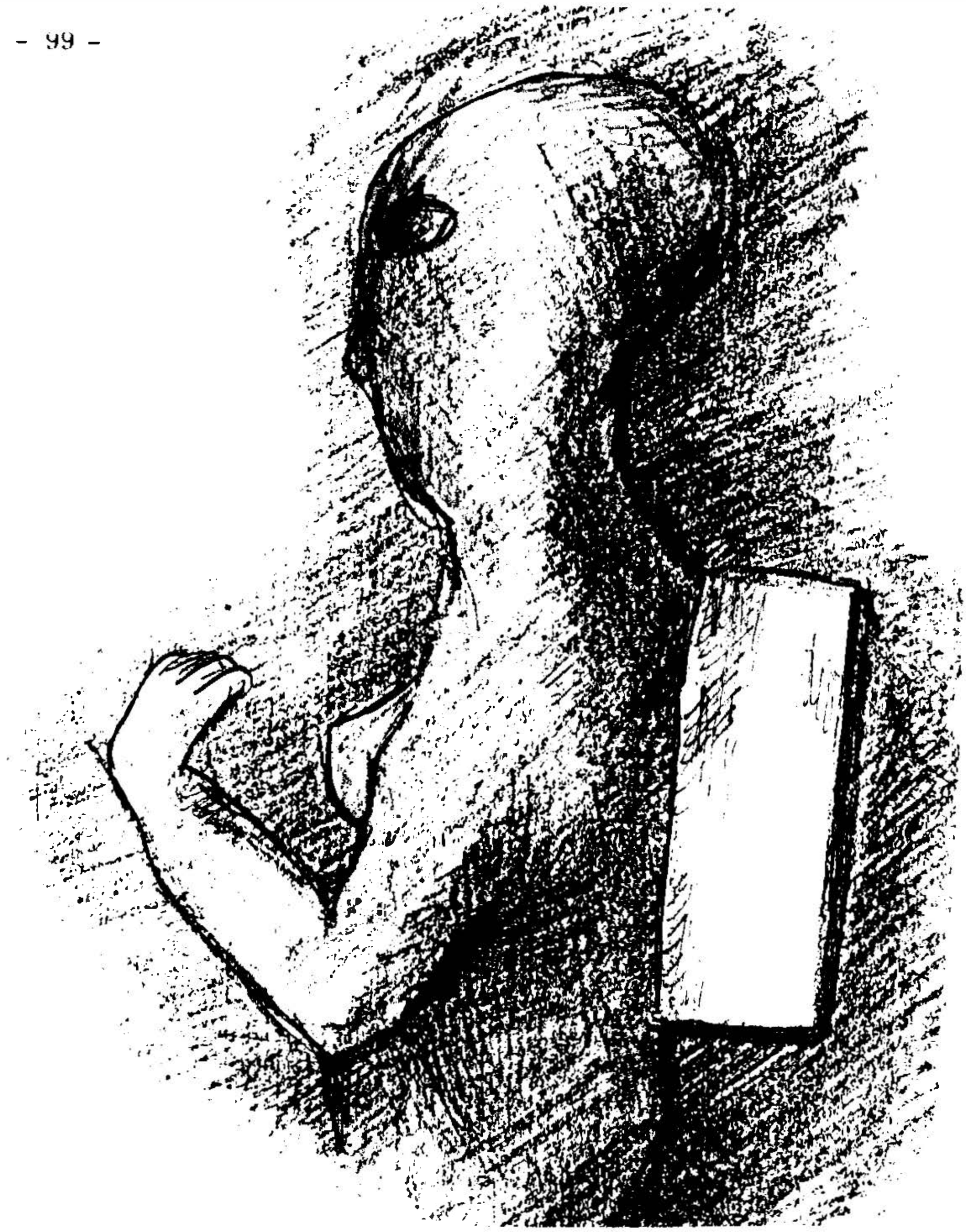


Fig. 3b. Typical entity taking part in the abduction.

Fig. 3c. Small entity seen by the witness aboard the UFO.

ring around the sphere).

Klaus–Dieter remembers having been in a domed room immersed in bright, yellowish light. The dome was colored a faint yellow. He sat or lay on a sort of dentist's chair. In front of him was a large, round opening leading out into the open. Lined up along the wall facing him were several greyish–green entities with their backs towards him. They were gripping handles on the wall and performed pumping up and down movements.

The witness also saw some individuals who filled him with fear. However, he either cannot or will not remember their looks. Close in front of him a creature looked at him with oversized eyes with white eyeballs and small, dark pupils. It reached into his mouth with thin, leathery, webbed fingers, and tried to pull out his teeth. The witness was nauseated. One of the entities loosened his trouser belt and tried to remove his pants. The entities talked to each other. The witness thought he could clearly distinguish male and female voices. He believed they talked about "killing" and was on the verge of tears.

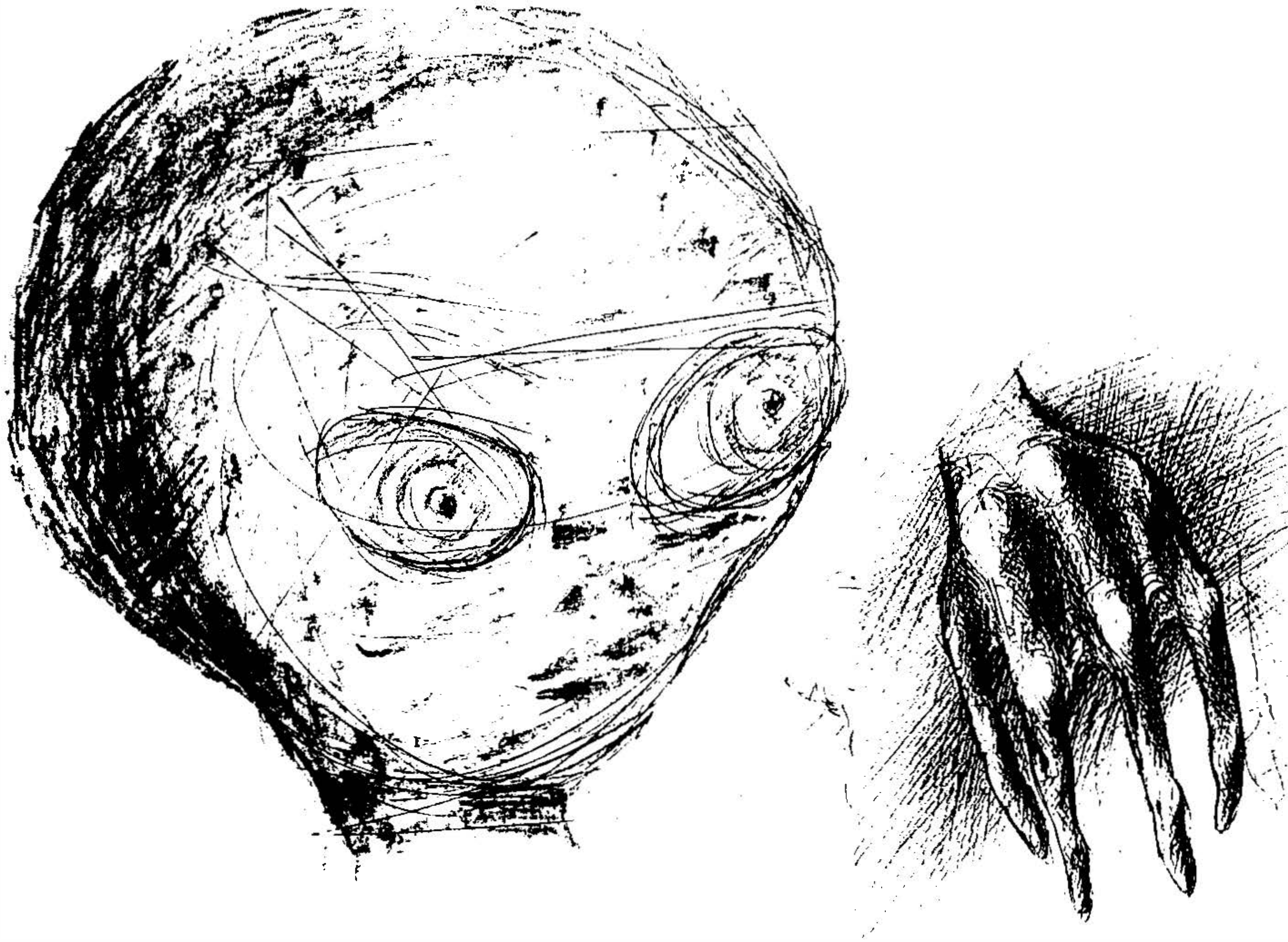


Fig. 4. Drawing by K. D. Kaufmann of the entity that examined him. One of the 4 fingers was used as a thumb. The witness could make out webs between the fingers.

Klaus–Dieter was terribly afraid. He noticed a small, gray being among the rest. It had a huge, bald head with enormous, almond–shaped brown–black shining eyes, wrinkled skin, a small, narrow mouth, and no nose or ears. In contrast to the others, it seemed to be kindly disposed towards him and to be curious rather than aggressive. It indicated to him that he would be allowed to return home.

Klaus–Dieter felt that once again he floated through the air and was set down next to the fence. It seemed that he was being carried, for he heard heavy breathing behind him, "as if someone were using a snorkel". He reached back and felt a belt around a waist. Some force pushed his hand back and he fainted.

Case 3. Norbert Haase, Stendal, 1962

There existed in Stendal (Sachsen–Anhalt) a large lake with a small island in it (which I still remember, having lived in Stendal till 1955). In January of 1962 this lake was frozen, and a group of schoolboys were skating on the ice (today the lake has been filled in). Together with the others, Norbert Haase, then 16 years old, saw a "large flying star" in the sky at about 6:30 p.m.. In contrast to his five friends, who went home, Norbert wanted to continue observing this light. He skated towards the island, upon which the bright, lens–shaped object was descending. It was about 25 m in diameter and remained suspended in the air 5 m above the island.

The object now was twice as large as the island and so bright that Norbert's eyes hurt when he looked at it. At the same time he felt a prickling sensation on his skin. He heard his friends yelling at him to come back and then lost consciousness.

When he came to, he lay on the embankment of the lake 150 meters away from the island. His skates were lying next to him. His watch had stopped at 7 p.m.. His eyes hurt and he had a headache. After walking the short distance to his home it turned out to be shortly before midnight already, and his folks had been waiting for him. His face was reddened, as if he were suffering from a sunburn. There was a hole on the right side of his nose. The upper layer of skin had been removed within a circle 3 mm in diameter.

The dermatologist diagnosed a high radiation dose and had Norbert transferred to the Johanniter Hospital in Stendal, where he was treated over a period of 3 weeks. He had nightmares and began to talk in his sleep. On the 4th day of his confinement he was visited by several

physicians, accompanied by two men from the State Security Police (the East German STASI), who wanted to find out more about the source of radiation responsible for his illness. He had to answer numerous questions for them and to fill out a long questionnaire.

A few days later, two psychologists performed several additional tests on him and put him under hypnosis. This was repeated the following two days, each time for a 3-hour period.

At last, Norbert Haase began to recall some of the events that had taken place after he had seen the craft come down. He remembered having lain on a table and to have undergone some kind of X-ray examination. He was surrounded by "handsome human beings in tight-fitting white dresses". Their turtle-neck collars were decorated with the emblem of a green tree. In West Germany, the witness was not willing to undergo a further examination, but it may be possible to locate the STASI documentation of the case (UFO-Nachrichten, Nov./Dec., 1980, Wiesbaden).

Case 4. Norbert Schuster, Lübeck, 1963

At the time the following episode took place, Norbert Schuster was 30 years old and worked in one of the shipyards of Lübeck. One Sunday afternoon in May he went for a walk in the nearby woods. After a while he noticed a girl in front of him wearing a long, white, transparent gown. Mr. Schuster did not succeed in coming closer to the young woman. Although she appeared to be slowly strolling along, the distance between him and her always remained the same.

By and by he became aware of a strange, whirring sound in the air, which kept getting louder. Mr. Schuster climbed an embankment where the footpath ended. The girl had suddenly disappeared. Hovering above a meadow stretching away from the embankment, Mr. Schuster saw a metallic craft resembling a British steel helmet. It had a diameter of 10-25 m and seemed to be rotating, since sparks were flying off its rim. The device was surrounded by a bright glow.

Soon after, a light flashed from a small sphere at the top of the "helmet", and an "unusually bright light" briefly groped its way across the meadow and hit the witness "like a bullet" squarely between the eyes. He passed out.

It was dark by the time the witness woke up again. Norbert Schuster had a headache and felt like vomiting. He felt dizzy. Somehow, he

managed to get home. He has no recollection of the Sunday that followed. On Monday his color perception was disturbed. He heard shrill sounds in his head and had the impression of constantly hearing unknown voices converse in an unknown language. Through the next few days he suffered from outbreaks of perspiration, nausea, and dizziness. Mr. Schuster did not consult a physician for fear that the light beam from the UFO might have damaged his brain. Instead, he went back to work, hoping that in time everything would return to normal. This turned out to be true, and by and by he recovered his balance.

10 days after the event he began to have mystic experiences. He experienced himself as a tree, a climbing plant, a tiger, a fish, etc.

Some time later he began to realize that he was establishing contact with a "gigantic intellect", i.e. a giant brain, or an intellectual power. He sensed that he had somehow obtained access to a large brain in the UFO, whose task it was to receive and store impressions of other beings and to transmit them telepathically to their own home world.

Contact with this giant brain was not continuous, but was established only occasionally and drove him to the brink of madness. On the other hand, he experienced an enormous expansion of his consciousness. Mr. Schuster developed a greatly expanded world view and a completely new concept of life. In the course of time the "contacts" slowly diminished.

His experience was followed by the appearance of paranormal phenomena: lights and car ignitions turned off on his command, light bulbs and window panes burst on merely being touched.

We met Mr. Schuster repeatedly in 1973 and had some very interesting discussions with him. We were surprised at his knowledge of cosmology and his concept of elementary quanta of structure, which he described as "bundles of spaghetti". This seemed to anticipate modern superstring theories.

Unfortunately, Mr. Schuster refused to be examined by psychologists, so that we could not further investigate his story.

Case 6. Manfred Haus, Duisburg, 1972

In October, 1972, Manfred Haus, his brother, who was 2 years younger than he, and a friend attended a soccer game. Manfred was 10 years old at the time. When darkness set in, the boys went home. At about

6:30 p.m. their route passed through a forest. There they saw a bright light shining through the branches and moving in the direction from which they had come. Manfred decided to turn and follow the light. The light grew larger and seemed to descend towards the ground. This was the last thing Manfred could remember. When he woke up from unconsciousness everything around him was in darkness.

Manfred returned home, where his long absence had caused a great deal of excitement. His parents, who had already gone out in search for him, punished him by putting him under house arrest. Only in 1993 did Manfred's 67 year old mother mention that Manfred had awakened repeatedly in those days and that he had had nightmares. He had also spoken of having seen small humans who had run around the light. They allegedly had had large heads and big, black eyes. Regression by hypnosis might be suitable for closing gaps in Manfred's memory.

Case 8. Gabriele Maier, Au (Upper Bavaria), 1974

The highschool student Gabriele Maier, at the time 15 years old, had paid a visit to the disco in Au, Upper Bavaria, sometime in spring or fall of 1974. She went home around 9 p.m. and observed a bright, saucer–shaped object with a round dome on top 200–300 m above the village at a declination of about 60 degrees. Its angular diameter was 2 to 3 degrees, and its size was perhaps 20 meters. Powerful search–lights ("bright like electric arcs") were mounted along the lower rim of the dome. At first the craft remained stationary. Then it came nearer and made a chirping sound "like a basket full of crickets".

Gabriele grew afraid and does not remember what happened next. The first questioning by us evoked strong emotional reactions. She burst into tears and thinks that something must have happened to her. She is afraid of hypnotic regression.

Case 10. Horst Wirtz, Krefeld, 1981

One evening in September, 1981, shortly after 1 o'clock in the morn–ing, the mailman Horst Wirtz was driving home from Krefeld, where he had gone bowling, to Tönisforst, where he lived (Krefeld is located on the western edge of the Ruhr region, Germany's largest industrial area). He was supposed to drive straight ahead at a certain traffic light, but instead he followed an inner compulsion and turned right (in the direction of Kempen). Immediately afterwards he made a second right turn. His car was brought to a halt 6 to 8 meters after crossing

the railroad tracks. In the field on his right, about 3–4 meters away, stood a small human being, about 1.60 m tall, clad in a silvery overall. Some 30 meters behind it was a bright object 4–5 m in diameter, about which bright colored lights were revolving. Remaining seated in his car, Horst Wirtz asked what was the matter and received the non-acoustic answer: "I see that you are afraid. I won't come any closer". The entity, which carried a small device in front of its chest, did not move its lips while these words were spoken. Again the witness asked: "What is going on here?". He glanced all around him looking for help. He heard something like "zetareticuli" and "you are not yet ready, but we shall meet again". Afterwards the humanoid turned around and walked towards the object. The revolving lights increased in brightness. Again Horst Wirtz looked around for help. When he looked back towards the field, all was dark. The light had vanished. Only a small bright dot was ascending towards the sky. His car started again. All in all, the episode had lasted some 5 minutes. Deeply disturbed and in a state of shock he arrived at home. He was so afraid that he was shaken by weeping spells. For nights on end he was unable to sleep. After telling his wife, both of them recalled having seen a UFO in the same place as early as 1978.

Not until 1993 did Horst Wirtz decide to come out into the open and tell of his experience on television. Fear has prevented him from again visiting the location of his sighting. He is not certain whether he remembers everything correctly, and he feels that "more may have happened" to him. However, Mr. and Mrs. Wirtz do not want to have anything more to do with the matter and refuse to be regressed hypnotically for fear the entity might return.

Case 11. Mr. and Mrs. Fried, Münster, 1982

A couple, Mr. and Mrs. Fried of Münster, had an encounter in 1982 which is typical of many abductions. They were driving at night along the super-highway. Close to Hagen they observed a "star", which kept getting brighter and slowly descended to the ground. Mr. Fried pulled into a parking lot in order to get a better view. However, both are under the impression that immediately afterwards they were again driving on the super-highway. Both had the feeling of awakening from a brief fainting spell. They soon discovered that they had missed their exit and that already an hour had passed since they had pulled into the parking space.

The witnesses turned to the UFO organization GEP in Lüdenscheid for help. However, since that group did not carry out its own investigation

of witnesses the psychologists of our MUFON–CES group were informed. Personality tests gave positive results. Next, a hypnotic regression was scheduled to be carried out by the hypnotherapist Bick, who suggested that the health insurance should pay for the treatment. The insurance declined to do so, and Mr. and Mrs. Fried refused to defray the costs themselves.

Case 12. Rolf Kaster, Schwerte, 1986

Shortly before his final examination, the chemistry student Rolf Kaster was underway with his bike on a rainy day towards the end of August or the beginning of September, 1986, near Schwerte–Ergste, between the meadows and small woods on the southern banks of the river Ruh. It was about 6 in the evening when he had the encounter which was to change his life.

He woke up from unconsciousness on a meadow at 10 o'clock at night. At first, he thought of a bicycle accident. Frightening pictures passed through his head. He rode home terribly tired. Slowly his memories began to take shape. He had met giants, and it seemed that he had been inside a spacecraft.

Recall case 1: Hemer is about 10 km away from the location of this new UFO appearance! Both sites are situated on the eastern edge of the Ruhr district (Schwerte is situated about 70 km east of Krefeld, case 10).

In 1982 a similar flying object had made its appearance at about 1:30 in the morning a few kilometers north–west of the present position. The witness at that time was a 22 year old salesman living in Schwerte, who had driven his girlfriend home. Near the village of Drüpplingsen his car radio suddenly began to sound fainter and the headlights dimmed and went out. The driver stepped out to examine the cause. In the sky he noticed a very bright disc, which kept coming nearer until it remained suspended in the air close to the witness. Everything was very quiet. The witness was unable to move. After about 10 minutes the light of the disc dimmed and the witness was able to stir. The craft rose towards the sky and was gone within seconds. Headlights and radio were functioning perfectly again. The radio, which the witness had turned up to hear anything at all, was now terribly loud.

These then were the surroundings in which Rolf Kaster rode on his bicycle along a narrow cement lane leading through meadows, along lakes, and through woods. All of a sudden he saw something like an

animal – or so he thought – step out from behind some bushes about 10 meters ahead of him. He dismounted and saw a female figure slowly stand up und become bigger – so big, in fact, that she appeared to be more like a giraffe; about 3.50 to 4 m tall!

The huge female was very slender, with long limbs and a relatively small body and head. The fair–skinned face had European features and might be called handsome. She wore an overall of a subdued metallic sheen which covered her hands and left only her fingers free. Her hood and boots seemed to consist of a material similar to that of the overall. Around her neck she wore a ring from which a colorless stone was suspended.

Kaster's question, as to whether she came from the future, was answered with "no". In a German dialect, which Kaster had difficulty understanding, the lady giant told him that she came from the constellation of Lupus (the alleged UMMO–visitors are also supposed to have come from that constellation, more precisely from 424 Lupi, a star at a distance of 14.6 light years from the sun). Kaster leaned his bike

Fig. 5. The witness is perched on the shoulder of the lady giant in the rain. Next to them a rusty chain hangs down from the UFO.

against the bushes. The lady beckoned him to follow, which he did for a distance of a few 100 meters. With difficulty he climbed over several fences. He was not afraid, only very curious.

The story of how Roland Kaster got on board the UFO is so absurd that he apologizes for this part of his account. He himself calls this an "abstruse" aspect of the story and says: "Believe me, if I wanted to, I could invent a really good, interesting UFO story, full of thrills and excitement". However, real UFO events are different!

The lady giant and he entered a small forest and emerged on a grassy clearing. Right above them at a height of about 100 meters a small cloud floated. Suddenly, it began to rain from the cloud, but only on three closely adjacent circular patches about 1.50 m in diameter. After waiting a few seconds, a long iron chain descended from the cloud, carrying an iron pipe at its end. Roland Kaster guessed that the material was iron, because he could plainly see rust and parts rubbed blank due to wear. Next, the lady giant lifted him on her shoulder and mounted the iron rod. Kaster's hairs stood on end with fright, and he felt dizzy. Both of them were pulled up. The chain neither rotated nor swung back and forth. After a few meters Kaster could make out the ground only indistinctly due to the rain. Looking up at the cloud, he discerned in it a large, lens-shaped object about 100 m in diameter.

In the interior of the craft Kaster met other giants, both men and women, all of them completely nude. His lady companion also began to

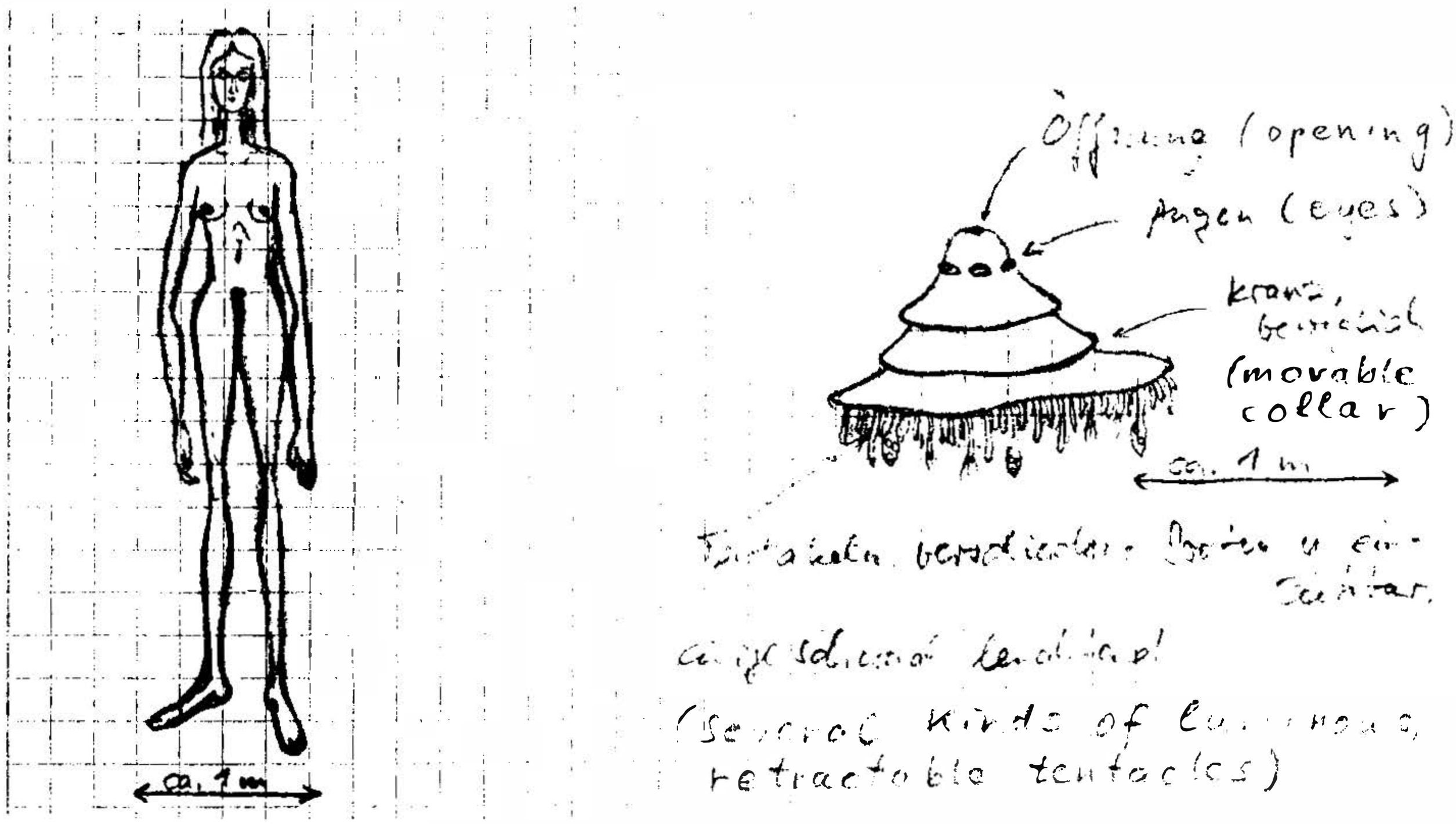


Fig. 6. Drawing by Rolf Kaster of his nude lady companion and the strange funnel-shaped creature in a transparent tank.

undress. The bottom of the device was silvery and metallic.

A sort of large aquarium on wheels contained a dark, grayish-green living creature in a liquid, looking like three funnels, one on top of the other. On its underside, measuring about 1.50 m in diameter, it carried short tentacles. It seemed to Rolf Kaster that several eyes were arranged in a circle around its top. Some of the short tentacles were glowing. Kaster had the feeling of being able to communicate telepathically with the "funnel creature", in contrast to the giants.

A helmet lined with a jelly-like substance was put on his head. He sat on a bench. Next to him, on a large bench, sat a giant clad in nothing but a helmet befitting his size. Kaster was given to understand that his helmet was connected to some type of computer, because he was to be tested. He had to play a sort of 3-dimensional chequer game. The device in his hands looked like a 4-dimensional cube (a small wire cube inside a larger one).

Perhaps it was an intelligence test. At any rate, Kaster could also draw information from the "computer". He asked many questions and received prompt answers. He asked about specific physical phenomena and thought he received information enabling him to make inventions at a later date. However, his question as to why the giants looked so much like humans was not answered. He surmised that this question was not allowed. (Later on he thought that the giants might have been biological robots, created especially for the purpose of inspiring him with confidence and respect, and that the funnel-like creature was the true "master" of the spacecraft).

He wanted to remove the helmet. This caused extreme pain, paralyzing him so that he could not breathe. He had the brief impression of the funnel creature changing its color to white before he passed out. He woke up on the grass close to the bushes behind which he had hidden his bike. Kaster had difficulty remembering what had happened and was so tired while riding home that he feared to fall off his bicycle. At home he immediately fell asleep. Next morning his hair was sticky with a peculiar dried substance.

Many details of this story are so grotesque that one suspects it to have been rendered unbelievable on purpose: The giants, the rusty chain which did not swing, and the rain on a few patches.

But the situation on board is also hard to believe: How can a frightened person under these circumstances be expected to formulate, of all things, special technical questions about the manufacture of pharmaceu-

tical products and diamonds, and about equipment for the production of energy? Rolf Kaster has thought about the answers he received and has patented a few inventions. In this way he hopes to establish his credibility.

A hypnotic regression probably could uncover further details.

We are aware of only one other case in the UFO–literature in which a witness mentioned 4 m tall human beings in a UFO:

In April, 1897, The "Houston Post" printed the report of a Danish sailor. According to the newspaper, the vessel "Christiane", on which the seaman sailed in the Indian Ocean in 1862, was thrown against the rocky shore of a small island during a storm. He and several other sailors saved themselves by climbing ashore on the island.

The seaman Ole Oleson reported to the newspaper that he and his comrades found nothing edible on the rocky island and were threatened with starvation. However, according to Oleson's testimony, an airship, coming from the sky, crashed on the island a few days later. In the wreckage the sailors found the corpses of humans 4 m tall with tanned skins. In addition to peculiar devices and metal boxes the shipwrecked seamen also found food items, with whose help they managed to survive. They used the wreckage to build a raft with which they left the island. Eventually, they were picked up by a Russian vessel which took them to Australia. As proof of his story, Ole Oleson could show a large ring with two peculiar stones. Later on he settled in Texas. In 1897, when newspapers all over reported strange flying objects, he told his adventure to the press (W.O. Chariton: *The Great Texas Airship Mystery*, Plano, Texas, 1991).

Case 14. Mrs. R.S., Korbach, 1990

A witness with the initials R.S., who wants to remain anonymous, informed GEP of an event which she thought would not be believed anyway. As reason for her anonymity she mentioned her extreme fear of being ridiculed or of being considered crazy.

On February 18, 1990, around 6 p.m. she was out walking with her dog in the hills of Waldeck (near Korbach, 70 km east of Schwerte/Hemer). All of a sudden her dog lay down on his back and started to whimper. The witness had to carry the dog. At first she heard a low hum, which ceased after about 30 seconds. A large, round object, whose diameter measured 10 to 20 m, was floating above a clearing

and suddenly began to glow with an incredibly bright light, lasting about 20 to 30 seconds.

After that its light dimmed and now it had a metallic appearance. The bottom of the oval craft glowed in a dark red color ("like glowing charcoal"), and the object lowered itself silently to the ground.

In the meantime, the dog had escaped. The witness, who was completely blinded, wanted to run away, but was hit by a "blue ray of light", which paralyzed her. She was short of breath, tried in vain to call for help, and was completely wet with perspiration within 30 seconds. Then "there was a voice" sounding female and somehow metallic, which said: "Don't be afraid, nothing bad will happen to you". Actually, though, the witness became even more afraid and nearly panicked. The ray of light changed to green and her breathing improved.

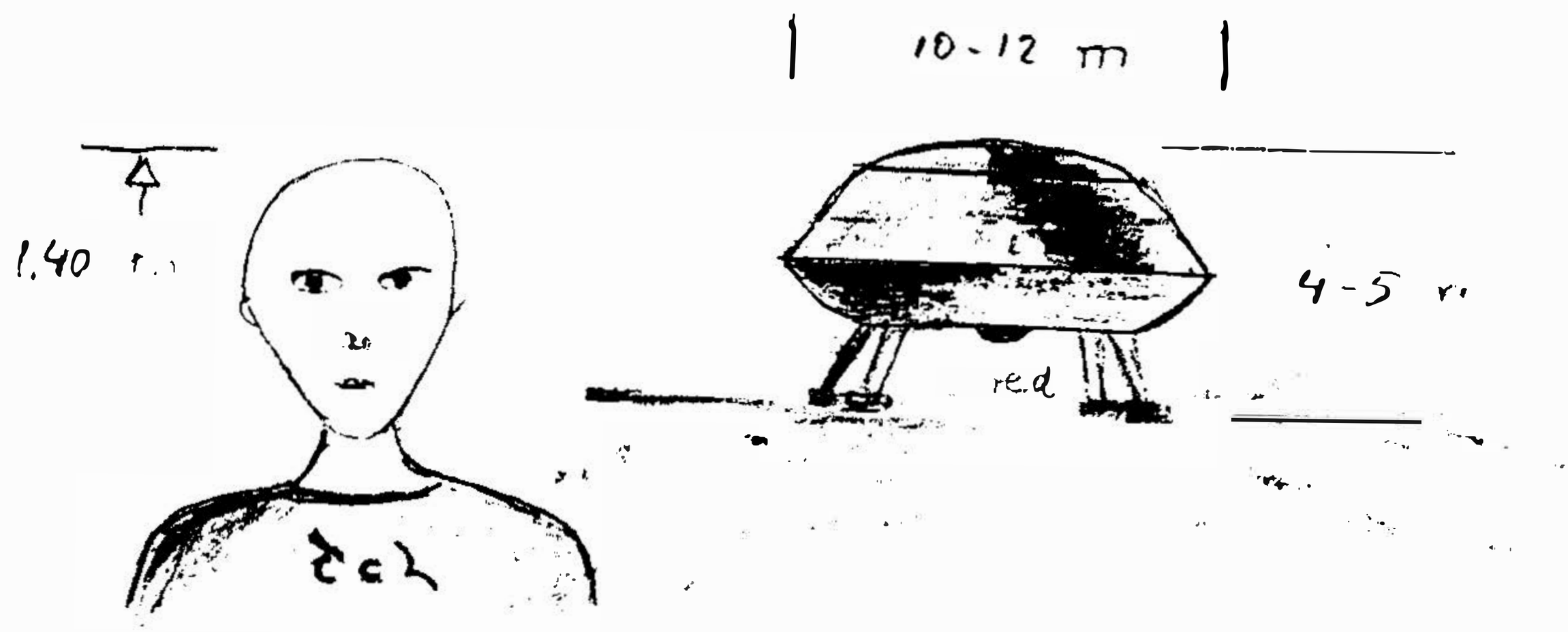


Fig. 7. Drawing by the anonymous witness from Korbach of the landed UFO and one of its occupants.

All of a sudden two entities were standing in front of her, both of them between 1.40 and 1.60 m in height, with bald heads and gray skin. They wore dark green overalls. On the chest they carried the symbols . She did not understand their language. They soon returned to the craft, which was standing on 4 legs about 1.50 m high. The green beam vanished and Mrs. S. sank to the ground in a faint. It was 9:30 p.m. when she woke up again. She took a few steps and vomited, which she did again after reaching home, where her dog was already waiting for her.

She had a terrible headache. Her face and hands were dark red and

burned like fire. She discovered two points on her chin which looked like punctures. It took a week before she felt normal again.

Our inquiries into the whereabouts of the witness (notices in the local press) have so far remained unsuccessful.

Case 15. Christiane König, Schwabmünchen (near Landsberg), 1990

On March 16, 1990, two young women from Schwabmünchen near Landsberg seem to have had a traumatic encounter with an unidentified flying object at about 10 o'clock at night.

The brother of one of the women brought us into the case. However, at first the witness did not want to tell us about the incident. As she finally did so, her story was interrupted by convulsive sobbing. During a visit to the sighting location with the two women it became apparent that they described two completely different objects. Both of them de–scribed the arrival of the craft in exactly the same manner. At first it was a large star, which flew towards the nearby town to just above the rooftops, where it took on the apparent size of a bus. It was lost to sight and was waiting for the women's car outside the town by the side of the road. From this point on the stories of the two women no longer match. The main witness remembers that the red dish–like object flew close to and parallel to the car at eye level. Her niece disagreed. According to her, the object was orange and cylindrical in shape with a row of lights or windows on the side, which did not fly lower than 20 m. As another car approached from the opposite direction the object flew steeply upwards and away.

The difference between the descriptions does not, as every skeptic would assume, mean that this case is not true. Instead, it seems that the first witness had another sighting, which she has partially sup–pressed and is now mixing this with details of the sightings from March, 16. It was some months after the sighting, in July, 1990, when she woke up with a nightmare. She had overslept and had to rush to the training center. Shortly afterwards she noticed a pain in her back and in her left foot, which she could not explain. Back home again at noon she found a wound as if made by a knife or drawn by a hot pin across her rear right–hand shoulder blade. On her right calf muscle there was a 2 inch long cut with a point–like wound above and below it. Underneath the inside bone of the right ankle another scar took the form of a pictogram consisting of a horizontal "one" with a triangle on one end.

She went to the doctor and showed him the wound on the back. His opinion was that it was probably caused by her cat. Four months later the scars were a brown color. Unfortunately, the witness refused to allow any tissue to be taken, although a well-known dermatologist was interested in studying it. Also she would not allow a hypnotic regression to be performed (although Dr. Rima Laibow during a visit to Munich offered to perform this). Possibly at some later date we can obtain more details on the case.

While Mrs. König rejected a hypnotic regression, in other cases witnesses have turned to us with the request to arrange just such a treatment.

In 1971, Mrs. Karin Fischer, 45 years old, saw a blue, glowing cloud from her window at night in Hamburg, and fainted. During the next three quarters of a year she felt so tired that she had to sleep almost continuously. Since then she carries a scar on her left shoulder which looks as if a bullet had caused it. Her tiredness subsequently changed to insomnia. For the past 20 years Mrs. Fischer has been unable to sleep without sedatives. Poltergeist phenomena occur in her vicinity. No one so far has regressed her hypnotically to discover the cause of her scar.

Case 16. Christel Müller-Baronski, Berlin, 1991

Following a television show on UFO abductions, a 60 year old lady from Berlin got in touch with the moderator of the show and reported an experience she remembered only partially, but which she felt had been an abduction. The TV personnel turned to us with a request for assistance in the investigation. The only thing the witness, Mrs. Christel Müller-Baronski, remembered, was that one night in fall of 1991 she was carried down the stairs in a lying position by some "people", who took her to a brightly illuminated room, where she lay on a table.

She could not remember further details. After passing a psychological examination, our psychiatrist, Dr. Widhalm, put her under hypnosis. It took him several hours to break down a posthypnotic barrier and gain access to events that until then had been locked away in the mind of the witness. At that moment tears came running down Mrs. Müller's face. She clearly remembered everything.

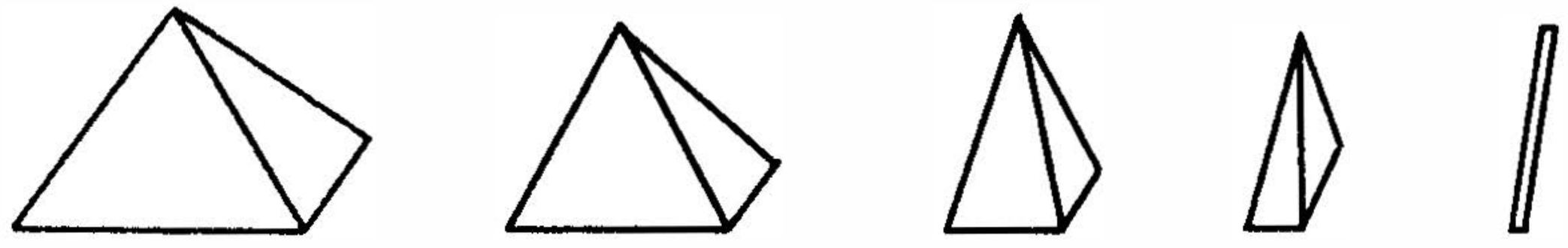
The witness now saw entities in front of her. They were humanoid and

about 1.60 m in size. They wore long white robes which also covered their arms. Their faces were unrecognizable. The entities floated her in a lying position down the stairs and across the lawn in front of the house to a lens–shaped object. They entered the craft via a ramp, and placed her on a sort of operating table. The entities talked to each other in a foreign language. No one touched Mrs. Müller. Instead, some equipment on a stand was wheeled in position and began to probe her body. Something touched the back of her head and caused pleasant electrical shocks to run down in waves from head to foot, but at the same time she felt an icy cold penetrate her body and passed out. During hypnosis the psychiatrist met up with a situation which frightened Mrs. Müller. This aspect will be reexamined once Mrs. Müller feels strong enough and willing to continue.

Case 17. Rolf Fuller, Tuttlingen, 1992

On July 24, 1992, Mr. Rolf Fuller had driven with his brother from Eberswalde to Tuttlingen. He was overtired because he had spent a sleepless night. On that warm summer night he had sat with his relatives on the balcony with a view towards the nearby wooded hills and the clear sky. At approximately 10:30 p.m. he observed a "star" moving slowly and growing in size. At first its color was white, then red and blue, and then white again. When it had come to within a few thousand meters, Mr. Fuller recognized it as a pyramid of light. It moved closer from an elevation of 45^0 and remained stationary at 35 to 40 degrees. This lasted for 2 seconds. It looked as if it left glowing pyramids in its wake, looking like a time exposure of a moving object.

The pyramid carried out circular movements with its base, which measured some 50 meters, while its pointed top remained stationary. Every 2 to 3 seconds a flash illuminated the area underneath the pyramid. After a while, the pyramid backed away in an upright position, describing an S–shaped horizontal curve. Towards 1 in the morning the pyramid was "reduced" in steps, as if it were "swallowed up" by a vertical wall.



For some strange reason, Mr. Fuller did not draw the attention of any of the other seven members of the family to the appearance. Lightning

from the pyramid was thought to be due to a distant thunderstorm and no further attention was paid to the phenomenon.

Towards 1:30 a.m. Mr. Fuller and his brother broke up in order to reach the house at the other end of Tuttlingen, where they intended to spend the night. They arrived there at 2 in the morning on July 25. The two brothers slept in a single bed.

Fig. 8. Rolf Fuller (left) and his brother a few days before his abduction in Tuttlingen.

Sometime during the night Rolf Fuller woke up and found himself in unfamiliar surroundings. He was in a room about 5 m in diameter, which was weakly illuminated by a reddish light. A small figure, no more than 1.30 to 1.40 m tall, in a blue suit with a black belt was standing in front of him. It wore a dark blue peaked cap. Its arms were long, and so were its fingers. Its face looked like that of a "rabbit without its ears". The entity had big, slanting, closely spaced dark eyes, a small mouth and a very small nose, no ears and stubbly hair. Its chin jutted out.

Rolf Fuller was surprised: "What in thunder is the matter?" he asked and shook the small being which carried the sign

in a yellow field on one sleeve. At that moment each of his arms was seized by two entities even smaller than the first one, wearing greyish brown overalls. They weighed very little. He hit one of them in the face with his elbow, so that it fell down. He could easily lift up the two individuals hanging on to his right arm. The entities did not seize him directly with their fingers, but each pair clamped its arms around his and crossed its fingers around an arm of his. They evidently intended to lead him to a medical couch. Fuller could tear himself loose. He made a somersault over the couch, got back on his feet and lifted the couch, which turned out to be very light, in order to throw it at the entities. However, when he realized that he could not escape without their help, he put the couch down again.

Rolf Fuller stepped up to the "boss" and demanded to know what he wanted of him. He did not get an answer. Fuller addressed this individual with "boss" and "fat one" ("Dicker", a derogatory German way of addressing a person), tapped his belly lightly with the back of his hand and said: "Say something!".

Fig. 9. Rolf Fuller claims to have been abducted in August, 1992. He had to fight 4 entities with "heads like rabbits without ears".

Suddenly one of the entities jumped on his back. Again two of the beings seized his arms on the left and on the right. Fuller kicked with his legs and hit the "boss", who lost his cap. The entity on his back pressed its hand on his mouth, whereupon he fainted.

The entire episode had lasted about 5 minutes. Rolf Fuller woke up sitting upright in his bed. The 5 entities were still with him and pushed him into a horizontal position on top of his brother. Fuller saw all entities double (the way Betty Andreason described them, too). This multiplicity of projections merged into a single one and disappeared all of a sudden. Outside it already began to dawn.

Under the impression that he still had to defend himself, Rolf Fuller seized his brother, who is 8 years younger than he, and pushed him out of bed. The brother did not take this very seriously, because he believed he had taken up too much room in the bed. After that both of them fell asleep.

Fuller believes that he was fully dressed while on board the UFO. For this reason he is unsure of the reality of his experience and wants to find out the truth of it through hypnotic regression.

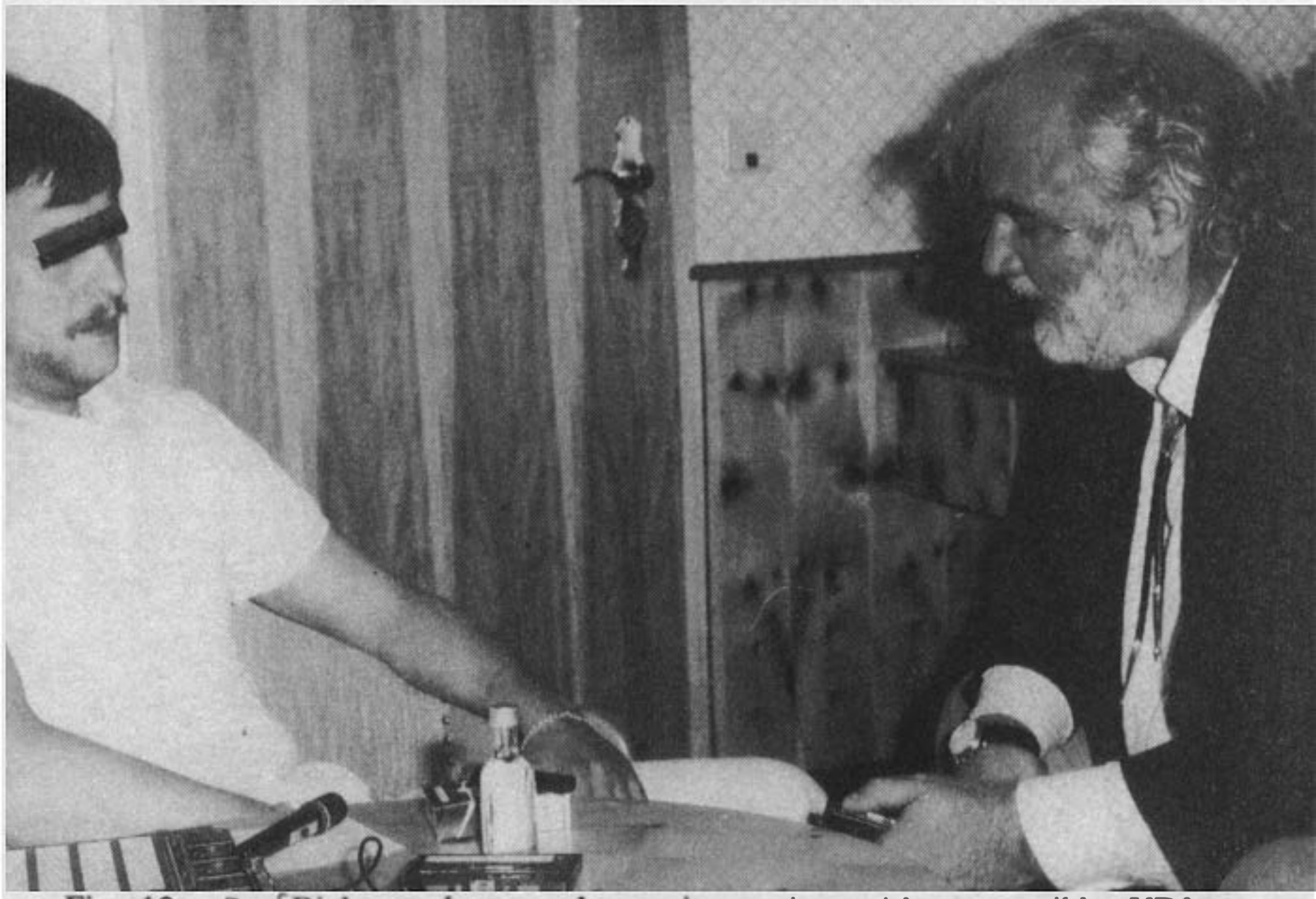


Fig. 10. Prof. Bick conducts a hypnosis session with a possible UFO abductee.

Brilliantly Shining Object and Strange Figures in Langenargen

CE1/CE3-Case

by Illobrand von Ludwiger and Adolf Schneider

translated from the German by William Craig

MUFON-CES Report NO. 4, 1978, pp 43-83:
"Strahlenwirkungen in der Umgebung von UFOs"

and

MUFON-CES Report NO.8, 1981, pp 346-354:
"Offizielle Untersuchungsberichte der Russen und
der Amerikaner über unidentifizierbare Himmelserscheinungen"

November 1989

Location : Langenargen/Lake Constance

Time : 24/2/1977 between 2:30 - 3:45 a.m.

Objects : 2 bright fusiform objects, each with 4 brilliantly shining "searchlights"

Distance : > 50m

Altitude : > 15m

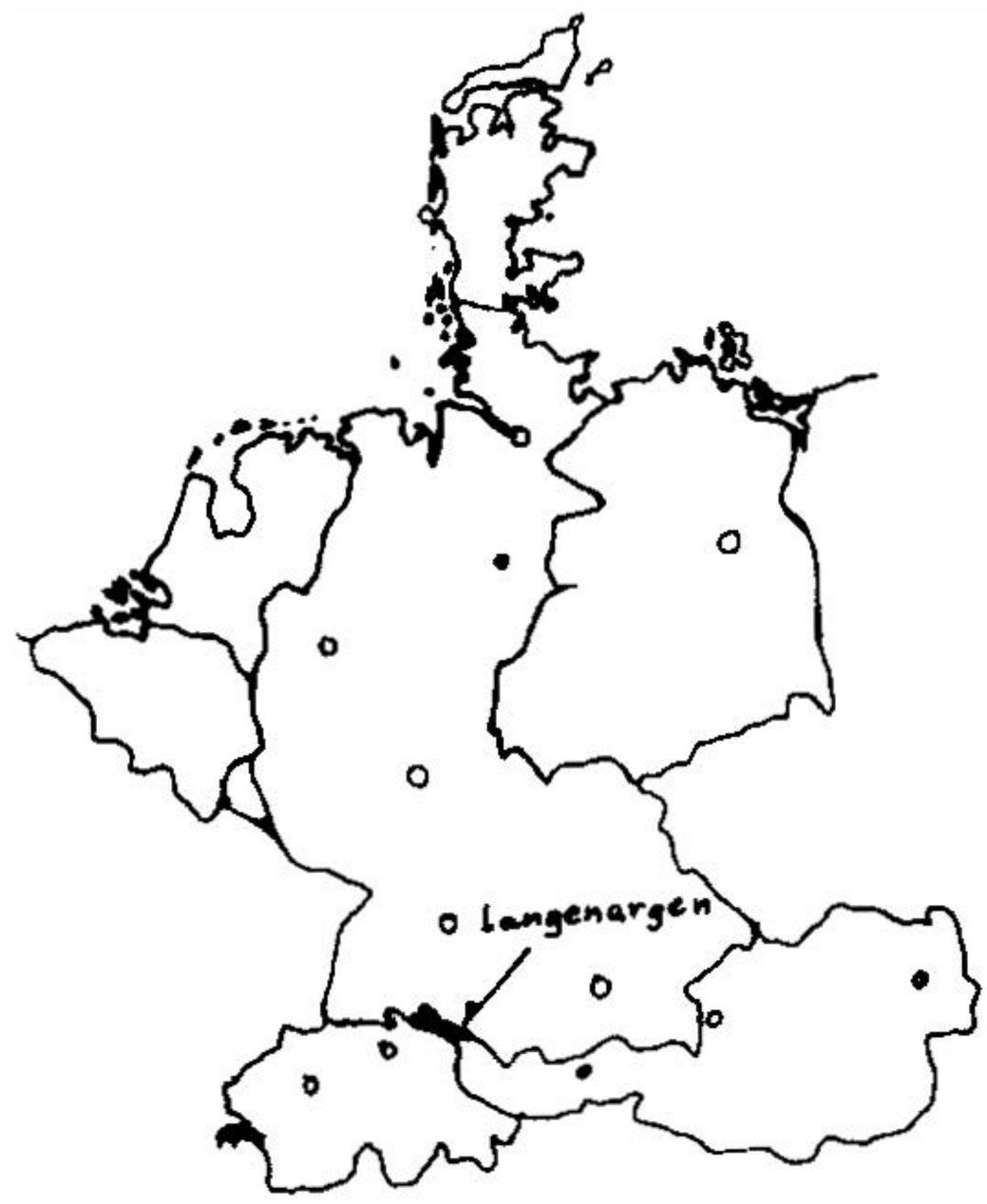
Size : ca. 17m

Witnesses (for CE I) : 6

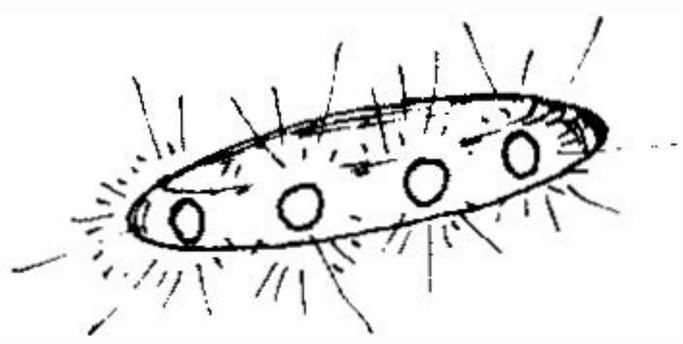
Reliability Index : pr = 99.99%

Witnesses (for CE III) : 1

Reliability Index : pr = 90%



Peculiarities: 2 figures, 1.10 - 1.30m high, seen by 1 witness



Interviewers:

Prof. Claus H. Bick
Illobrand von Ludwiger, M.S.
Dr. Irene Saenger-Bredt (+)
Prof. Werner Schiebeler
Adolf Schneider, M.S.
Siegfried Streubel, M.A.

Part I - The Sightings

1. Introduction

Supposedly shining a thousand times brighter than magnesium light were the UFOs reportedly seen during the night from Ash Wednesday to Thursday, the 24th of February, 1977, by the 52 year old Rudi Grutsch (now deceased), proprietor of the "Waldeck" Cafe-Restaurant in Bierkeller, and the German Federal Railways employee Lothar Schaefler, 27, from Langenargen. Schaefler even felt himself so assaulted and threatened by the strange happenings that he fled in panic to seek protection in a neighboring house, breaking the glass door with his fist. Reports from independent witnesses, as well as thorough questioning of the primary witnesses and psychological evaluations, verified the authenticity of the events.

We first learned of the incident through a short article in the Bildzeitung from March 3, 1977, fourteen days after its occurence:

> UFOs OVER LAKE CONSTANCE: SEEN BY 8 WITNESSES
>
> im. Langenargen (Lake Constance), 2nd March.
>
> Neither the German Federal Railways employee Schaefler ("I drank four beers at the most"), nor the innkeeper Rudi Grutsch, nor even Mr. Zirn, want to claim to have drunk too much that night on Lake Constance when the UFOs came.
>
> It was last week, Thursday, two o'clock in the morning, as Mr. Schaefler came out of his favorite bar in Langenargen: "Suddenly a shrill howling and brilliant searchlight beams. From a height of about 50m two shapes dove towards me with a deafening noise. I screamed for help and ran away." Mr. Schaefler was so scared that he jumped in fear through a pane of glass.
>
> Innkeeper Grutsch verifies: The parking lot in front of my bar was lit up as bright as day by the glaring light." Five other neighbors also claimed to have seen and heard the two UFOs.

After one of us (A. Schneider) personally spoke with the witnesses for the first time, it became clear that the case apparently dealt with a Close Encounter of the Third Kind (CEIII). The primary witnesses described their experience in more detail to the Schwäbische Zeitung (Friedrichshafen) on March 4th, wherein it was stated:

> To the question whether he had also noticed the shapes of any occupants in the strange object, Mr. Schaefler declined to reply: "That point I wish to discuss with experts only."

As a result we were quietly able to seek verification of the experiences of the witnesses, undisturbed by publicity and sensationalism.

Figure 1: Langenargen on Lake Constance.

Figure 2: Bierkeller-Waldeck with the Waldeck Café.

Numbering over 5000 residents, the town of Langenargen, which lies on the northeast shore of Lake Constance, has been from time immemorial a beloved and heavily visited recreation center. In 1970 the "Sonnenstube" on Lake Constance could look back upon a changing and traditionrich 1200 year history. Prominent landmarks of the town are the Montfort Castle, rebuilt in the Moorish style in the 19th century, and the splendid Baroque Church of St. Martin. Along with the 250 industry, commerce and handicraft businesses which are today based in Langenargen, the tourist trade, farming and lumbering play important roles. The Institute for Seas Study Group for the Protection of Shorelines on Lake Constance, has gained special significance. (see figure 1)

Bierkeller-Waldeck, lying 2 km to the north of the town center, and focus point of the UFO incidents of 24 February, sheltered an air observation stand during the Second World War. This observation post was evolved from a para-military association founded in 1928, and was incorporated into the German Air Force shortly before the war began. Near here, in the 1km distant community of Schwedi, was the then Naval Radio Bearing Station, Southern Headquarters.

This radio, receiving, and transmitting center in the middle of Europe was part of a ship convoy monitoring and listening system. At the time gigantic dipole antennas, which were dismantled after the war, were located between the barracks. The German Army now has its 72nd Signal Corps Regiment's Radio and Direction Finding Southern Headquarters here.

2. First Sighting: Shining Objects over Lake Constance

In the night from 23 to 24 February the weather was murky: the sky was largely overcast, and a weak breeze was blowing from the east. The waxing moon had already set by midnight. In the early morning hours Lothar Schaefler drove Rudi Grutsch home in his green Citroen 2CV. The two had spent the evening together in Langenargen, leaving the Magg Bar, near the train station, towards 2 a.m. After a few minutes Schaefler arrived at the Waldeck Cafe parking lot. (see figure 2)

While Grutsch was getting out of the car, Schaefler, who remained in the car, saw something shining in the sky and called it to Grutsch's attention: "Look! What's that up there?" It was lights, still pretty far away, but shining brightly. Between the tall spruce trees in front of the parking lot, and the gable of the Waldeck Cafe, the witnesses could see two bright points of light approaching in a straight line from Lake Constance. Grutsch, who claims to have flown 33 missions with the JU52 during World War II, and who was afterwards deployed as a paratrooper in the Africa Offensive, estimated the height of the objects to be about 1000 meters. A minute later Schaefler also climbed out of the car. Rudi Grutsch was so blinded by the dazzling brilliance of bluishwhite light coming from four circular "searchlights" on the front parts of the objects that he had to shield his eyes with his hand. Grutsch, who wears glasses (+0.9/+0.75 diopter) and does not hear well, could not make out any further details. Lothar Schaefler believed he could see oval contours standing out weakly against the dark background. (see figure 3)

Grutsch was disconcerted: "I've never seen anything like it before." Both objects approached rapidly, until they were about 500 m away. They then remained motionless for about 5 minutes, the lights sweeping the immediate area. Each of the objects appeared to be larger than a Sikorsky S-58 helicopter.

Both witnesses were overwhelmed by the intense brilliance of the objects. "A thousand halogen lamps would've been but a candle flame in comparison," Grutsch later states. Schäfler described the beams as "whiter than sunlight," comparable to the flashlight of a camera.

Schaefler, who was stationed in a helicopter unit in the German Army in Laupheim, began to wonder: Aluette choppers don't carry such bright light. These objects here emit a high-pitched whistling tone. Chopper noise would have shaken the entire neighborhood awake. An electrician, he is of the opinion that in order to produce that kind of brilliant light one would have to have installed an entire power plant up there.

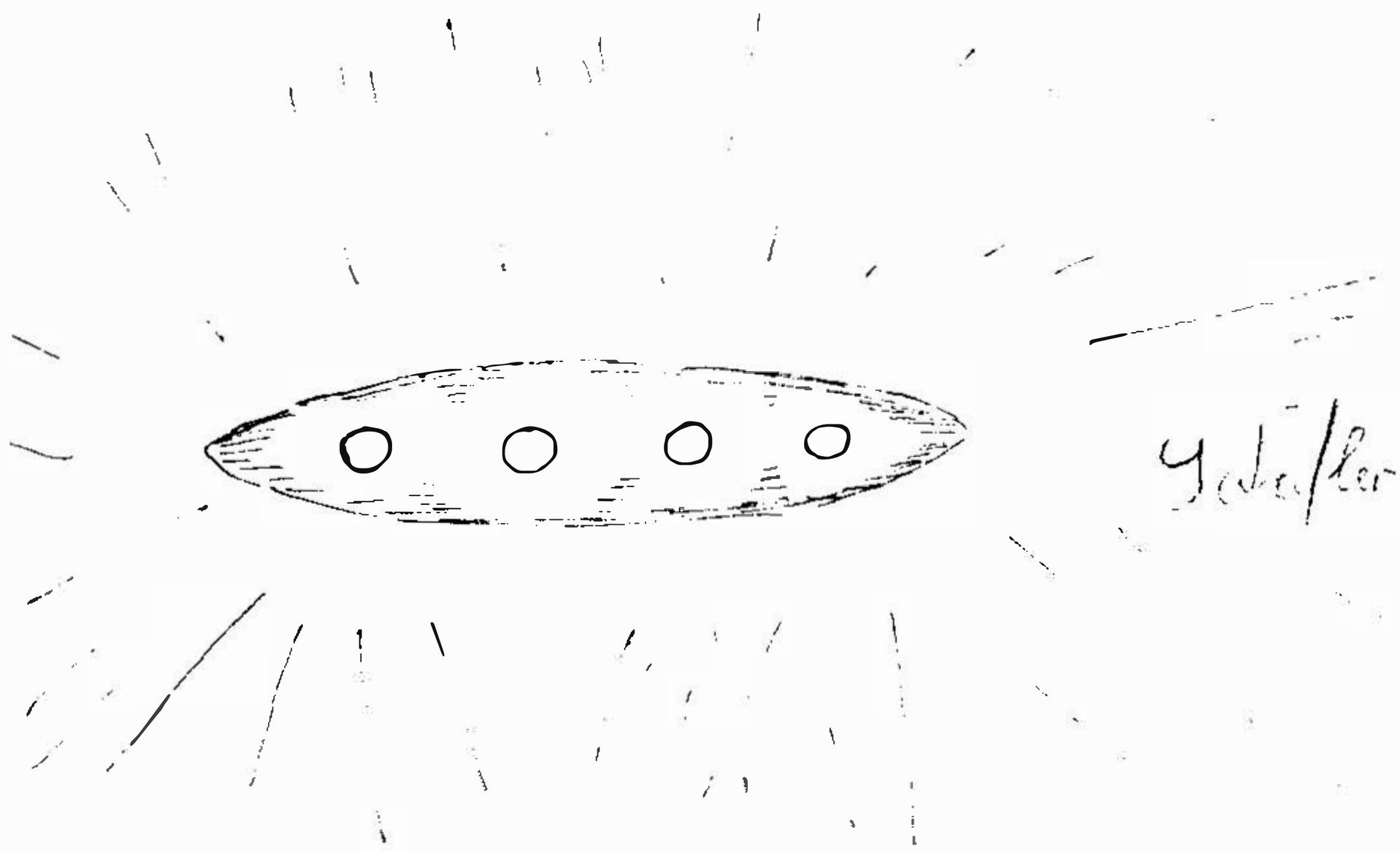


Figure 3: One of the objects drawn according to Lothar Schaefler's statements.

The lights, arranged to point directly toward the front, did not produce sharply defined beam cones. The immediate area was lit up as bright as day. The lights themselves appeared to flicker or quiver too rapidly, and to transform them-selves in some way.

After the now totally noiseless objects hovered in the sky for about 2 minutes longer, they began to approach one another slowly, until they appeared to touch. Both witnesses heard two cars drive by. The drivers must also have been able to see the lights, but were later impossible to trace.

Neither of the two men spoke any longer to one another, the spectacle having rendered them speechless. Suddenly "the things just disappeared, as though turned off." Grutsch looked automatically at his watch. It was ostensibly exactly 2:10 a.m.

Both Grutech and Schaefler were of the firm opinion that they were not the victims of hallucination during the sightings. Unfortunately, it will always be questionable whether or not the witness Grutsch was inebriated, since he would not allow himself to undergo any psychological testing in the course of the investigation. Schaefler admits drinking a total of "4 - 5 1/4 l" of wine in the Magg Bar (later verified by the police in a blood-alcohol test: < 0.03%, meaning he was relativaly sober).

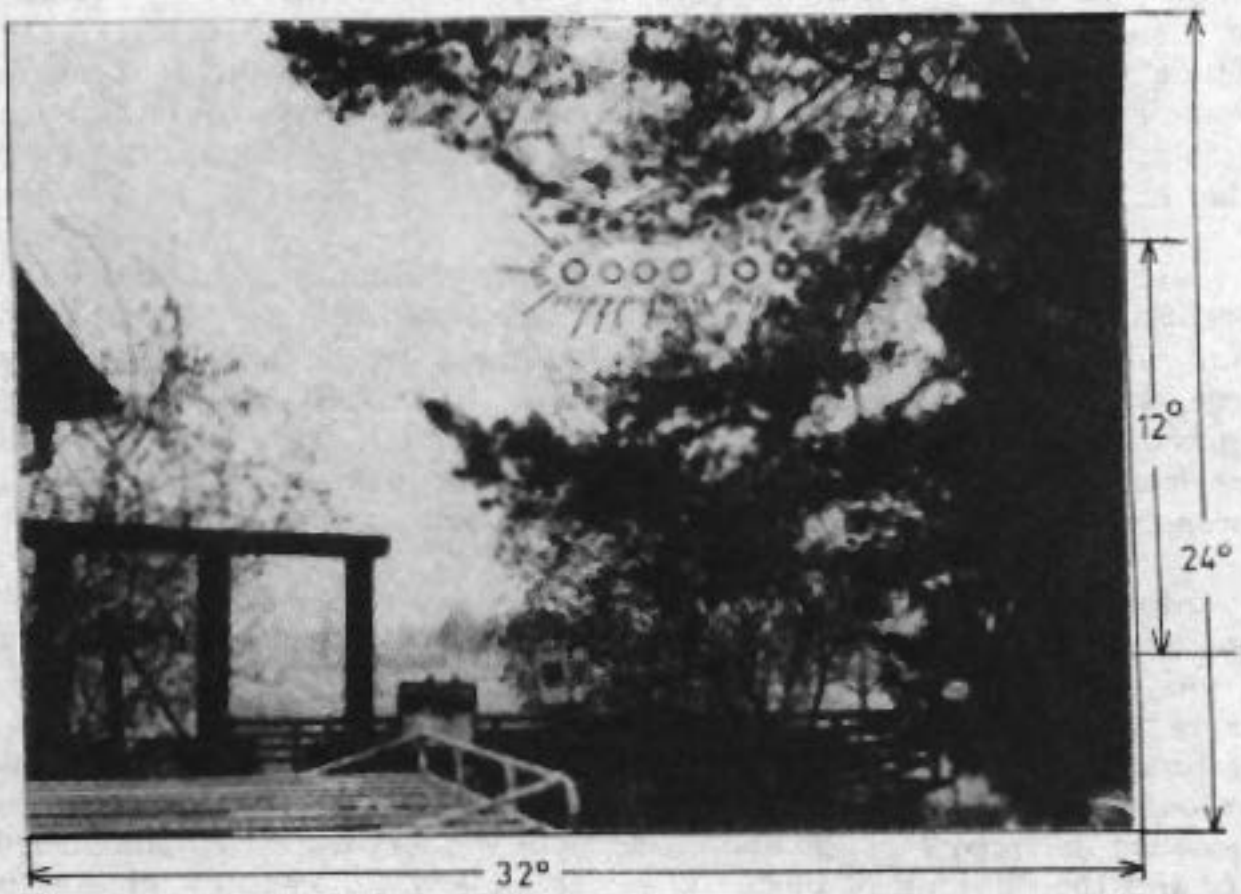


Figure 4: Location of the first sighting from the Waldeck Cafe parking lot.

3. Second Sighting: The Objects over the Waldeck Cafe

Shortly after 2:30a.m. Rudi Grutsch said good-bye to Lothar Schaefler. He entered the house through the back door, locking it after himself. Just as he was about to go up the stairs he looked out of the ground floor window and saw the unknown flying objects suddenly appear anew. This time they were coming out of the northeast, from the direction of Tunlswald, and appeared to be quite close. Grutsch estimated their distance at the beginning to be 150m, and their height at some 50-60m above tha ground. Once again there were two times four lights, which lit up the back yard and neighboring houses as bright as day, such that the house walls partially became mere black shadows. "Had a copper penny been lying in gravel, it would have shone like gold," assessed the innkeeper later on. He went toward the ground floor window, appraching to within a half-meter of the closed window, before he suddenly found himself unable to go any farther.

He had no idea whether the cause of this cataleptic rigidity was psychic or physical in nature. He wanted to call out to Lothar Schaefler, but found himself unable to do so. "That's impossible! Such things simply don't happen!" and recalled: "I was standing there and thinking, 'now it's all over.'"

In the meantime the intensely brilliant objects came closer. Rudi Grutsch noticed Schaefler was still running around outside, first ducking to the right behind the nearby bushes facing the kitchen, which jut out from the rest of the house, then standing up again and fleeing around the far corner of the kitchen to the other half of the house. Unable to call out to Schaefler, Grutsch then claimed to have seen an indistinct shadow - shaped like a small barrel- swaying to and fro before the built-on kitchen, i.e. directly in the path of Schäfler's flight.

Asked for the duration of these events during a further questioning on April 6, Grutsch admitted: " I had lost all sense of time. To me it was just too long. All I could think was, 'My God, what's happening!'" After about two or three minutes -he can't remember exactly - the objects began once again to approach one another, as in the first sighting. This time, though, the two innermost lights appeared to fuse, then disappear. The remaining lights came increasingly close together, until they also coalesced and disappeared.

Unfortunately, Schaefler was unable to verify this spectacle later on, having been unable to look directly at the lights because of their terrific brightness. "It was simply not comprehensible to me," repeated Grutsch over and over again during a later interview. "First it was eight, then six, then four, then two lights, and finally one. The last light even appeared to get bigger." The fusion process took only a couple of seconds. In his opinion, "the last light's getting larger and proceeded in jumps or jerks." Immediately thereafter Grutsch heard cries for help, and the clinking of pieces of broken glass. He was now able to move again, and ran to the upstairs window in the hope he would be able to see more from there, but outside all was bathed in darkness. He remained standing in front of the window for a while longer, before going into the bedroom, shaking all over. Mrs. Grutsch, by now awakened by the noise Schaefler was making outside, thought a burglar was trying to break into the house. The next door neighbor, Mrs. Burk-hart, has no telephone, and called to her from an open window to call the police at once. At first she also suspected a burglary. Mrs. Grutsch then called the police station in Friedrichshafen. Upon perceiving her agitated husband, who repeatedly whispers that he has just experienced something too impossible to believe, she didnt press him, but instead dressed quickly, intending to run over to her neighbor's. (see figure 5)

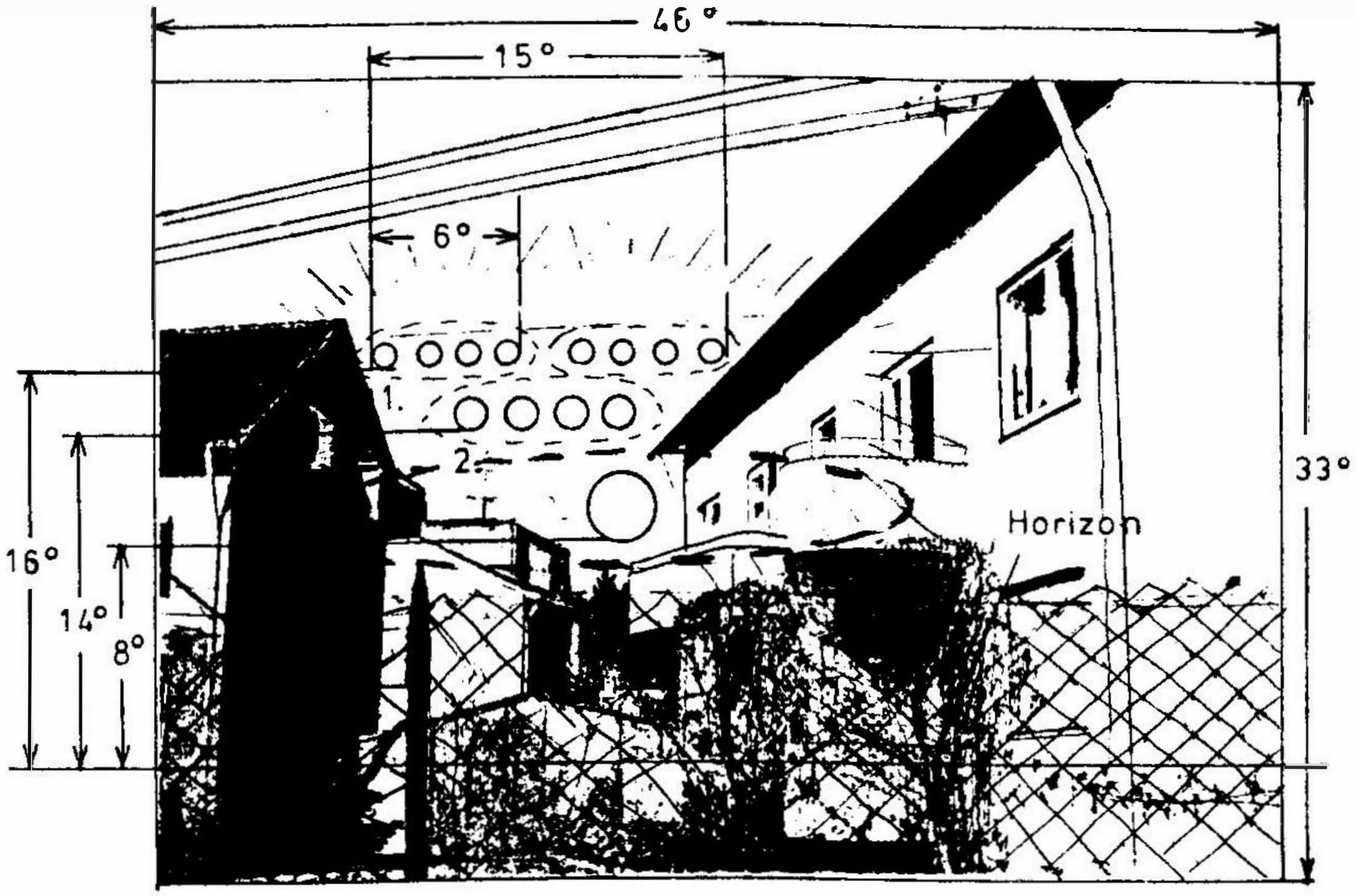


Figure 5: View from the ground floor window at the back of the Waldeck Cafe.

4. Unknown Figures Appear Suddenly

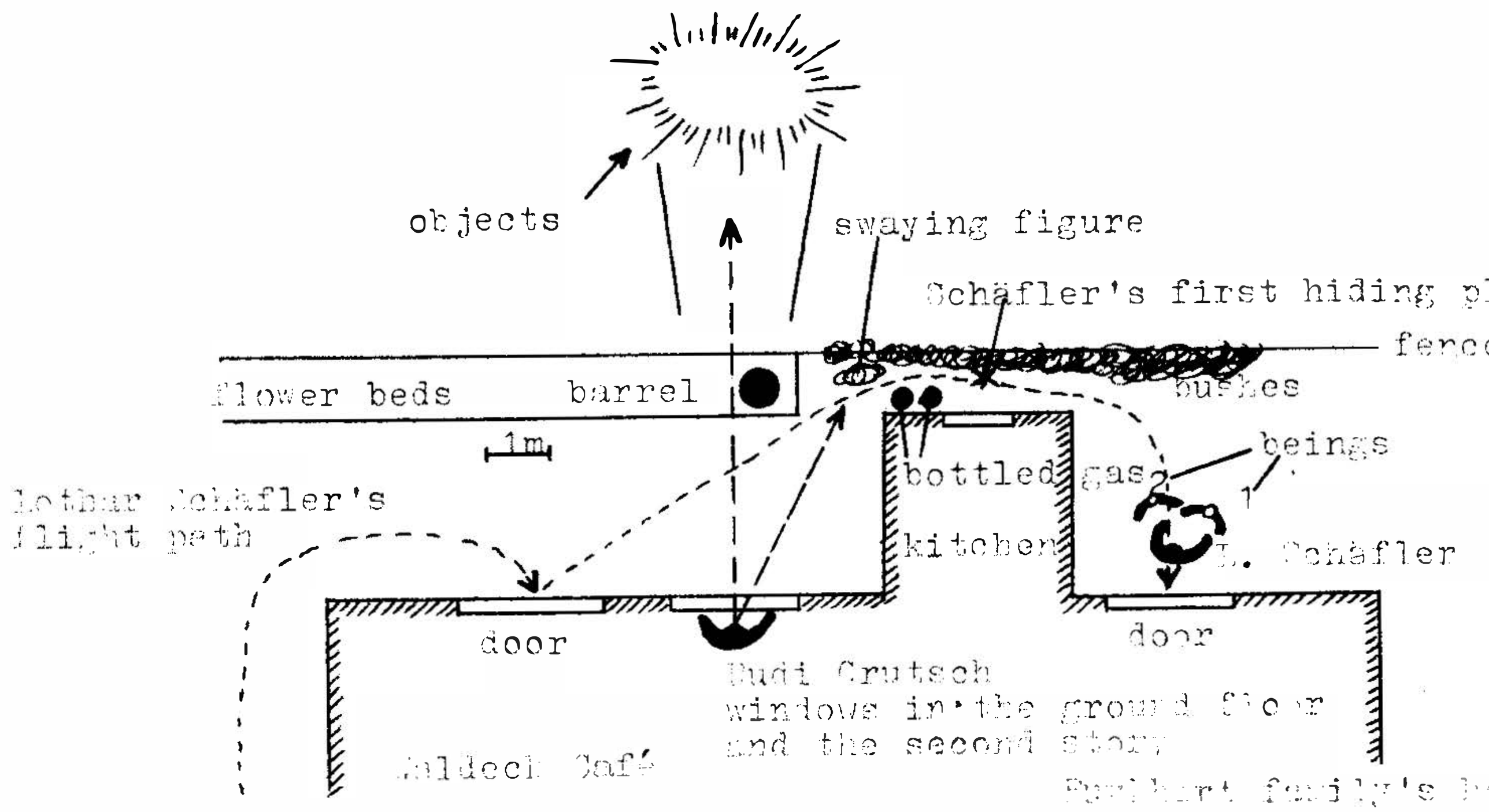
Meanwhile Lothar Schaefler has experienced a time of terror. Shortly after the sudden disappearance of the objects, just as he is about to climb into his car, he also saw the light flare up in the sky once again. This time there was only one object, but very near. The enormous size of the object instilled in him an overwhelming anxiety. He wanted to follow Grutsch into the house, ran first to the south entrance, then to the north, but all doors were locked.

Schaefler reports: "There were four very large searchlights, or whatever they were, kind of circular, or maybe semicircular, that constantly wobbled or quivered - if they were even lights".The object emited an extremely high - pitched, piercing, but not loud, tone of constant intensity. (Schaefler, who is employed by the German Federal Railways in a telecommunications workshop, and earlier by the Saba Works, compares the tone to the 15kHz tone of a sine wave generator, as used to test loudspeakers.)

Lothar Schaefler ran along the kitchen wall and threw himself full length in the small bushes before the back yard fence. The light kept coming closer. By now the entire area was lit up so blindingly bright that Schaefler didnt even feel secure in this hiding place and ran to the rear entrance of the Burkhart's house.

There Schaefler suddenly heard a short whistling sound, "from very high to low frequencies," felt a slight draft of air, and - as though conjured out of nothing - suddenly there stood two strange, alien beings directly behind him.

The figures were no more than about 1.30m and 1.10m tall, respectively (as later indicated by comparative measurements). The beings had a quite human-looking body, although their long arms reached almost to below their knees. Conspicuous was also their oddly cramped fingers, reminiscent of those of spastic children. Other than a kind of frill around the neck - somewhat like a harlequin - with some 6-7 light green "star-like serrations," Schaefler could not make out any further articles of clothing. Their skin appeared to be somewhat lighter than human skin. Their hairless heads were completely round, as were their clearly defined mouths. Ears and noses could not be seen, nor did they have necks. The strange figures rocked their torsos slowly back and forth. At the same time their small eyes - "like the Chinese, slanted, but not as narrow" - stared unflinchingly at Schaefler, now paralysed with fear. The larger being stood about 1m away from the witness, whereas the smaller one was at a 90 arc to the left.



Figures 6: Positions of the observer

Schaefler recalls: "I stared at them, and they stared at me, and then I simply went nuts." Although the figures made no gestures signifying aggressive intentions, Schaefler flew into a state of panic. He threw himself against the Burkhart's door and cried for help, but the door was locked. In his desperation he impulsively broke the upper middle pane of glass, unlocked the door from the inside, fell on the floor, and didnt look around him anymore. By the time the house tenants arrived everything had disappeared - the beings, as well as the lights.

5. The Police Arrive

Mr. and Mrs. Burkhart, the Grutsch's next door neighbors, later reported that someone repeatedly rang the door bell for about 15 minutes, beginning around 3:30a.m. Finally, cries and appeals for help were to be heard, along with the noise made by the breaking of the door glass. Only then did Mrs. Burkhart get out of bed, although she was hesitant to run to the door to see who was there. Everything remained quiet for about 5-8 minutes. Then, from her roof window, Mrs. Burkhart cautiously called over to the Grutsch's neighboring window: "Mrs. Grutsch! Someone was trying to break in. Call the police."

In Friedrichshafen, Police Sergant Krüger answered the phone and immediately notifies the nearest patrol car.

After a while Mr. and Mrs. Burkhart went slowly down the stairs and found Lothar Schaefler lying prostrate on the hallway floor, his hand bleeding. Upon seeing them Schaefler calls out in his Swabian dialect, "they're flyin' around up yonder," and excitedly points to the sky. The Burkharts, who did not notice anything, believed Schaefler - a complete stranger to them - to be either drunk or mentally unbalanced, and suspected he has been involved in a fight, as Schaefler had blood smeared all over his face from his bleeding hand. The police arrive within a few minutes, but suspected right away that this does not look like a burglary attempt.

Toward 4 a.m. the police took Schaefler to the Friedrichshafen Hospital, where his hand, cut open on two fingers by the glass shards, was bandaged. The policemen believed at first Schaefler was suffering from hallucinations brought on by an alcohol delirium, but began to wonder when the blood-alcohol test showed only 0.03%. (They were amazed that several scientists bothered to take the witness's story seriously, due to the general lack of information concerning the UFO phenomenon.) Towards 5 a.m. they called the witness's mother, who had understandibly been worried over the whereabouts of her son, trying to calm her. Lothar Schäfler finally arrived home toward 6a.m.

6. Further Witnesses

The following day Schaefler informed his colleagues of his experiences. He was sick and unable to work. His friend and colleague Wolfram Nafts from the telecommunications unit talked him into reporting the incident to the press as a means of eventually locating further witnesses. Although Grutsch and Schaefler foresee mocking and derisory comments bound to come from many of their friends and neighbors in the future, they agreed to follow this suggestion. Thus a short notice appeared in the Bildzeitung from 2 March, supplemented by a more thorough representation in the Schwäbische Zeitung from March 4th.

In the course of the following days further persons came to the Waldeck Cafe, also claiming to have observed strange things during the night in question. Two of these additional witnesses could be personally interviewed by us. A third witness described his experiences over the telephone.

Within 100m of the Waldeck Cafe, in a northeasterly direction, lives the Brielmayer family, on Buchenstrasse. While her husband was peacefully sleeping in the early morning hours of 24 February, Mrs. Brielmaier took a bath, long after midnight. Shortly after she also lay down in bed and heard a loud whistling noise in the sky. At first she thinks it was merely one of the night flights which regularly fly over the house between 1:30 - 2:00 a.m. on air corridor G4 in the direction of Oberdorf, to the northeast. Because, though, of their high altitude of 8000m, the planes are to be heard only under certain weather conditions.

The 65 year old witness told the following: "Hardly did I get in bed, when I started thinking what an unholy racket the planes were making today. After two minutes at the most, the loud sound was there again. Now it sounded as if there were two objects which wanted to land. Besides a low-pitched, very, very strong noise like a motor, there was also a high-pitched, whistle-like humming in the air." The noise reminded Mr. Brielmaier of the roar made by the French SA330 Puma transport helicopter, units of which are stationed in nearby Eriskirch and Friedrichshafen. Her son-in-law, Mr. Hoffmann, was later of the opinion that the French must have performed a night flight maneuver on February 24th. In any event, a landing approach right in the middle of the houses would certainly have been forbidden. Furthermore, the whistling made by the objects was supposed to have been comparatively louder.

Upon hearing someone yelling, Mrs. Brielmaier pulled the bedroom curtains aside from her bed, and now had an unobstructed view in the direction of the kindergarten and Waldeck Cafe. The sky to the left of the Grutsch's and Burkhart's semi - detached house was brightly lit up. The lower part shone lilac pink (*), the middle part chamois, and the upper part grey-violet. Like a rainbow, the colors ran over into one another. Toward the top the lustre weakened noticeably.
The two primary witnesses also believed to have seen a slight bluish tinge. Whereas Schaefler had indicated a shade approaching turquoise blue, Rudi Grutsch spoke of a weak color between turquoise and ultramarine. Mrs. Brielmaier stressed that the surrounding houses lay in darkness. (see figure 8)

Mrs. Brielmaier was unable to understand why none of the residents east of the Waldeck Cafe should not have heard or seen any traces of the objects. She herself claims then to have perceived cries, and shortly afterwards, the jingling of glass shards. Directly after that the coloring in the sky disappeared. The entire spectacle might have lasted for two minutes at the most, although she could not be sure.

(*) Philatelic Color Chart, LIPSIA, Vienna.

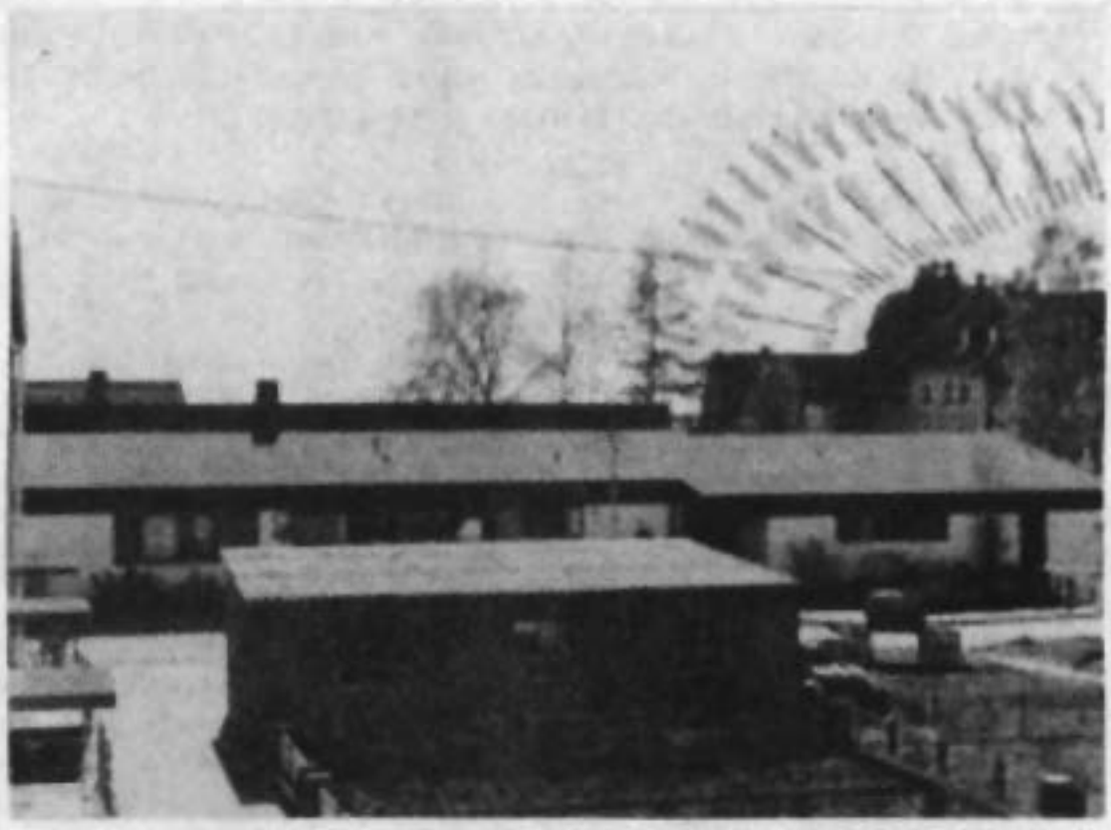


Figure 8: Mrs. Brielmaier's view of the aerial color display.

(The Brielmaier family's large German shepherd, confined to the living room on the ground floor during this time, remained quiet. The other dogs in the neigborhood, which occasionally bark loudly, were also quiet.)

Further inquiries in the neighborhood provided no new clues. Mrs. Eble, the bedroom of whose house on 11 Fichtenweg (house III, figure 10) faces south, had been sleeping soundly at the time and noticed nothing unusual. The other residents of the building, Mr. Krüger and Mrs. Scholz, also knew of nothing. Neither were any of the residents at Nr. 12 Fichtenweg (houses II, figure 10) able to remember any unusual happenings during the night in question. They all had heard only the cries for help and the arrival of the police, and were under the impression it had dealt with a family quarrel. Mr. Burkhart, Jr. and Mr. Braun, the residents of house Nr. 1 (figure 10), which lies behind the Waldeck Cafe toward the south, did not even bother to reply to a written inquiry.
A further witness, Karl Brugger, lives in Endringer Manor, 1.4 km from Bierkeller-Waldeck, shortly before Oberdorf (figure 9). On the evening of Ash Wednesday he had already gone to bed by 9 p.m., having to get up very early to drive to work the next day. He suddenly woke up in the middle of the night and thought at first he had overslept because it was as bright as day outside, in the direction of Bierkeller. He then looked out the window: "It looked as if the police had set up a warning light, like the ones you see on the Autobahn after there's been an accident. It was extremely bright, brighter than the floodlights in a soccer stadium. It looked like a brilliantly lit round searchlight, but considerably brighter. Taking a quick look at the clock on the night table I saw that both hands were already past midnight."

Brugger did not notice the exact time. The size of the light had been difficult to judge, but he thought perhaps it might have had a diameter half of the full moon.

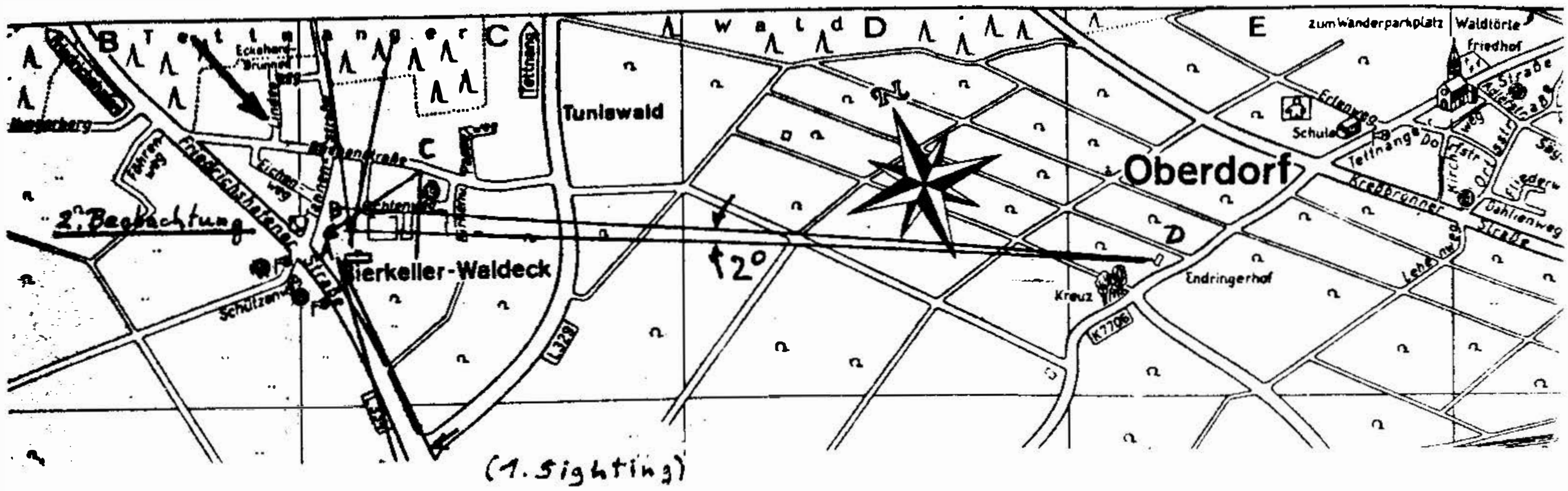


Figure 9: Map of Bierkeller-Waldeck and Oberdorf with the locations and fields of view of the various witnesses.

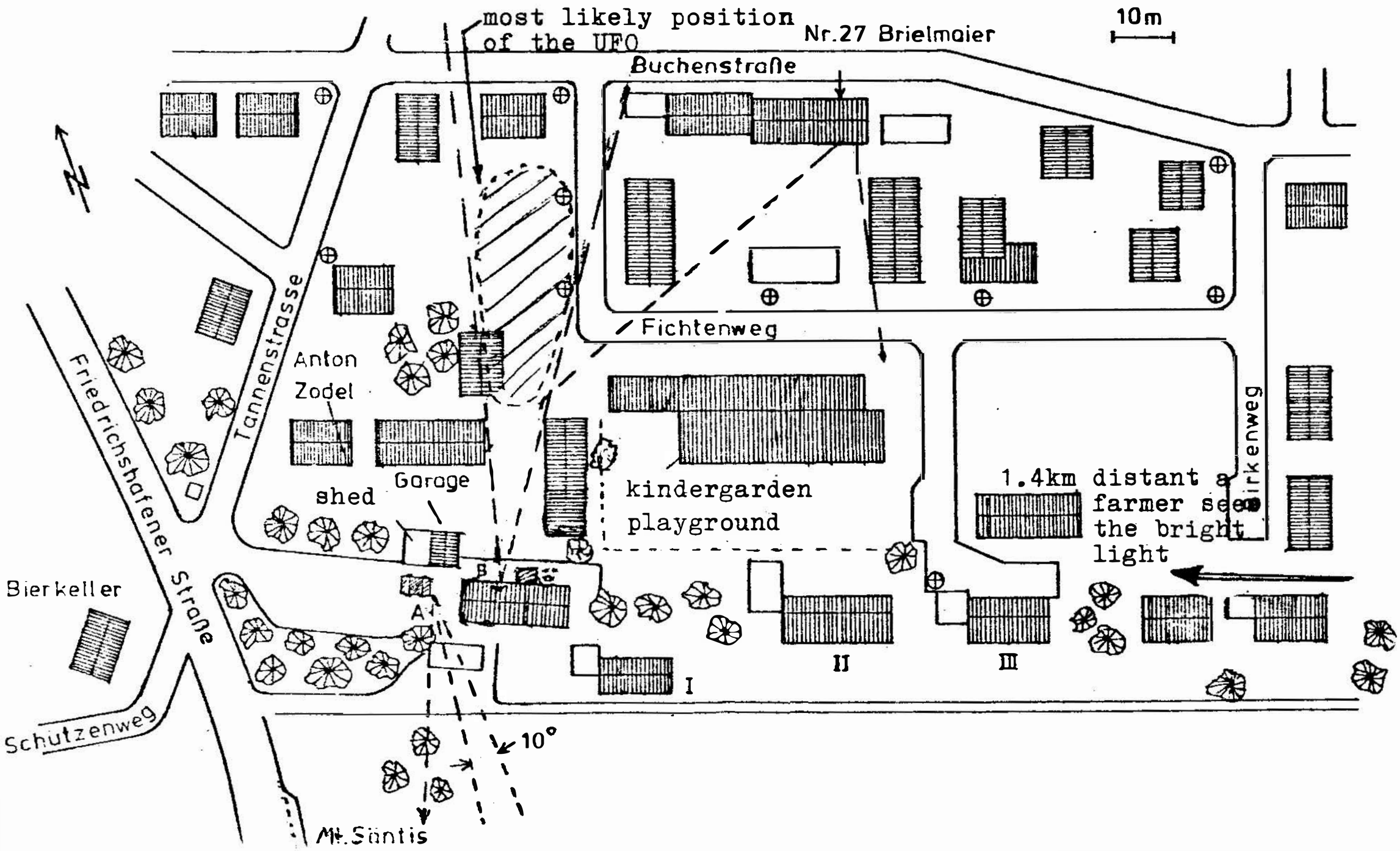
A supplementary report comes from Oberdorf, lying 2 km east of Bierkeller-Waldeck, and also administrated from Langenargen. Wilhelm Mehr, the brother of the former head designer of the Messerschmitt Works, and who has always had an active interest in air traffic, tells the following concerning his late night observations on February 24, 1977: "I arrived home with the car somewhere around a quarter to one in the morning. After I had put the car in the garage and was on my way to the house door, I saw a glaring white light in the eastern sky. It blinked at intervals of a second, but certainly wasn't a recognition light on a passenger plane. I estimated the distance to be about 15-17 km, and the altitude to be around 5000 m. The light was snow-white and had the appearance of a welding torch adjusted to 'flash'." During the war Mr. Mehr worked in the FLAK(*) (Anti-Aircraft-Defense), had absolved identification service, and was himself an instructor. Since the object stood absolutely still in the sky at the beginning, the witness thought at first of a star, about the size of Jupiter, but at least eight times brighter. After about 8 minutes, though, the object began to gain altitude, and to fly away with the speed of a passenger plane in the direction of Wagen. "The thing then shot off like a meteor and was suddenly gone. I thought to myself, there is something not quite right there," wondered the surprised Mr. Mehr. Afraid to make a laughingstock of himself, he did not at first tell anyone of his observation.

(*) trans. note: abbr. of German Flieger-Abwehr-Kanone, meaning literally aviator-defense-gun.

10km distant 2 women are afraid of the bright light

the 2 women are looking in this direction

Bierkeller: site of the main events



He had already noticed something strange in the early evening hours of the 23rd. Toward 7:45p.m., shortly before he went out of the house, he heard a loud whistling sound outside, as though a rocket were flying by the house. Immediately thereafter there was a boom which rattled the windows. That it had been the usual sonic boom of a jet breaking the sound barrier, Mr. Mehr rejected. The following day he questioned his neighbors, but no one had heard a rocket or anything similar.

Mr. Mehr and the witnesses Brielmaier and Brugger did not at first give any special significance to their observations. It was only a few days later, after the story of Rudi Grutsch and Lothar Schaefler was made public, that they reported their own experiences to Grutsch. There are probably other eyewitnesses, who fear making themselves known to the public. Schaefler confirmed that during the night of Ash Wednesday numerous guests were visiting the Magg Bar, leaving it again only after it was long past midnight. According to the bartender the locality was closed at precisely 2a.m. That would confirm Grutsch's assertion that it must have been around 2:10a.m. at the time of the first sighting, but not the claims of others - taking into consideration that the police did not arrive at the scene until about 3:45a.m.
That same night Mr. R. Houben, proprietor of the Bierkeller, claims to have seen a yellow sports car with a French license plate depart from his parking lot on Friedrichshafener Strasse. He says he was awakened by the roar of motor and the bright headlights.

Wolfram Nafts, Lothar Schaefler's friend and colleague, later heard from a railwayman, who he knows only by the first name, and who shortly thereafter moved to Ulm, that his wife had also seen the bright spectacle in the sky on the night of Ash Wednesday. Together with a colleague, she was driving on the way back home, from Oberteuringen to Friedrichshafen. When the two women saw the mysterious bright light in the sky in the direction of Langenargen, they became alarmed and stopped over at a sports club which was still open to wait until the light disappeared. As so often happens in such cases, they made no attempt to call the spectacle to the attention of others, for fear of being laughed at.

An inquiry in the neighborhood confirmed the course of the events following the breaking of the Burkhart family's door. Among others, Mr. and Mrs. Zodel, owners of a grocery store on Tannenstrasse, were also awakened by the loud occurence and ran to the window to see what was wrong. At approximately 3:45a.m. the two claim to have heard Mrs. Burkhart cry excitedly, "Mr. Grutsch! Mr. Grutsch! Police!". After a while Mrs. Grutsch was supposed to have called back, "They're coming, Mrs. Burkhart."

The Zodels were also under the assumption the matter dealt with a family quarrel. At first they thought Mrs. Burkhart was admonishing her own son, who had perhaps come home too late. When the police arrived a while later, the young man ostensibly went away peacefully with the policemen, and after the blunt command, "Get in the car," willingly climbed into the patrol car.

Viewed (1st sighting) from position A(figure 10), the Radio and Direction Finding Southern Headquarters of the 72nd Signal Corps Regiment lies one kilometer to the northwest, in Schwedi. Captain Kotz verified that during the time in question no unusual observations or interference were noted, and that no tape recordings had been made.
Fritz Meier, editor of the Schwäbische Zeitung, in Friedrichshafen, arrived at the same negative result. He received his information from the nearest German Army radar station, in Kempten, and through a Swiss colleague in the Air Traffic Control Center in Zürich.

When the objects appeared for the first time their altitude was supposed to have been at least 1000 m. Using this same elevation angle, they must have therefore been at a distance of 1000m/tan 12° = 4.7 km from Waldeck. This is equivalent to a fourth of the distance between Langenargen and Rorschach, Switzerland.

7. Size and Distance Estimates

At a distance of 1.4 km Mr. Brugger estimated the size of the light to be 3/4 ± 1/4° (half the angular diameter of the full moon), which gives an absolute size of 17 m (+5, -6 m). (Schäfler estimated the object to be larger than a helicopter, and under hypnosis gave it a diameter of 15 to 20 m !)

As seen from position A (figure 10) the width of one of the objects with 4 lights, in accordance with Grutsch's sketch (figure 5), comes out to ca. 4 ± 1°. With a diameter of 17 m (+5, -6 m), the objects would have been, to begin with, at a distance of 17m(+5,-6)/tan(4±1°) = 270 m(+200,-130 m) from Waldeck, and thus have hovered over Friedrichshafener Strasse.

From a relative height of 12±1° above the horizon, the absolute height is calculated to be (240±170 m) * tan(12±1°) = 46 m(+51,-22 m).

As the objects appeared again behind Grutsch's house after the first visual contact, they were much closer. Assuming that the size of the individual lights remained unchanged during the observation, then, based on Rudi Grutsch's estimated angular diameter of 2±1° for the ultimately remaining light, and a real size of 3 m(+0.5,-1 m) for the diameter of 17 m(+5,-6 m) computed for the object, the distance of the light during the last visual contact must have been some 100 m(+123,-58 m).

Lothar Schaefler estimated the distance at 50 m to 80 m. Giving the estimated distance at 70±20 m for both witnesses, the object that Grutsch had seen at a 16° altitude must have hovered, roughly estimated, at 18±5 m above the ground.

8. Aftereffects

Lothar Schaefler's friend and co-worker, Wolfram Nafts, reported that Schaefler came to work the day after his experience looking deathly pale. He behaved absentmindedly and vomited several times. During the next few days he had to be repeatedly spoken to before he reacted. While driving he would also at times be "somewhere else". Occasionally "he turned off for minutes at a time". Half a year later he still acted as though he were another person. He was no longer as jolly as he once was, having become quiet, and was still occasionally absentminded. While mountain climbing he was always freezing, which earlier was never the case. The first few weeks after the UFO encounter Schaefler suffered from insomnia and nightmares. He let a lamp burn at night due to anxiety. At times he would awaken exactly between 2 and 3 o'clock in the morning, having earlier slept soundly through the night.

Two days after the UFO encounter he suddenly broke out in a sweat while sleeping in the early evening, and was literally soaked to the skin. Before this he had never experienced such a thing. Two weeks later he developed a stomach ulcer because of which his doctor wrote him sick for three weeks and sent him for convalescence.

What bewildered Schaefler above all else, and what he had no way of explaining, was the course of time during the encounter. According to Rudi Grutsch the encounter must have taken place some time between 2:10 a.m. and shortly after 2:30 a.m. Nevertheless, it was not until an hour later that the Burkhart family claimed to have heard the ringing of their door bell, and only after a further lapse of a quarter of an hour, the breaking of the pane of glass. Schäfler therefore assumed there were still further fragments of the actual happening slumbering in his subconscious, which could, circumstances permitting, perhaps be brought to light in a hypnotic regression. Just how deeply Schaefler's experience had really shocked him would only become apparent in the course of our investigations.

Rudi Grutsch was also, at least for a few days, totally confused. Shortly after the sighting he was "a nervous wreck", and ran around for three days "as though in a fever". On the third day following the occurence he began the have hallucinations. He would sit in bed and see "little musicians" sitting on the furniture. Nafts further reported that Grutsch was very nervous the day after the incident, pacing constantly back and forth in his Cafe, in front of the house, in the guest rooms, back to his house, appearing to be looking for something. He continuously filled beer glasses although only a few guests were sitting in his local.

From our investigations we were forced to conclude that Grutsch's accounts contradicted one another with each new period of questioning. The physics professor Schiebeler from Ravensburg, who according to his own declaration had not yet concerned himself with the UFO phenomenon, had visited Grutsch a week after the incident. He considers Grutsch's testimony to be unworthy of belief. It was also noticeable to us that Grutsch was inclined to exaggerated self-portrayal, and to overtell his story. He claimed that he had spoken about the phenomenon with two of his guests (allegedly master mechanics from Friedrichshafen) for about 30 to 40 minutes following the first sighting, which fact Schäfler did not verify. Grutsch ostensibly knew the names of the witnesses, but did not wish to reveal their names to exonerate himself.

During the first interview Grutsch affirmed that he had also seen the strange visitors. He could prove this absolutely. The two beings were standing left and right of Lothar Schaefler, and were swaying back and forth right before the window. Schäfler was surprised at the time by this account because Grutsch had not mentioned anything about it to him. Moreover, Grutsch transferred the figures to a spot on which Lothar Schaefler's encounter had not taken place. The innkeeper claimed to have deliberately giving his own observations to the press on March 25, 1977, due to tactical considerations. When, on April 6, 1977, Grutsch was asked about this point anew, he remembered only a single, barrel-shaped form which kept swaying near the bottled gas behind the kitchen wall. Due to the overwhelming brightness in the yard he couldn't see exactly what it was that had been moving there so elusively.

In view of this contradiction the observance of one figure or two figures by the innkeeper is not believable. Grutsch also refused to have anything to do with all psychological tests which might have confirmed his credibility. Therefore we have to assume that Grutsch, on the night in question, was no longer sober enough to fully grasp all the details. His reliability is therefore rated by us at only 50% .

9. Physical Investigations

During a supplementary examination of the sighting area with a Geiger counter on April 6 --6 weeks after the UFO incident- no increased level of radioactivity could be registered. An examination of the metal posts of the wire-net fence with a magnetic compass showed no indication of possible magnetization. The negative result of the radiation measurement does not mean that at the time of the sighting there was likewise no radioactive radiation present. After 14 days it would in any event no longer have been possible to separate such activity from the normal background radiation. The natural ground radiation lies at 70mR per anno or 8µR/h. These mean values may be considerably exceeded in certain regions. (In the Feldberg region between Lenzkirch and Todtnau in the Black Forest, for example, values up to 25 times higher were recorded.)

The radioactivity control check in Langenargen was undertaken more to reassure the witnesses. An unknown physicist had allegedly already searched for traces with a Geiger counter on March 6th --namely in Rudi Grutsch's yard, at the spot where Schaefler had first tried to hide himself. There the counter had begun to clatter markedly, registering an indicator value of some 60-70 (presumably milliroentgens/hour). That would indeed have been the radiation yield, spread over half a year, which could just be accepted as harmless.

There were no physical traces found. Contrary, to similar reports Schaefler did not have the feeling, in spite of the intensive light radiation, that the air temperature during the nearest approach had increased noticeably.

Part II - Hypnotic Regression

1. Regressive Hypnosis Sittings.

Above all else, questioning under hypnosis had as its goal the establishment of clarity concerning the length of the individual episodes on 24 February. The interviews produced contradictory times for the appearance, or presence, of the light phenomenon. The time given for its disappearance toward 3:35a.m. is definite. If the proprietor of the Magg Bar has closed his doors precisely at 2a.m., this would coincide with the time given by Grutsch, who together with Schäfler observed the lights for the first time in Bierkeller 10 minutes later. The sighting was supposed to have lasted only about 5 minutes. After this Schäfler went to his car. The second encounter with the objects, in his opinion, was also supposed to have lasted only about 5 minutes. Grutsch even went so far as to say he had lost all sense of time. If Schäfler indeed rang the Burkharts' doorbell for at least 15 minutes, the objects must have shone in the sky for at least 20 minutes. Apart from this, which doesn't make sense to us, just why the Burkharts did not react sooner to the ringing of their doorbell, the questions remains open, which especially troubled the witness Schäfler, how the contents of a full hour's experience could have disappeared from his memory, and just what really happened to him during this time. (The simpler explanation for the missing hour is naturally that the Magg Bar did not close until 3a.m., and that Grutsch had "miscalculated" by an hour when he looked at his watch.)

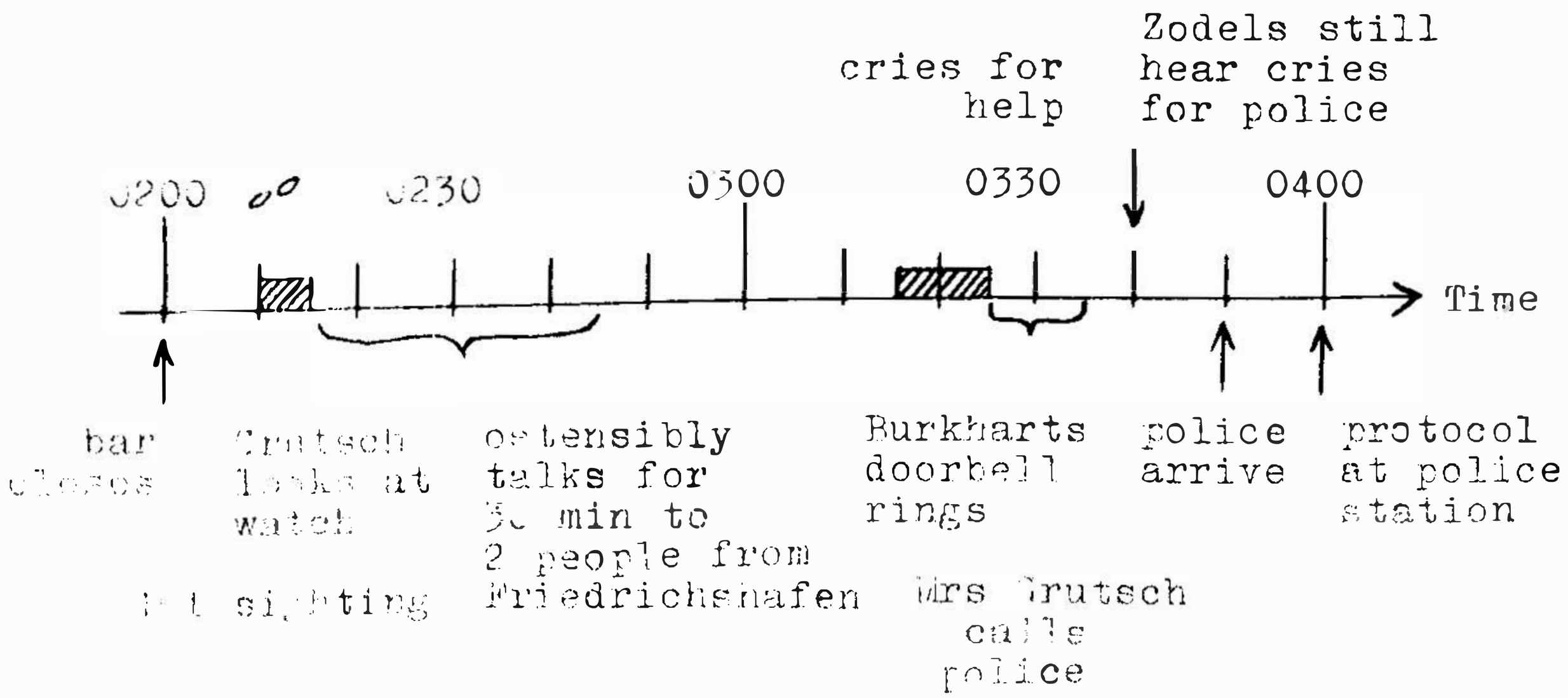


Figure 11: Sequence of events.

Until 1975 there were about 50 known cases in which witnesses of UFO close encounters (CE III) had complained of memory and time losses (there were 19 cases alone between 1973-1975). In 18 cases the witnesses were questioned under hypnosis (Webb 1976).

In the hypnosis effected regression of the test subject to the point of time of the events being examined, it must be taken into consideration that the person in question was unconscious at the time, and no experience contents are present during this state. On the other hand it is also known that in regressive hypnosis sittings with witnesses of UFO CE III incidents--regardless of the particular events--traumatic blockades are created which cannot be broken by the hypnotist (IUR 1977).

The subconscious is extraordinarily cooperative in a state of hypnosis. To comply with the hypnotist's will subjects describe "experiences," even when unrelated to real experience contents.

With UFO witnesses the hypnotist is faced with the difficult task, on the one hand, the need to break through a possible traumatic blockade, and on the other hand, to prevent the subject's merely confabulating an experience because he was in a state of amnesia during the time in question.

Professor Alvin Lawson of the California State University, who has investigated ca. 100 reported UFO abduction cases, has conducted interesting hypnosis experiments, together with Dr W.C. McCall, to determine to what extent the descriptions by hypnotized subjects of imaginary abductions agrees with reported genuine abduction experiences (Lawson 1977a, 1977b, 1977c). For this purpose people were selected who had little knowledge, as well as no definitive opinion, concerning the UFO phenomenon. The hypnotist gave only "reference guide-lines," that is, he did not provoke certain experimental descriptions in that he, for example, said: "Next to the landed UFO figures now appear. Describe how they look," etc.

The result was startling: the imaginary experiences described by 8 of the hypnotized subjects did not greatly vary from those of hypnotized subjects who experienced "real" abductions. The reported "experiences" were just as ludicrous as those ostensibly real. The experimenters also found sufficient grounds for the assumption that a telepathic coupling was existent between them and the hypnotized subjects during the regressive hypnosis of the "imaginary abductees." Several of those hypnotized could not accept upon awakening that they had experienced no real abduction!

The main differences between "real" and imaginary experiences of abduction by an UFO are, aside from possible physical and physiological effects--which differentiate the genuine UFO witnesses from the other group--psychical abnormalities such as time loss, amnesia, fear, nightmares, emotional effects, whose existence can be varified under hypnosis.

Clearly the test subjects had been "confronted" with stories of extraterrestials--as presented by television, in science fiction novels or in scandal sheets--even if no longer conscious of it. Each of the 8 test subjects drew different "UFO occupants" (dwarves, monsters, animals, hairy forms, men, robots). The psychology Professor J. Harder, who has likewise interviewed many UFO witnesses under hypnosis, sees considerably more differences than Lawson between "imaginary" and genuine abduction cases (Harder 1977).

Lawson sees the biggest problem in the explanation of the "stimulus" which "triggers" the witness to describe abduction experiences which do not differ from confabulations in a state of hypnosis (Lawson 1977c). The energy field surrounding the UFOs might call forth such psychical effects.

In "UFO abduction cases" one has therefore to distinguish between those in which the witness first under hypnosis reports an encounter with strange beings, and those where the witness already has a clear idea of the beings before hypnosis.

The latter case pertains to Schäfler's encounter. It is therefore certain that the appearance of the figure which the witness claims to have seen were not first "invented" during hypnosis.

Through the mediation of Professor Bender (Freiburg), Professor C. Bick, director of the Pfälzer Fels Sanatorium in Dahn, agreed to question Schäfler under hypnosis. As secretary of the International Union of Hypnotherapists, and experienced in ca. 1000 hypnotherapy treatments, Professor Bick was well aware of the danger of the conscious or unconscious influence of the hypnotist on the responses of the subject under hypnosis. Because of this Professor Bick did not want to know the details of the report before the sittings.

In the first sitting on 12 June 1977, Professor Bick obtained the course of the events on 24 February 1977, asked catch questions and prepared Schäfler for the hypnosis to follow. Among other things Schäfler related that he had not yet read anything about the UFO theme, other than short reports.

To the question what he feared the most, the witness answered it would disturb him very much if others considered him "not quite altogether there."

Figure 12: Professor C. Bick, hypnotherapist and director of the Pfälzer Fels Sanaterium in Dahn, with the witness Lothar Schäfler.

In the second sitting Schäfler was placed in a state of deep hypnosis. An attempt was to be made to call forth the possibly repressed experiences.

To begin with Schäfler related all the events of the first sighting and then told of the bright object encountered in the second sighting. The following contains excerpts of the description of the encounter with the 2 strange figures:

C. Bick: We are still interested in what happened while you are standing there. You stood there for quite some time. Do you see them standing again before you?

L. Schäfler: Yes. I see them the whole time standing before me. One was directly in front of me, the other somewhat farther to the left.

C. B.: Do you have the feeling that the two have hypnotized you?

L. Sch.: That could be.

C. B.: That you did things at their bidding, without being able to remember?

L. Sch.: That could be, because I am missing a half hour and can't explain it.

C. B.: You didn't stand there a half hour, though?

L. Sch.: Sure. It must be so. When they went back up I was still in the same place.

C. B.: Just a moment. You did break the pane of glass. Were the two still there?

L. Sch.: Yes, then they were still there.

C. B.: How did the beings look? Were they standing completely still?

L. Sch.: The two beings swayed somewhat. I had the feeling that they were swaying 2 or 3 cm over the ground.

C. B.: How were the feet covered?

L. Sch.: It was a though they were standing next to me naked. As I saw it, it was pure skin.

C. B.: Do they also have ears?

L. Sch.: I don't see any ears. The head is relatively large for the body size. The round mouth makes movements, like a fish gasping for air, approximately.

C. B.: And a nose--is it also there?

L. Sch.: But very. . . That isn't a nose! They're. . . a very small nose. I see holes, but very small.

C. B.: Are the holes directly in the head?

L. Sch.: They're in the head. Exactly like humans, only very small.

C. B.: And the eyes?

L. Sch.: The eyes are slant eyes, like the Chinese, only with a slant toward the back, and in the middle they're really big. . .

C. B.: Do they move? Do they have pupils?

L. Sch.: No. They have pupils. They looked at me.

C. B.: How does it look, that which is looked at you?

L. Sch.: They're looking. . . they're looking at me.

C. B.: Do they have hands?

L. Sch.: Yes. The hands have fingers. But it isn't like with us. But they are fingers. . . like fins. They're together and very short, but the arms are very long. No fingernails. There are 4 fingers.

C. B.: What is happening now?

L. Sch.: I'm looking at them. They're not speaking with one another, only looking at me. And I looked at them too. It occured to me that something isn't right. Then I was afraid and smashed in the window. I turned around and smashed the glass.

C. B.: How far was it to the door?

L. Sch.: About 2 meters.

C. B.: Were they scared when you broke the glass?

L. Sch.: They stayed, I believe. . .

C. B.: We have to take another look now. How long had you been standing there when the two came?

L. Sch.: 5 minutes, I'd say.

C. B.: Did your feet hurt afterwards?

L. Sch.: No. No complaints at all.

C. B.: Or do you have the feeling that something else is happening to you in the meantime?

L. Sch.: I'm sure of it!

C. B.: Something is happening to you?

L. Sch.: Yes.

C. B.: Also then, you don't quite stay in the same place with your person? Are they doing something to you?

L. Sch.: Yes.

C. B.: What are they doing to you?

L. Sch.: I don't know.

C. B.: We have to find that out.

L. Sch.: I don't know. That half hour is missing.

C. B.: But that's what we're looking for. What are they doing while they're with you?

L. Sch.: I stood there. . .

C. B.: Yes?

L. Sch.: Then they came. . .

C. B.: Yes?

L. Sch.: . . . .and then--I was on the ground again. . . or still in the same spot, I don't know. . .

C. B.: You were on the ground again! Were you suddenly away from the ground?

L. Sch.: No. . .

C. B.: But certainly. You just said: "I was on the ground again." Where were you in the meantime?

L. Sch.: In between I was in any event. . . something must be happened. .

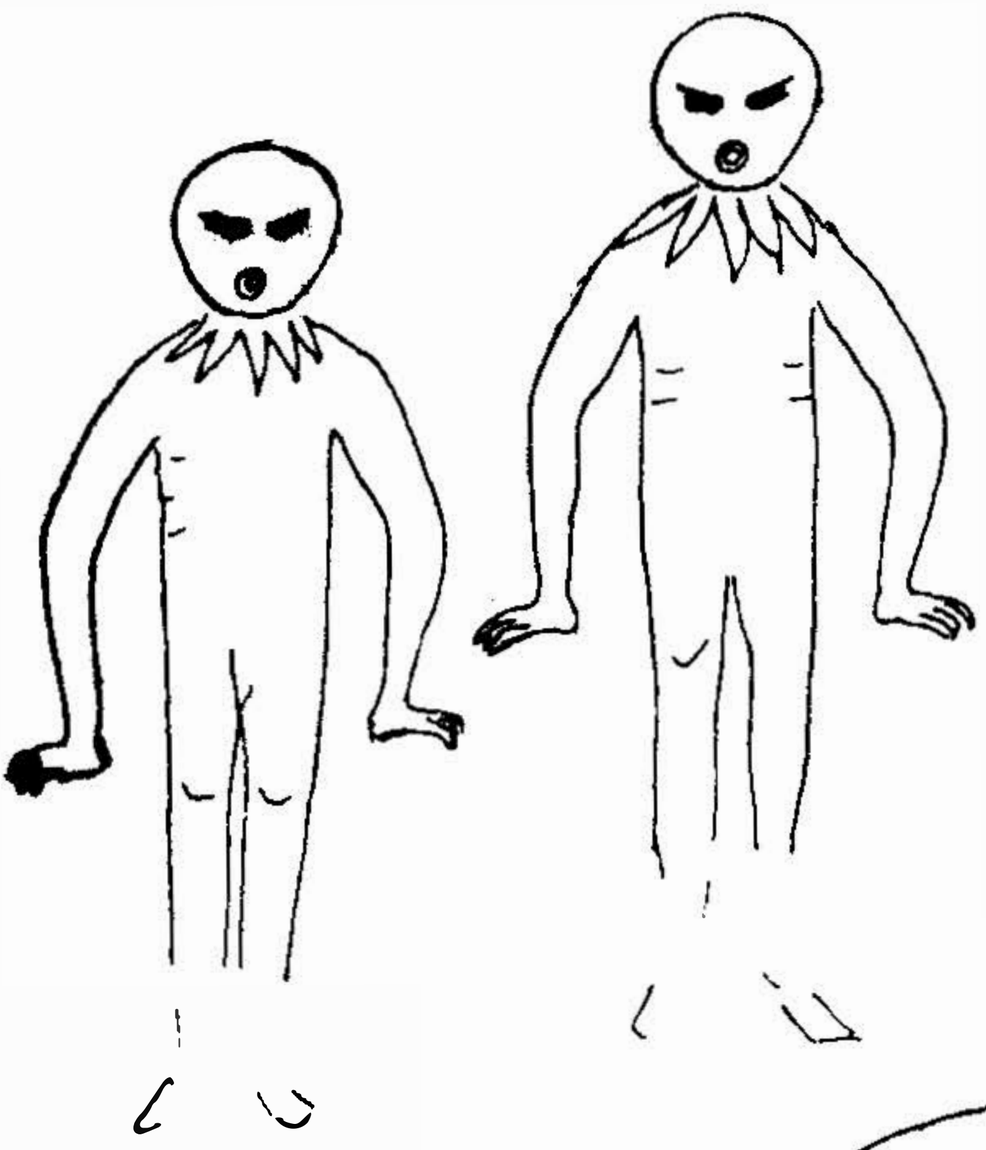
C. B.: Why? How do you arrive at that now?

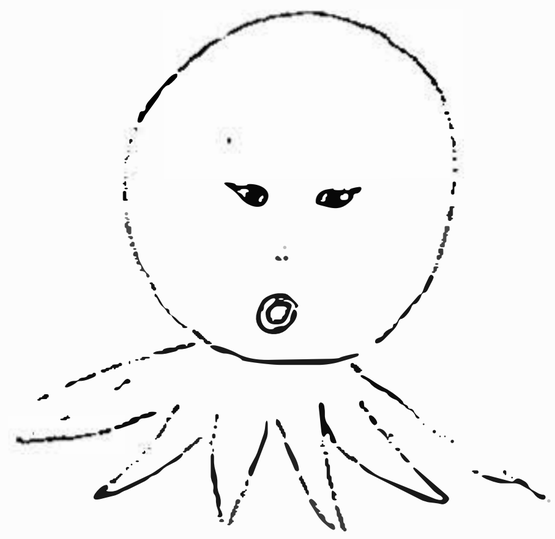
L. Sch.: The half hour is missing.

C. B.: But you just said: "Then I was on the ground again."
L. Sch.: Yes.
C. B.: Were you perhaps. . .
L. Sch.: I had the feeling that. . .
C. B.: You had the feeling what. . .?
L. Sch.: . . . that I was away. . .
C. B.: That you were no longer on the ground?
L. Sch.: Yes.
C. B.: Where were you then?
L. Sch.: I have no idea.
C. B.: We have to find that out. You can remember it very clearly now. Look. Now you are going back again to where you had the feeling you are losing the ground under your feet.
L. Sch.: I had the feeling. . .
C. B.: You had the feeling? Were you then suddenly somehow no longer there?
L. Sch.: Yes!
C. B.: And then you suddenly came back to your place again?
L. Sch.: I guess so.
C. B.: During the time when you suddenly are lifted away from the ground, what happens? Where are you going? Are you coming close to the flying object?
L. Sch.: It's getting brighter, still brighter.
C. B.: But what's happening? Come on, out with it! What's happening?
L. Sch.: Don't know. . . Afterwards I was on the ground again!
C. B.: Were you in the flying object?
L. Sch.: No, I don't think so.
C. B.: Do you have the feeling that you were inside?
L. Sch.: I was away from the ground, that's the feeling I had.
C. B.: You were not on the ground. Where were you?
L. Sch.: Away from the ground, I don't know. I only know that the object was getting brighter. And afterwards I was on the ground again and those two were standing next to me again. . .
C. B.: . . .and couldn't remember anything else?
L. Sch.: No.
C. B.: Good. I believe that's enough.

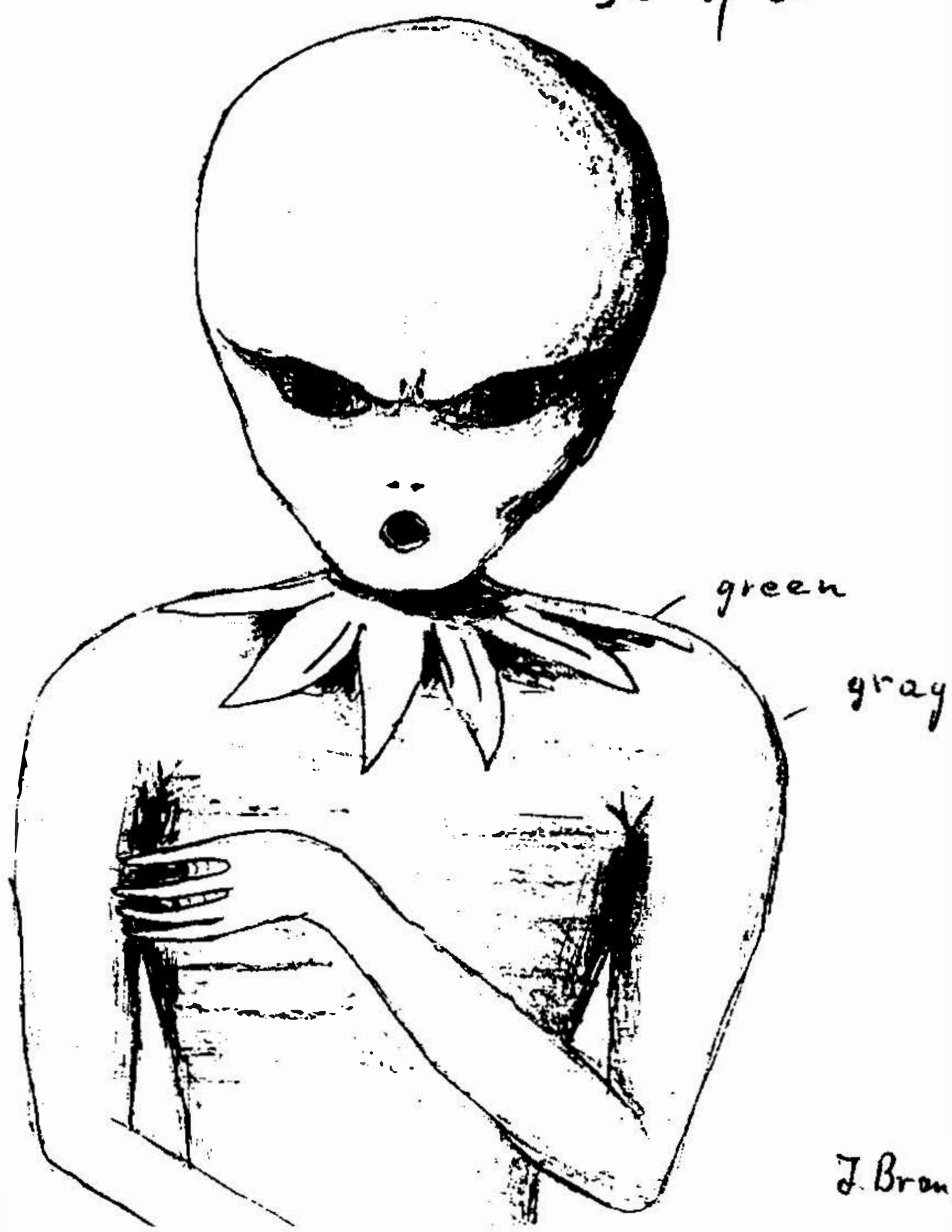
Figure 13: Drawing of the humanoids.

(see next page for original size reproduction)





Drawn in 1977 by I.v.Ludwiger and confirmed by the witness



Drawn in 1989 by I. v. Ludwiger after the witness has selected a picture from a collection of several "ET-faces"

Figure 13: Drawing of the humanoids.

The regressive hypnosis succeeded in bringing several forgotten details in the description of the beings to light (nose, number of fingers, mouth movements), although the repressed experiences still remained hidden. In our first interview Schäfler was of the opinion he had seen the beings for only 5 seconds. Under hypnosis he estimated the length of the confrontation at 5 minutes. The Burkharts said on the other hand that Schäfler had been ringing their doorbell for 15 minutes.

A further regressive hypnosis questioning would have increased the danger of confabulation, due to the grounds mentioned above. The witness was therefore advised to try to remember the events without being influenced by others, by noting as many of his dreams as possible. Further event contents were to be searched for at a later date through a dream analysis.

2. Evaluation of the Case by a Psychiatrist.

The UFO report and the examination of the primary witness L. Schäfler were discussed with Dr med H. Bjarsch, Chief Medical Adviser and specialist for neurology and psychiatry in the Tegel Clinic in Berlin. Dr Bjarsch was especially concerned over the time of occurence of the incident. It was a night after Fasching, and any psychiatrist hearing of a description of "little beings" would be led right away so suspect alcohol delirium. Since the appearance of the bright object, as confirmed by the statements of independent witnesses, is a fact, and since the appearance of the beings, according to questioning under hypnosis, may be considered subjectively truthful, it only remained to clarify the question whether the anxiety and stress situation was the cause of a hallucination. This could happen if a person is predisposed. According to Bjarsch a psychotic tendency would already have to be indicated, contrary to the view of Prof Ziolko (University of Berlin), in whose assessment hallucinations under the influence of shock could also occur, unrelated to psychoses. Hallucinations cannot be induced through fear alone.

A predelirious state could have been present in the primary witness if the had drunk especially heavily on the preceding day (i.e. on Fasching Day), or if he were completely worn out. The first conditon was certainly fulfilled, but on the other hand Schäfler was able to sleep as much as he wanted to on Ash Wednesday, having had the day off.

That the police officials simply assumed the witness was drunk told the psychiatrist nothing. According to his experiences policemen are among the worst possible witnesses.

The combination "bright flying object and strange figures" does not represent the usual hallucination. Since this combination apparently has been observed worldwide one could think of a new collective archetype, but his conclusion would be going too far to suit Dr Bjarsch.

A psychoanalyst would explain the evolution of the appearance of the beings as follows:

The bright light allows the witness to think of a spaceship landing. In the spaceship are little green men. . . small and green like frogs. . . like Kermit the Frog in the Muppets Show. . . spacemen wear round helmets. . . This then becomes a human-like being with light skin and a round head, but with a shape like Kermit, with overly long arms, fingers with fins, and a harlequin collar.

Whether the hallucination or projection of the dwarves was caused by a shock, and if so, whether intentionally or unintentionally, and whether the picture of the figures was randomly--e.g. according to the pattern mentioned above--produced, or was induced and controlled in this form by something in the bright object, cannot be determined.

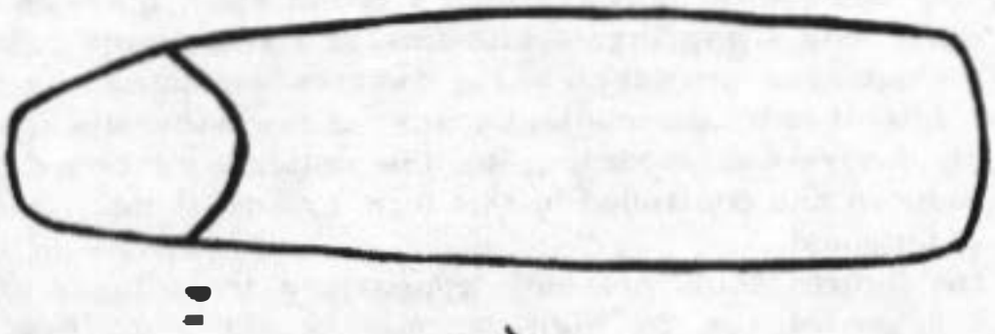
In any event the figures could not have approached the witness as normal physical beings because of the 2m high fence. We consider these beings projections, where it remains open whether they were induced by the witness psychically, or came fromthe object in some way.~

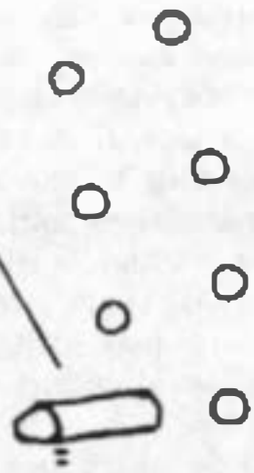
It was also apparent to Harder that the UFO witnesses whom he questioned depicted obviously nonsensical details as true occurences--also in those case where the incident was largely confirmed through several dependable and independent witnesses. He is of the opinion that the confusion of the witnesses and those investigating is "wanted." If someone can manufacture such apparatus as UFOs, then he should also be in a position to manipulate human brains in such a way that the witnesses record the experience in their memory other than according to the information supplied by sensory organs. Important information is repressed and replaced by earlier experiences (e.g. from science fiction films, etc.) which results in confusion in the witness and his report. "We should expect that there would be a plan to neutralize instances in which information should leak out unexpectedly," writes Harder (Harder 1977), and recommends the development of investigative programs which would throw more light on the matter.

The intelligence which lies behind these objects well understands to disguise itself through "mimicry." It only has to show itself "unbelievable enough," and the witness will not be believed. This psychological warfare is reminiscent of the scenario of the allied invasion in 1944: over the peninsula on which they had planned to land (Contentin) hundreds of straw dummies were thrown, fire crackers set off, and records with the cries of soldiers played. This fake invasion was to make the Germans believe the real invasion would take place somewhere else. When allied paratroopers later sprang into this same area, other duty stations no longer believed the reports of the invasion witnesses. One merely laughed at the soldiers who apparently were still fooled by these silly dummies of the English.

The parallels to UFO mimicry are apparent.

The largest of the 8 objects, as it appeared through the binoculars (8 X 30).





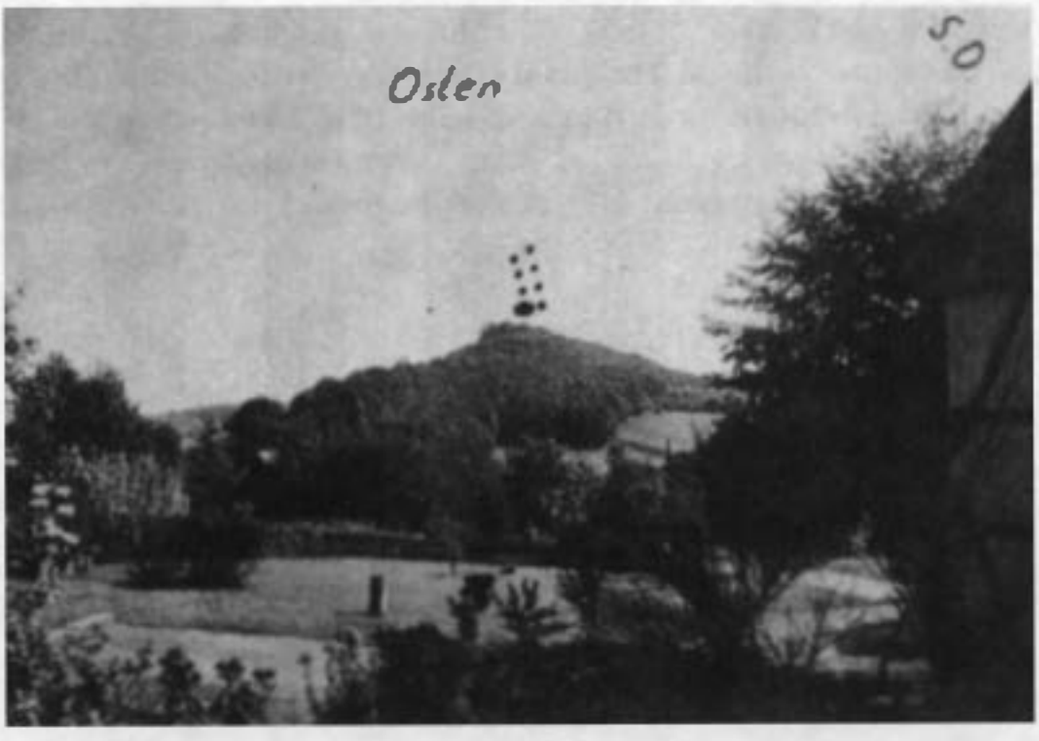
Formation of eight yellowish-red. objects

Observation on 30/7/1974

ca. 4:30a.m.

drawn according to statements made by Miss E. from Hagen

East



This picture was taken from the point of view of the observation and shows the eastern sky with the 8 objects, as they flew in formation at the time of the observation.

3. Physiological Aftereffects of UFO Shock.

We have already reported concerning aftereffects in Sec. I - 8. On September 12, 1977, we (I.B.) were called by the primary witness's doctor and asked for assistance in his treatment. Schäfler had become addicted to pills. When Dr Z. investigated the cause of this addiction she found out for the first time about the UFO incident. As far back as February she was unable to explain how her patient could suddenly develop a stomach ulcer. He had noticed that he was always able to sleep well after taking a medication (Novodolestan) to combat his pains. As a result he was now addicted to this medication. Upon our urging Schäfler underwent psychotherapeutic treatment and now has overcome his anxiety, as well as his addiction to pills.

It has also happened in other countries that a scientist who questions UFO witnesses must frequently also serve as a "healer," as pointed out by the sociology professor, Ron Westrum (Westrum 1977). Westrum writes that a closer encounter generally causes a mental shock, and that the conflict between experience and the sense of reality is even capable of inducing paranormal events. The continual occupation with the unusual experiences and the unfortunately inevitable fact, to be excluded therefore from the social circle of the society, mutually strengthen each other, so that many witnesses of close encounters can become sick long after the event.

An example from our own researches:

In our first congress report we reported about a sighting over the Hochries (Schneider 1975). What we did not report there was the devastating effect which this event had on the caretaker's mental state. The nighttime event had developed in him to an anxiety state, which made it impossible for him to remain any longer at the Hochries cabin. After a psychotherapeutic treatment in Rosenheim he once again tried to go back to his job at the cabin. But it was no longer the same. He imagined to have seen "strange beings" in the cellar, etc.

In another case, investigated by Peiniger, the occurance of an UFO sighting had concrete physiological effects.

At 4:30a.m. on 30 July 1974, an amateur astronomer from the Hagen area observed several small yellowish-red points of light and a large cigar-shaped object (1 angular diameter) through her binoculars. Suddenly she was hit by a flash of lightning coming from the large object that knocked her unconscious for 30 minutes. Immediately after waking she was sick. She was developed a 39 fever, diarrhea, swollen eyes and red spots on her eyelids. For several days she suffered from high blood pressure, headache and muscle cramps. She was afraid to go out of the house and dreamed night after night of the event. Her environment now experienced her as irritable and lacking self-control. Depression drove her finally to a suicide attempt. (See Figure and Picture, next page.)

The physiological and psychological aftereffects of the UFO encounter on the witness in Langenargen fits exactly the scenario of a CE case.

4. Reliability Index and Results of the Investigation.

Olsen (1966) proposed that all UFO reports be given a reliability index so that foreign scientists might know how believable the individual cases are, since the interviewer is generally the only one to experience the witness personally, and thus able to make an estimation of his trustworthiness. The definition of the reliability factor p_r might be considered too banal, but since several hundred cases have already been evaluated in this manner, we will continue to apply this definition.

Among n witnesses with a witness unreliability factor p_u, the reliability factor for the report p_I, with reliability factor for the conducting of an investigation p_r of a "k-th" hand report, is

$$p_r = (1 - \prod_{m=1}^{n} p_m)\ p_I \cdot 2^{(1-k)}$$

The factor p_r allows at least the sorting out of such reports which appear "too unbeliebable," i.e. $p_r < 50\%$. Values of 90% are considered "to some extent reliable," values over 95% as "reliable," and values of more than 98% as "very reliable."

Along with the factor for the unreliability of a witness there is a factor for the unreliability of an accompanying photograph.

If all photometric, shading and blackening values obtained through analysis agree with the data given by the witness for the object, then the value of p_u = 20%.

A photograph is acknowledged, if not proved a fake, like the statement e.g. of a pilot or scientist, as the "proof." (Considered alone a UFO photograph "correct" in every detail, with p_r = 80%, would not even give a report the value "to some extent reliable.")

The unreliability factors for the witnesses in Langenargen were estimated as follows, according to the impression of the interviewer:

L. Schäfler:	0.1	1st hand information: $k_1 = 1$
R. Grutsch:	0.5	
K. Brugger:	0.3	
Mrs Brielmayer:	0.3	
Railwayman's wife:	0.5	2nd hand information: $k_2 = 2$
Her colleague:	0.5	

The reliability that the brilliant, unidentifiable lights in the sky hovered over the spot in question is (p_I = 1):

$$p = \left[1 - 2^{1-k_1} \prod_{m=1}^{4} p_m^{(1)} \left(2^{1-k_2} \prod_{n=1}^{2} p_n^{(2)}\right)\right] = 99.94\%$$

or, respectively (without the 2nd hand witness statements), p_r = 99.055% that the brilliant light hovered very close to the ground.

The assertion that the object had 4 bright "lights" (statements from R. Grutsch and L. Schäfler) is considered, at p_r = 95% reliable.

Based on the psychological examination performed on the primary witness, his reliability factor could be brought to 90%. His statement that there were 2 figures which suddenly appeared can be considered, with p_r = 90%, in any event as "to some extent reliable," even if the event must be considered subjectively.

We have therefore the following facts:

Toward 2:30a.m. on February 24, 1977, two extremely bright discs coming from the direction of Lake Constance flew quickly over Langenargen at low altitude. The only moving source of light on the ground at this time was Schäfler's car.

The bright objects hovered several hundred meters distant from the two witnesses, and came so close together they appeared to touch, building an 8-unit row of lights. The objects had round searchlights on the outside which after several minutes were turned off suddenly. The objects apparently moved on to the northeast, turned the lights back on again, turned and approached anew to within several dozen meters of the witnesses, flying between the houses in Bierkeller.

Grutsch had apparently looked into the bright light--which did not appear especially blinding--a few moments before Schäfler. He could see 8 lamps arranged in a row, and in the time span "which passes between pulling the pin on a hand grenade and its explosion" observed the process of the lamps "melting together." When Schäfler looked into the bright light he discovered only 4 lamps. Because of the intense brightness he now avoided looking directly into the light, which now began to approach closer to him "as a single lamp." This, for Grutsch, uncanny occurence may have been a simple projection phenomenon:

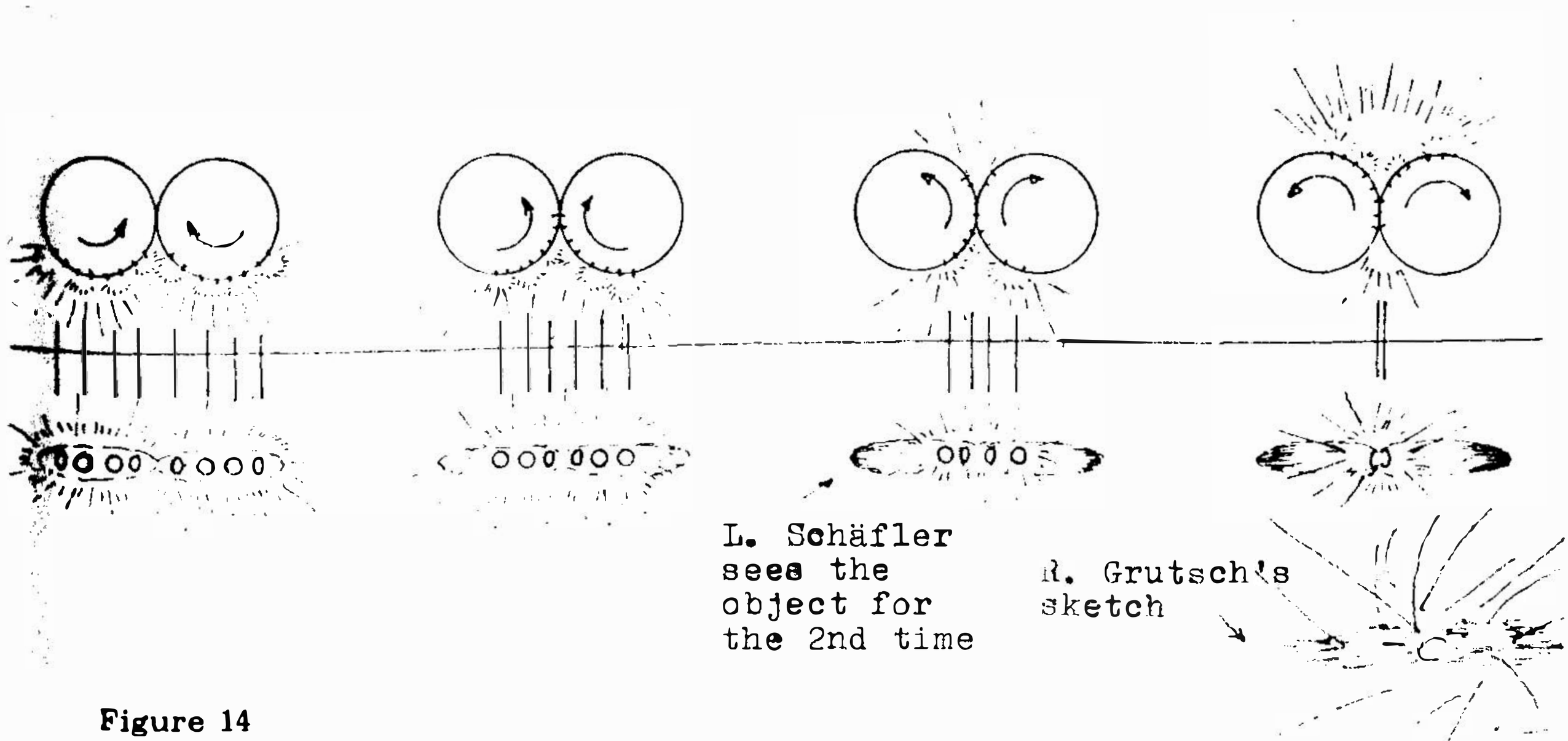


Figure 14

The two touching discs could have turned toward one another, rotating in opposite directions. Since each disc had only 4 lamps on the outside edge, they would have to have disappeared one after the other. When the rotation stopped there was only a single bright lamp to be seen. The remaining lamps had now enabled outlines of the objects to appear against the dark background, so that Grutsch, at the moment of closest approach--when only one lamp remained, could see dark outlines for the first time. The objects emitted a high pitched, penetrating whistle.

What now followed had either taken only a few moments--in which case Grutsch and the bartender at the nightclub had each made an hour's error in looking at their watches, which is highly unlikely, and which is further contradicted by other visitors in the nightclub--or else both witnesses must have experienced a time loss of more than an hour during the course of the events. Both witnesses actually have the feeling that certain parts of the events have been erased from memory. Since only Schäfler agreed to a thorough questioning under hypnosis, we can only say at this point that this witness must have had further strong experiences during this time, during the occurence of which he possibly became unconscious, to which the feeling, expressed under hypnosis, not to be standing on the ground any longer, could also point.

The witness experienced the sudden appearance of the two "carneval figures" very consciously. Since these were not a projection of the witness's own subconscious, but were instead more likely generated from the bright object, it can be deduced from the agreeing statements from Grutsch and Mrs Brielmaier the light went out when Schäfler began to scream. That could have been a coincidence, but if not, it would at least point out that an acoustical contact existed between the witness and the bright object (perhaps through the projection of the figures?). An explanation for the projection will be possible only when research on the brain and the conscious processes, as well as their connection with paranormal abilities, has reached an adequate level of development.

The literature is full of similar reports of laterally positioned lamps. Contrary to this we could find no reports concerning figures such as those in Langenargen, as far as the "clothing" and the mouth form go. The remaining details fit descriptions given in other places. It would in any case be misleading to talk of a new archetype or even of extraterrestrial spacemen.

Perhaps at a later time it might still be attempted, either through a dream analysis or in a renewed regressive hypnosis sitting, to eventually uncover the missing experiences in the time span between ca. 2:45 - 3.30a.m.

Part III - Aftermath

1. Supplementary Information Relating to the Langenargen Case.

Apparently the object (or the objects) had come direct from Italy. As reported in the "Münchner Merkur" on 11/1/1980--based on information supplied by the SAD-Rome Agency--the Italian Defense Ministry had made public that in the night from 23 to 24 February, 1977, an Italian Air Force fighter was followed by an UFO for 23 minutes. The object was surrounded by a very bright halo of light. During the chase the plane and the object had covered a distance of some 375km. Only after a 270 turn over the Po Valley did the object disappear.

As regards the appearance of the humanoids, it is of interest to note what L.H. Stringfield reports in his book "The UFO Crash/Retrieval Syndrome - Status, Report II: New Sources, New Data" (MUFON, Seguin, Texas 78155, 1980).

Stringfield claims to know ca. 20 witnesses who had supplied him with reports concerning UFO crashes in United States territory.

The U.S. Air Force is supposed to have examined the wreckage of a metallic construction that crashed in New Mexico in 1962, in which two lifeless human-like beings were discovered.

The unnamed witnesses described these figures as being of small stature (1.20 - 1.30m) and similar in all details..except for the collars--to the two beings which were seen in Langenargen. In 1977 Schäfler could not yet have known of these publications.

Two CIA officials and a doctor sworn to secrecy described the appearance of the beings to Stringfield. They supposedly had overproportionately large round heads in relation to their body size and slanted eyes. Mouth, ears and nose were very small (mere holes or slits). The head was bald. The relatively long arms had four webbed fingers (to the second finger joint). The skin was white-grey.

Are these coincidences due to a worldwide appearance of a new archetype in the Jungian sense? Were the beings in Langenargen and New Mexico real? Are the coincidences pure chance, or perhaps a chance occurence which was "badly done up?"--The reader can decide for himself.

2. A Man-in-Black Case.

Although Schäfler was no longer the same uncomplicated person he was before this encounter, within a year he had managed to take up his normal day-to-day life once again and talked to others only occasionally about his sighting in February 1977.

In July 1980 a colleague of Schäfler's called and asked for our advice: because of nervousness Schäfler was not able to speak with us himself.

We were then asked if it were possible or usual that witnesses of a CEIII encounter were sometimes threatened by mysterious men. Schäfler had just fainted once again, and in falling had badly injured his hand on a broken bottle. The act of becoming unconscious led Schäfler back to the threat by a man who had told him something bad would happen if he ever again talked about his sighting, which he had just done.

Hoping to be able to calm Schäfler we visited his mother and learned how his present state of bad nerves had originated. One evening in September 1978 (toward 9p.m.) Schäfler was walking home from the direction of Lake Constance. On the empty street (with one-family houses) a bicyclist coming from behind drew even with Schäfler and spoke to him. He was supposed to have said that Schäfler should never again talk about his experience, otherwise something would happen to him.

At first Schäfler did not take the man, who wore a long black coat or cape and a black, broad-brimmed seaman's slouch hat, seriously. Then suddenly he was terribly frightened: ten meters in front of him the bicycle and rider literally dissolved into nothing!

Several weeks later Schäfler began falling over in a faint (the beginning of epilepsy, as predicted by Dipl. Psych. S. Streubel in Part II). Schäfler believed the bicyclist's--whose presence he constantly believed to feel--threats would be fulfilled. His nervousness increased to such an extent he was finally afraid to go out of the house without accompaniment.

In the spring of 1980 Schäfler once again encountered the mysterious man in the long black coat as he was walking along the street in the evening. The man approached him from behind (this time without a bicycle), repeated the same threat, and then disappeared by dissolving into nothing, as in the first encounter.

Our psychologist, S. Streubel, examined Schäfler, and we calmed him down by telling him his fainting attacks were a normal sickness which followed that which he had experienced, and that "these men" would "latch on" to insecure victims, such as himself, wanting to harm them. He, Schäfler, should simply laugh at the man if he met him again. The man could not harm him physically in any case. After this Schäfler clearly felt better because we had looked into his very special situation in the only proper way.

A psychic projection might be one explanation for this MIB case. Schäfler had been unable to remember--even during regressive hypnosis--what happened between 2:30 - 3.20a.m. on the morning of his experience. His subconscious searched in vain for the "lost events" in his memory, where they had not been stored. Finally the unconscious manifested itself in the form of the bicyclist in order to tell the conscious there were no further repressed experiences, or that they could not be revived in conversation.

Schäfler did not recognize this phantom image as a psychic projection, nor were other witnesses present during his confrontation with it. By redirecting his fear due to the time loss to the phantom image, the possibility of getting rid of his dread of the forgotten events arises.

That Schäfler actually had had an experience which lastingly damaged him psychically was shown by an extensive psychological examination.

We have come to the conclusion that MI8 reports should be more seriously examined by psychiatrists to better help the witness, if necessary, out of severe depressions.

Supplementing this is the following special evaluation by the psychologist S. Streubel.

In the meantime we have visited Schäfler in 1980 and 1989. Each time a pechological examination of the witness has been done. In 1991 we have paid the treatment of Schäfler by a psychotherapeut. There was a need to continue the treatment. The witness decided to break up because of difficulties in connection with the bad attainability of the therapeut.

The witness and the investigators have been attacked by skeptics like Rudolf Henke (from GEP) who never met the witness peronally. Today, in 1993, the witness is in good health again and has lost his fears as a consequence of autogenic training.

Lothar Schaefler, Siegfried Streubel and Illobrand von Ludwiger in Langenargen in June 1989

BIBLIOGRAPHY

Davison, G.C. & Neale, J.M., 1974: Abnormal Psychology: An Experimental Clinical Approach, Wiley, New York.

Goldfried, M.R., Stricker, G. & Weiner, I.B., 1971: Rorschach Handbook of Clinical and Research Applications, Englewood Cliffs, N.J.: Prentice Hall.

Harder, J.A., 1977: APRO Bulletin, Sept. 1977, p. 5

Hathaway & McKinley, 1963: MMPI-Handbuch, Bern.

Lawson, A.H., 1977a: What can we learn from Hypnosis of Imaginary Abductees? in 1977 MUFON UFO Symposium Proceedings, Scottsdale, Arizona.

Lawson, A.H., 1977b: MUFON UFO Journal, Nov. 1977, p. 7, Seguin, Texas.

Lawson, A.H., 1977c: MUFON UFO Journal, Dec. 1977, p. 7, Seguin, Texas.

Mischel, W., 1968: Personality and Assessment, Wiley, New York.

Nunnally, J.C., 1967: Psychometric Theory, McGraw Hill, New York.

Olsen, T.M., et al., 1966: The Reference for Outstanding UFO Sighting Reports, UFO Information Retrieval Center, Inc., Riderwood, Maryland.

von Paczensky, S., 1976: Der Testknacker, rororo Nr. 6949.

Schmidt, L.R., 1972: Psychologie und Praxis,

Schneider, A., 1975: UFOs reagieren auf Leuchtraketen, in: Die Erforschung der UFOs (MUFON-CES Symposium Proceedings, Innsbruck, 1974), p. 66ff.

Webb, D., 1976: Analysis of Humanoid/Abduction Reports, in: Proceedings of the 1976 CUFOS Conference, p. 266ff, Evanston, Illinois.

Westrum, R., 1977 MUFON UFO Journal, April 1977, p. 11, Seguin, Texas.

The Application of Rorschach Tests to Possible UFO–Abductees

by

S. Streubel

It seems that in a small number of the UFO–reports that we have received an abduction may have taken place. A confirmation of this has not been obtained in any one single case. One reason for this is that the witnesses cannot remember a certain period of time during their encounter, and until recently we have not been able to find any open–minded therapeutic hypnotist who is willing to work free of charge. Several witnesses were willing to visit a clinic specializing in hypnotic treatment, but after attempting unsuccessfully to substantiate their case with the local medical insurance they gave up the idea. MUFON–CES, as a private society, cannot bear the cost of such treat–ment (a preliminary session with one of the witnesses, for example, cost MUFON–CES $ 175.– in 1991). Due to this aspect of cost there is no question of our paying for a thorough treatment.

MUFON–CES now has found a professional hypnotist who is prepared to work free of charge. According to our preliminary research there are, in Germany, at least 6 other potential abduction witnesses, but the investigation of these has been postponed until they are prepared to be treated by this hypnotist, when possibly their repressed experiences can be brought to the surface.

Some of the possible abduction witnesses have allowed themselves to be treated by a clinical psychologist. The following article discusses the results of these treatments. It has been found that one of the supposed UFO witnesses is mentally ill (schizophrenia). His case is presented in spite of this, as it can show to other researchers this possible explana–tion of a case.

Following is a brief summary of the reports from several witnesses and an account of Rorschach tests performed on them by the author.

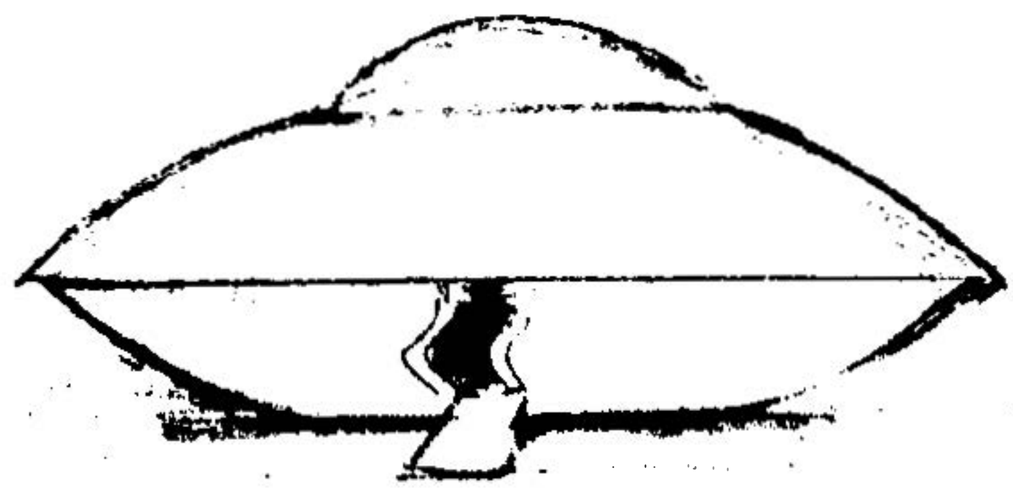
Case 1. Pia Mosbach, Berlin, 1965

Pia Mosbach's encounter with a UFO happened when she was only 4 years old. In the year 1964 she was living with her parents in bar–racks near the Soviet border in Berlin. The toilet house was several

meters to one side of their barrack. She remembers going to the toilet one autumn evening. The door stayed just slightly open and the witness saw the moon and a "second moon", which moved and flew out of her range of vision. She went out into the open, crawled under a damaged fence, and passing a factory went to the canal on the other side of which was the Berlin Wall. Directly on the bank of the canal the round "moon" had landed. The object radiated light of a yellow color. In front of it human forms moved about.

The witness can then remember lying on something bright. Around her it was also bright. Above her stood two beings. One was a large human. The other was a small being with a large head and no hair. Then she remembered lying on the grass and holding her hand as she stood up due to a painful cut she felt at this point. Then she ran towards her house, along the side of the canal, by the factory, underneath the fence and through the window into her bedroom. The parents were asleep. She crept into bed without waking anyone.

For twenty years she was followed by nightmares and the certainty that "something certainly must have happened". Since then she hears strange melodies with texts in a foreign language, which she can write down or play on the piano. The words in this language frequently repeat themselves. The texts appear to originate in the subconscious mind, not in the minds of "extraterrestrials". This case should be treated by hypnotic regression.



The author performed a psychological examination of Mrs. Mosbach on June 12, 1983.

1.1. Synopsis

- Pia Mosbach had a traumatic sighting at the age of 4 in August, from 8.30 p.m. to 11.30 p.m. At this time she heard concepts such as "Galaan", "Daimon", "Star", and "Friends". Even today she feels herself fixed to these. Without any prior knowledge of musical notes or even having learned to play an instrument, she now plays melodies on her home organ and sings 62 different songs in foreign languages. The texts have the above concepts repeatedly as part of their contents.

- Before starting to play and sing these melodies she always hears a whistle.

- After her UFO sighting her eyes were very sensitive to light, particularly on the left side, and the pupils were too wide open. As protection she used pink folding glasses. As a result, her behavior was noticeably more clumsy, so that the other children joked about her, especially at school.

- She could no longer see the color of yellow. Red appeared as a bright pink, orange as yellowish, and yellow appeared white.

  With a friend she once used a red lamp and found out that she could then distinguish between yellow and white. After this she obtained red glasses from her optician. Today she can once again see all colors correctly without glasses.

  Also after the sighting she would see double when she used both eyes.

- She tells of another traumatic experience when she was 11 years old. Whilst taking private tuition with a Greek she was nearly raped. It was only her menstruation, which she has been having since she was 9 years old, which saved her.

- At the age of 12 she had to hide herself from 8 till 9 in the evening from two Turkish men. As a precaution but without fear she emphasizes.

- At the age of 19 she had another UFO sighting. She was not afraid but inquisitive and watched the UFO with interest whilst feeling her-

self drawn to it as if by a magnet.

- She was very impressed by the "Timo Rinelt" case (this was the first well–known child abduction after the second World War in Germany). At the age of 11 years she watched UFO films, the TV series "Enterprise", and films about "Close Encounters of the Third Kind". Recently, she has read a relevant book by Budd Hopkins.

- Her mother was born in 1928 and is now 55 years old. She says about her: "She is strict and terrible. Even today she talks only about the war, how bad it was and that there was nothing more to be had. – My aunt is older and knows more about my childhood than my mother. She confirms in a recorded telephone conversation with me the problems with my eyes since my UFO sighting".

- Pia is now 23 years old. She had herself sterilized as she did not want any children, she emphasizes. Her husband is 43 years old and has children from his previous marriage.

- She says that a specialty of her's is the ability to write with both hands symmetrically at the same time. She is a disguised left–hand writer who has been trained to write with the right hand.

- Previously she had always been afraid to tell of her sighting experiences. She would always wait a day before recounting it.

- As a whim she has the habit of having to count fence posts.

1.2. Special Characteristics Revealed by the Rorschach Test

- Color attraction
- color shocks
- subject criticism
- eye persistence
- aggression
- criticism of form
- beginnings of creative abilities. Lack of maturity
- failure

1.3. Test Evaluation

As a result of her eye condition the subject longs for the experience of colors, but suffers irritation because this addresses her emotional life.

Signs of intelligence and talent are present, but they are repressed because she is afraid of punishment and persecution. She is inhibited and not mature with partially infantile tendencies.

The result of her repressed fright is aggression, which builds up and can be released in an impulse. The environmental friction with her mother, whom she experienced as a stern person, resulted in the rejection of her proper role as a woman, so that she does not wish for children of her own.

Her way of thinking is rather chaotic, does not have any depth, and has schizophrenic touches sometimes leading to absent-mindedness.

The acoustical effect, which always occurs before she sings her songs, points towards an epileptic tendency.

The subject's "creative" talents puts her into the position of carrying out her own self-therapy, as the rhythm of her own music acts unconsciously as a harmonizing and self-stabilizing element, acting as it were to relieve her fright and release the pent-up aggression.

This "skill" should be emphasized by being acknowledged so that the feeling of therapeutic success will be reinforced.

Case 2. A. Nitsch, Hochheim, 1974

Mr. and Mrs. Nitsch observed a UFO on the night from April 10 to 11, 1974, between the towns Wicker and Hochheim near Frankfort. A. Nitsch and his wife, together with another married couple whom they knew well (but who unfortunately refused to make any statement about the incident), were returning from a weekend trip to the Eifel, about 60 km away, where they had been collecting fossils.

Shortly before Hochheim (after passing Wicker) at about 2 a.m. in the morning they saw, 50 to 100 m in front of their car, by the side of the road an illuminated disc-like object, which was hovering at a height of 10 to 40 m. They parked their car and watched. The object looked like two dishes placed face to face on each other. On the rim between the dishes there was a ring with a row of rectangular white lights. The upper part was divided into several triangular segments. The upper surface shone in rapidly changing colors.

"The light was constantly changing like the interference on a TV set when no station is tuned in. The colors were green, yellow, red, and

blue with green dominating. It looked as if it were alive, like some sort of organism out of light which one looks at through the microscope – like some sort of microbe – totally fascinating".

The rectangular lights were the brightest. The whole object was immersed in whitish light. In the lower part an illuminated section was lowered from the object and a cone of light slowly moved downwards out of this section (solid light). This cone of light seemed to feel around on the ground as if looking for something.

Suddenly the cone of light became smaller and shone through the windshield directly into the inside of the car. The light was not uncomfortable, but their breathing became heavy and all the occupants began to sweat. The main witness (A. Nitsch) thought: "Now we are going to be fetched". At some time or other the light retreated. There was absolutely nothing to hear. The ring with the rectangular lights began to rotate, at first slowly and then quicker and quicker until only a white stripe could be seen. The scintillating green above the ring became an intensive phosphorescent light blue.

The object flew several kilometers horizontally and stopped, rose vertically and then stopped again, flew rapidly horizontally some distance again and stopped, rose vertically again etc. The manoeuvre was repeated three times.

The witnesses were all unusually tired now. Later they gave the opinion that some sort of hypnosis had been used. For many years none of the witnesses spoke a single word about the experience. Mr. Nitsch stated: "When I looked at the clock at home afterwards, I realized that 2 or 3 hours had passed, although it seemed to me like about 15 to 20 minutes".

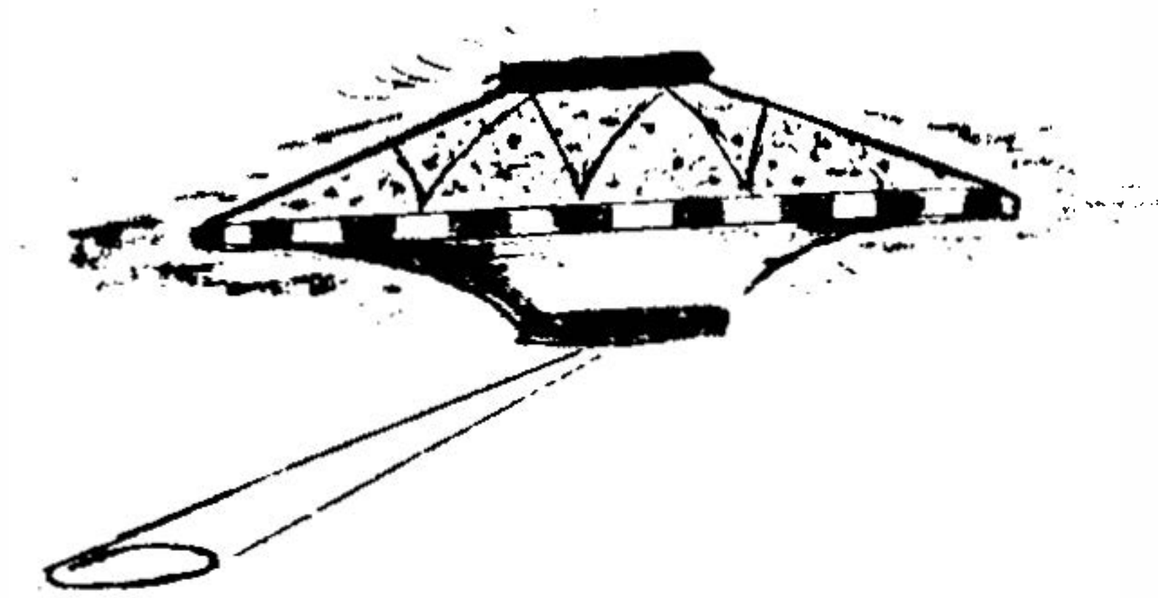
Like the other witnesses, A. Nitsch had suppressed his recollection of the incident for 10 years, until, whilst watching a science fiction film in the presence of friends, he suddenly remembered that he had once had a UFO experience. The friends, who listened to his story, informed the GEP (Society for the Research into Unusual Phenomena) in Lüdenscheid, who performed a first questioning of the witness and his wife (who in the meantime has separated from him). Mrs. Nitsch confirmed the description of her former husband in all important points. She, too, recalled the incident only in 1984.

Such an amnesia is unusual, but not unknown: Richard Haines reports a UFO sighting of a married couple, who saw an oval shaped object which hovered for about 5 minutes over the AT&T laboratories about

40 km due north of downtown Denver, Colorado, on the 13th or 20th of April, 1985 (Haines 1992, MUFON UFO Journal No. 29, 1992). The witnesses had first remembered their observations years later:

"Strangely enough, we (my husband and I) never discussed this event for 4 years. It just never seemed to enter our minds as a topic of conversation. It wasn't that we were embarrassed or afraid to discuss it with each other. We just didn't consciously remember it...".

The married couple A. and B. Nitsch reacted in exactly the same way. Also here – as Mr. Haines with his witnesses – we suspect that the witnesses experienced missing time and possibly more.



6.19
Location: Hochheim near Frankfurt
Time: 4/11/1974, <2:00 a.m., ?
Object: disc
Distance: <100 yards
Altitude: 10-20 yards
Size: 30-40 yards
Witnesses: 4
Peculiarities: solid light, possible abduction case
Reliability index: **99.76%**
Interviewers: GEP/MUFON-CES

The author carried out psychological tests on Mr. A. Nitsch on June 16, 1986, with special emphasis on the MMPI (Minnesota Multiphase Inventory) and the Rorschach tests. Results are reported below.

2.1. Synopsis

- Mr. Nitsch says that some time after his UFO sighting he had an accident with his moped. Someone did not respect his right of way on the road, as a result of which his leg was broken "40 times". He retained full consciousness during and for a long time after the accident. This happened on a Sunday, when there was a lack of staff in

the hospitals, so that he was passed through 4 hospitals before being brought to a special clinic for fractures in Rüsselsheim, where he was finally treated. Today he is 50% invalid as a result, and very sensitive to the weather.

- Because of his invalidity he finds it difficult to find a job. There was a time when he was shop steward, but now, with a friend, he buys and sells furniture which they purchase when a household is liquidated.

- He did have retraining as a business administrator, but because of the amount of protection given to invalids to prevent from being dismissed and his lack of experience in the newly learned profession, he has not found a new position.

- He has, as he says, a strong character and is ambitious with the ability to have his own way. He is honest and concerned about social relationships (he was once school speaker, later shop steward, and tea room manager in Heidelberg). He helps where unfairness occurs, and often puts his foot in it for the sake of others. He is very direct in his speech, which often again causes him problems.

- His parents are divorced.

- His father was very strict and often beat him until he was "black and blue". His mother always tried to prevent this, but was too weak.

  His father has a business and is well off. He once wanted to open a hairdressing saloon, where his son would work, but he did not want to. For this reason he had to work to pay for his own moped license instead of having it paid by his father. Also his father forced him to go to catholic church, although he did not really have any belief. He just went as he was told to.

- The subject has only contact with his mother as he finds his relationship with his father too stressed.

- His own marriage, too, broke up after 13 years. They had grown apart during his retraining in Heidelberg. He himself is very sensitive – (he had drawn a delicate picture of a woman in pencil) – but his wife would provoke him to become very impulsive and aggressive, so that he would tremble with fright.

  His wife believed that she had missed something in life so that she

often went to the disco, neglecting the apartment and her family.

Today he has to provide for her and both children. His wife and he are tied together by a mixture of love and hatred and each tries to discredit the other as much as possible.

- Like his father he cannot show affection or his feelings. Both of them are resentful. He fights his father and protests against him and his demands for authority. Because of his father he wasted his youth as his father put him in a home for apprentices.

- His father was test driver at Opel and wanted to realize his attempts to start his own business with the help of his son. He wanted to employ a famous hairdresser who would teach his son until he could take over running the business himself.

  Today the subject can no longer talk to his father. He hates him because he drinks too much, whereas the subject takes only cider, very rarely a beer, but no strong drinks. He cannot stand his father drinking. Under such conditions he always remembers the times when the father was drunk and hit him.

  In the son the father wanted to realize the things he could not achieve himself.

- The subject has never hit his own children.

- The brother of the subject flatters the father and is a spoilt child, who gets everything from the father he wants. The subject never gets anything from the father and also the father's new wife is against him.

- He is very aggressive and is afraid of being punished.

- He has a whim of controlling everything as he once lost 5 German Marks as a child 30 years ago. The father treated this as a deadly sin and punished him severely as if it were a severe violation of his duty.

- In school he once had a circulatory collapse.

- Since his accident, even as a passenger, he gets a sharp pain in the head from fright when in an uncertain traffic situation.

2.2. Special Characteristics

- Color shock and failure
- increased number of anatomical answers, hypochondriac
- heightened response to sexual questions
- increased Index of Reality
- one–sided dominance of sharpness of form (indicates helplessness when assimilating feelings and experiences)
- few answers to human topics
- color attraction
- visual interpretation
- repressed aggression
- anxiety feelings, fear of punishment and loss.

2.3. Test Evaluation

The subject considers himself to be a hypochondriac with heightened self–observation and has an epileptic syndrome.

He tends towards being relatively intolerant of alcohol and of being over–controlled, probably due to his weakness for irritability and fright of an eruption of his pent–up aggression. Whereas the subject longs for affection and security, he suffers because his father rejects him. He is depressive, annoyable and introverted up to having a possible obstinate and dogmatic personality.

Possible intellectual talents are hindered by emotional disturbances. His thinking is unsystematic and disconnected, but also characterized by a rational and pedantic accuracy. On the other hand, the subject distinguishes himself by his conscientiousness and regard to duty, which can lead to making hypersocial sacrifices for others.

2.4. Suggested Therapy

Psychological situation therapy.

Case 3. R. Schaefler, Langenargen, 1977

Three psychological examinations were perfomed on the witness. The first took place in 1977, the second in 1980, and the third on June 16, 1989. Only the last test is described below. The details of R. Schaefler's UFO encounter are described in *Brilliantly Shining Object and*

Strange Figures in Langenargen in this volume.

3.1. Test Account

- The acoustic aura (whistle) previously experienced no longer occurs.

- The epileptic attacks are weaker and occur more rarely than previously. The medical treatment which we recommended years ago has in the meantime been carried out. Since the EEG measurements made by Dr. H. in July, 1988, the recommended medicine for this therapy has no longer been required. During the last few months no epileptic attack has occurred.

- His fear of darkness is still present.

- The patient has indicated his readiness to take another hypnotic treatment in order to clear up the fears that have remained since his UFO sighting (the hope is to get an appointment with Dr. Bick).

- Since the last test the subject has married and has children.

3.2. Special Characteristics

- Red shock
- Failure
- Renewed friction with the environment
- Identification of blood, defects, corpses, and strange beings. Volcanos.
- Aggression
- Adherence to symmetry and the topic "geography"
- Subject criticism.

3.3 Test Evaluation

The subject has still (compared to 1977 and 1980) repressed fears, which is fear of life in the widest sense. He is unsure of himself and has inhibited aggression and fear of being a failure.

Instead of the previous frictions with his mother he now has them with his wife, who has taken the place of the mother. Vis–à–vis his wife he feels apprehension lest she should view him as crazy or nutty as a result of the UFO sighting which he has not been able to keep hidden. In fact, questions have arisen in family therapeutic discussions with her

about the possibility of the children having inherited such tendencies from him.

To be sure, the epilepsy has improved. The patient has had no recent attacks. Nevertheless, an epileptic tendency due to organic defects may still be present but remains in the background for the time being. Under new situations of stress or traumatic experiences it could rise to the surface.

The fear that this may happen is still there. On the other side there exists an apathetic schizophrenia which could be due to psychic causes.

3.4. Suggested Therapy

- Hypnotic examination and treatment
- medical control (EEG check)
- psychological family therapy.

Case 4. H. Jürgens, Gengenbach near Offenbach, 1989

Whilst the cases discussed so far seem to indicate abductions, the case of Mr. Jürgens is a pseudo–abduction.

A young man phoned W. von Lucadou, who is owner of an advisory board for parapsychology in Freiburg, and told him that he had seen two UFOs in Gengenbach near Offenburg at about 10 p.m. on May 5, 1989. The witness said that one of the objects had emitted short rays of blue light which were pointed downwards. The witness made a reliable impression. He seemed not to exaggerate the size of the objects as he gave this as being "half as big as the moon". The length of the sighting he estimated to be only about 20 seconds. Then both objects flew off vertically.

The witness hinted that "there was something in his life which he had repressed", and which he would like to bring into the open with hypnosis. We told him that we could enlist the help of a professional hypnotist only in abduction cases.

As a result of a call for witnesses in a newspaper, several independent witnesses from Gengenbach came forward, including a police officer, who wanted to remain anonymous. Thus, this sighting could be confirmed, although it was observed from a distance.

At the end of May the witness called us once again and claimed that on May 27, 1989, he followed an inner compulsion and climbed 8 km up a thickly wooded mountain to be hit by a blue ray in a clearing at 1 o'clock in the morning. The ray of light came from a hovering object, which looked like the objects he had seen on May 5. The witness then lost consciousness and did not wake up until about 6 o'clock in the morning.

On June 3 the witness filled out an MMPI test sheet. A doctor specializing in hypnosis, Dr. C. Bick, performed the first hypnotic regression in our presence. The witness did not believe that he had been in the state of hypnosis. However, he did remember that he was flown to the inside of the object and laid on a bright, silvery table.

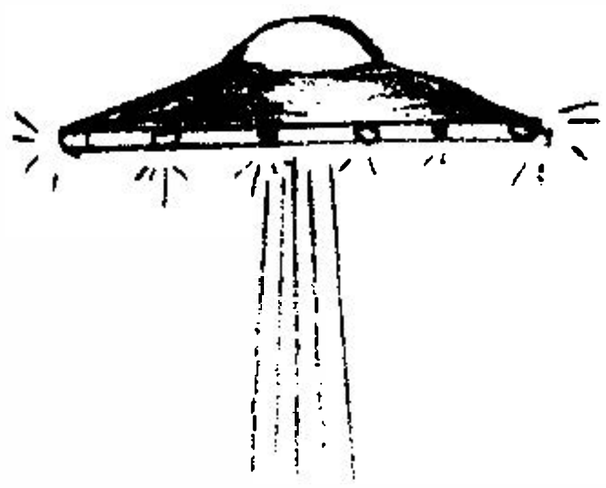
A further hypnotic regression was performed the following week in Dr. Bick's clinic. In the meantime the MMPI test had been evaluated. This gave a score of lies of 80%, which seemed to be extremely high but was confirmed by the factor "truthful answer to questions", which was only 22%. As a result, his personality test could not be evaluated. Mr. Jürgen's attention was drawn to this fact. He justified himself by claiming that he had not wanted to "make it too easy for us".

Mr. Jürgens wanted a hynotic regression at all costs. His "second sighting" seems to have been a pure invention with the aim to be hypnotized once again.

During the hypnotic regression he "remembered" that he had not seen anyone in the room. He saw 6 rotating "spools" and a wall with lamps like a computer. He thought that he had received a message there that he must warn the human race about a coming catastrophe. Details would be given in a later encounter. In a previous life he had lived on the planet from which the UFOs had come. This planet had been destroyed by another wicked race of extraterrestrials. The earth must await the same fate in the year 2000.

It became more and more evident during testing that the witness was suffering from schizophrenia. His wife informed us that her husband had been under psychiatric treatment several years previously. Also at this time he had suffered delusions that he must save the world from wicked extraterrestrials.

On June 17 the author began a therapy with the witness, which was continued by other clinical personnel.



6.11
Location: Gengenbach
Time: 5/5/1989, 10:15 p.m., 20 sec
Object: 2 domed discs
Distance: > 1 mile
Altitude: > 100 yards
Size: 10-20 yards
Witnesses: 2
Peculiarities: blue solid light beam
Reliability index: 75%
Interviewers: MUFON-CES

4.1. Synopsis

- According to his birth certificate only his mother is known and his actual father is unknown. The mother may well be hiding his identity as she is afraid that Mr. Jürgen's stepfather, who is regarded as being very dominant, would grudge this "error".

- His stepfather has a daughter in the eastern part of Germany whom, for some unknown reason, he treats very well. This is surprising, as he had wished for a boy as a grandson with the words "if the child is not a boy, then you do not need to phone me! If is is a boy, then you will get a present from me".

- As a result of these comments the witness does not now have any confidence in his (step)father, who used to be a person he respected. He was, however, never a good friend, used to hit him a lot, and called him a failure and stupid. There were often arguments about money. Whilst his mother tried to spoil him, the father often threatened with divorce because of him, or wanted him to be thrown out. In the end, by threatening "that or else", he succeeded in his stepson's 4th school year.

- Since then the witness has been alone without the protection of his mother and has had to take a lot of punishment both at school and in his apprenticeship.

- His stepfather he sees as:

- dominating, wilfull and selfish
- controls even his own sister
- threatening ("As long as you have your feet under my table.....")
- never open for a discussion
- never makes a mistake, is always right and is a self–righteous, egocentric person
- is an absolute football (soccer) fan and wanted to make me into that which he never achieved: a professional and famous football player, whereas I prefer athletics. As a result, he forbade me to watch television or to go out. He punishes more by despising and shows no sympathy. But I am better than he is and have love in my heart, but he does not know this. He should listen more to other people. I am very sensitive and gentle and not a sportsman. This is why I was rejected and not understood by him.
- Father was a foundry worker but is out of work as a result of a back injury.
- He forced me into an apprenticeship as a cook, although it did not interest me. I am not happy there as I am overworked with 15 hour days and no rest days. I would rather have studied science in general, philosophy, or as a teacher for others.
- Since I was called up for military service he says: "Since the army you are a man".

– The witness loves and needs background music.

– He says that he has visions of the future as in a theater, with pic–tures, voices and text in a secret language. He has been hearing this since he was 4 years old. Since 1981 till today 10 times. He sees an earth 1 and 2 and also the nothing (= God?). The message from earth 2 to earth 1 is the children's wish for security, love, trust, and friendship. Here is a false intelligence at work and not enough mu–tual understanding. This is a warning not to lose the children in a desperate escape. One would jump out of the frying pan into the fire and would lose them forever. The message from earth 2 gives him strength. Although here, as well, the positive exists and the danger of the negative, war. The children are also positively and negatively biased. We must respect and value more their need for security. This

is an urgent message "similar to the Ten Commandments, but with emphasis on other values, otherwise the children's world breaks down". He loves his children and takes a lot of care of them.

He himself once lived on earth 2 and understands there the more intelligent language composed of German, English, and also older languages. He understands them better than he speaks them and is better at writing them after a stimulation through disco music via headphones or instrumental music; he always hums along.

From ad hoc experienced acronyms he understands the spoken message "Beginning, End, Future, End Well".

It has been up and down for him for the past 9 years. Now he is stabilized in the center due to his contacts with his spiritual father and his strength.

The message can be read in the "New Bible", or one could just ask the pope. He would give the same answers as himself.

The "New Bible" is like the New Testament, but it has yet to be written. The work will be given to several people, including himself.

There are already hints about messages in the Old Testament. The "New Bible" will be for everyone and mainly for our children. It depends a lot on how we react to them in the future. More emphasis must be placed on love between people and consideration for one another. No cheating other people and egoism. Other people have already begun writing the "New Bible" for him.

- According to the report dated Sept. 10, 1991, from the County Court in E., the witness was admitted under compulsion to the Psychiatric Clinic in E. for 6 weeks.

- From Sept. 4 to Sept. 16, 1987, he was treated for the third time as an outpatient. The reason was delusions with omnipotent overrating of himself, belief in a mission with ideas of how to improve the world. The diagnosis was: Exacerbation of a psychosis which has been known since 1979 as a form of schizophrenia.

- In the MMPI pre-test for today's test the witness had some striking results:

Lying test	80%
Truthful answers	22%
Part acting	69%
Lying about social fright	100%
Schizophrenic prognosis	59%
Depression	35%

– Jürgens explains the partially contradictory results by claiming that he tested our qualifications. Without a satisfactory result here, he would, because of other experiences (misunderstanding, being laughed at, and bad treatment) say no more. He is in principle cautious and will not immediately tell everything: – Thus this test of our compe–tence would show if we understood his message and were capable of taking it seriously. He is afraid of being misunderstood and does not want to cast pearls before the swine.

4.2. Special Characteristics

- Aggression and dynamic tendencies
- darkness– and color shocks
- high percentage of anatomical answers (fright!), confabulation, mask interpretation, hangman interpretation (indicating fright and depres–sion), eyes (unsure, feels that he is being followed or watched)
- non–typical succession, disturbed intelligence
- color answers are nearly absent. At the same time there is a tend–ency towards color attraction and color shocks!

4.3. Diagnosis

Psychogenic schizophrenia.

4.4. Test Evaluation

The synopsis of the tests, the record and the evaluation show that the subject has marked intellectual talents which are, however, very dis–turbed. The disturbances are psychogenic in the form of schizophrenic phases with cyclic phases of depressive resignation alternating with maniac phases, as for example the passionate use of gambling ma–chines and excess use of money which are not his normal tendencies, or showing off his sporting prowess by running, walking or driving many kilometers. This he does in a euphoric frame of mind, tending towards partial exhibitionism. These phases can last up to 1/2 year.

The probable reason for the psychogenic disorders are family disturbances. The subject suffers from a father complex, resulting in periodic attacks of schizophrenia which have continued to this day.

In the family the father is felt to be very strongly dominant and authoritarian. The subject has failed to detach himself from his father. Thus, a negative fixation towards him has remained. This image of the father in many ways removed his proficiency to lead a normal life. He is still burdened with unfulfillable expectations, so that he suffers from a lack of recognition and feelings of guilt. He cannot assimilate his feeling of not being accepted without therapeutic treatment. For this reason he tries to obtain recognition by showing performances that he feels are special.

Apparently this method has not brought him the success that he seeks. The fear that he will continue to be a failure threatens his ideas of himself and his own value. To escape the reality of this depressive situation he tries to escape into his own imaginary world. He fights the fear of his father by means of projections: the experiences which are threatening from within are relocated into the exterior world, and in this way the reality is reinterpreted in a schizophrenic manner.

While the subject's father is probably his stepfather, who will not recognize him, the subject searches for his real father, who he hopes will accept him. So much of his hopes rest on this. He does this even if it means the loss of reality and moving into a fantasy world, with a religious–divine being and his spiritual father, whom he refers to as a "light symbol". As a result of his unbearable inner uncertainty the subject is searching for his own lasting self identity. In the end this occurs via his invented father image, which is in competition with his actual father image.

This mixture of images has in itself the danger of interferences. Whether the subject realizes this in the form of cognitive discords or only suspects it cannot be answered at present and must remain an open question. In any case, this represents another source for the changeable detachment or fixative phases from/to the different father images, with resulting cycles of guilt feelings (possible explanation for ambivalence).

4.5. Therapy Suggestion

A non–medical full situation treatment with the inclusion of his parents, brothers and sisters, and his own family. At the same time other

measures are required to rehabilitate him at work.

5. Comparative Investigation of the Available Rorschach Tests

5.1. Summary of the Subjects

From the psychological tests carried out up to date, Rorschach test results are available for the following subjects:

A:	Pia Mosbach	1983	Subject with UFO sighting
B:	A. Nitsch	1986	Subject with UFO sighting
C:	R. Schaefler	1977	Subject with UFO sighting
D:	R. Schaefler	1980	
E:	R. Schaefler	1989	
F:	H. Jürgens	1989	Subject with alleged UFO sighting
G:	Johann K.	1967	Subject without a sighting but with a special investigation from the German State Railways after a traumatic accident as an engine driver
H:	N.N.	1965	Subject without sightings and without any trauma.

5.2. Comparative Evaluation with 5 Subjects

In order to demonstrate the test comparison system a table was constructed with the normal profile and the various measured test results for the first 5 subjects A–E. These were then listed in a table of rank and evaluated with a Chi^2–test to find out if the difference between the 5 subjects and the normal profile are significant (the highly technical tables are not included in this article).

For simplicity the different results over the years for subject C–D–E (R. Schaefler) were treated as though they belonged to 3 different persons.

Comparison shows that all 5 profiles are significantly different from the normal value. This means that we cannot reject the working hypothesis that the subjects are systematically different from the normal population as a result of their traumatic UFO sighting, which weighs upon them.

5.3. Comparative Evaluation with 6 Subjects

In the next step we added a further subject, F (H. Jürgens), and checked if the significance changes.

The result showed that also here the significance ratios are maintained and the added subject F is significantly different from the profile of the normal Rorschach population.

Once again we have a systematic investigative difference from our normal result due to the traumatic burden on each subject. This means that our test comparison system remains stable.

5.4. Comparative Evaluation with Subjects C, D, and E

At this point we checked if the test profiles of subject R. Schaefler taken at different times change significantly.

The result of this comparative check shows, as expected, that there is no significant difference between the profile of the subject in tests C, D, and E. This means: The hypothesis that the three test profiles C, D, and E are from the same person cannot be statistically repudiated. In this sense the subject is self–consistent as far as his profile in general is concerned, although there are significant differences in some test criteria (cf. S. Streubel, Sondergutachten, MUFON–CES Report No. 8, I. Brand editor, 1981, p. 350).

In general, the theory can be deduced that all subjects with stress from a traumatic experience form their own group with respect to the Rorschach test. This group, as a subgroup, is significantly different from the normal test population.

5.5. Comparative Evaluation with a 7th Subject with Accident Trauma but no Sighting

We next checked if a person who has had a traumatic experience, but without a sighting, i.e. subject G (Johann K.), is different from the previous group in that he does not differ from the normal profile. In case this subject also differs from the normal profile, like the rest of the test persons, we can treat this as a reinforcement of the theory proposed in Section 5.3.

The result of our investigation is that the previous significance level

continues to be stable. For the newly added subject G the likelihood of an error in the significance rating is only 5%. Thus, our theory of a group of "traumatic subjects" is in general confirmed.

5.6. Comparative Evaluation with a Neutral Subject (i.e. one without traumatic experience)

The theory which we have deduced in Section 5.3 can further be tested if we add to our present group of individuals A to G a further person, subject H (N.N.), known to be *free from traumatic burdens* and having passed a Rorschach test.

Results show that our comparative test system reacts sensitively enough and now shows a difference relative to the group which has had a traumatic experience. The new subject H does not differ significantly from the normal test population. This means that the basic hypothesis – that H is not noticeably different from the normal population and hence belongs to it – cannot be rejected.

Thus we reinforce the theory that people who have had a traumatic experience in general have different results in a Rorschach test than the normal population.

Theoretically, we can explain this characteristic as follows: There have always existed certain a priori dispositions of the subjects A to F. A trauma caused the disposition to exceed the physiological threshold value. Post–traumatically, each subject reacts individually in accordance with his main weakness(es) and suffers individual injury. It seems that the Rorschach test is able to reveal this substantial and lasting weak–ness in the behavior of the respective test persons.

The following episode shows an example of the effectiveness psycho–somatic influences resulting from traumatic experiences can have on people:

A young man falls to his death whilst climbing in the mountains. He was 22 years old. His papers and address are found so that his mother could be informed on the same day. She was the only parent and he was the only son. She had not yet missed her son when the police brought the news of his death. At the moment that the news of his death was given to her, she fell dead in front of the police officers. As she heard the news she had a cerebral apoplexy which proved fatal.

Conditions leading to such psychosomatic reactions can be:

- grave concern about the given information
- a high degree of identification with the victim or in general with the "object" concerned
- a strong feeling of responsibility for the lost "object"
- a subjective evaluation of not being able to cope with the loss (senselessness of further life and the horror of a future with only meaningless day–to–day life)
- unchangeability of the facts (perceived conclusiveness)
- high regard for the value of the lost object
- an attempt by the person's own organism to protect itself from the expected unbearable pain (in general a fainting fit caused by the body secreting opiates (endorphines). This is usually an emergency program to ensure further life, but it is possible for individuals to have too high a dosis causing lethal overreaction)
- general inability to cope with the experience
- individually preferred tendencies, learned from similar situations in the past, to deal with such experiences
- synergy effect resulting from several stress situations at the same time
- individual constitutional disposition to a physical reaction to stress
- lack of personal experience on how to deal with experiences in extreme situations, border line situations and crisis management in general
- other existing or experienced anxiety effects
- neurotic repression mechanisms with difficulty to deal with experiences

Others...

6. Conclusion and Discussion of Results

The Rorschach tests on subjects who have had traumatic experiences are statistically significantly different from the average normal test results for the whole population.

The reason is the difficulty that the subjects have in assimilating the experience caused by the trauma. This shows itself impressed in the personality of the subjects and through corresponding special phenomena. At a later date with possibly enough cases to be statistically useful one could locate such syndromes by use of discriminatory analysis.

In general, the results of the tests also show that the subjects who have had UFO sightings, which they have not been able to cope with, have generally suffered badly and need psychological therapy.

How to interpret the significant difference in the test profiles remains open. One does not definitely know if the post trauma personality revealed by the test is automatically a result of the trauma or if it existed beforehand. Also it is not automatically obvious that the differences in the test profiles as against the normal population should be looked upon as pathological or not. This must be regarded individually in conjunction with the test results and the evaluation as well as the general behavior.

The statistical results show that the experimental method remains stable with an increasing number of subjects. However, when a person who has not had a traumatic experience is added, the method shows that it is sensitive enough to detect this and to show the subject as "not significant" and not belonging to the trauma group.

As a rule the Rorschach test and its results can be used as a check on the authenticity of people who claim they have had a UFO sighting. The test profile of such people should, at least statistically, be different from that of the normal population. If this is not the case, then caution is required. It could be a person who wishes to simulate such events. Thus, cases intended to deceive can be removed with reasonable accuracy (before further, more complicated tests are conducted).

An exception to this rule is the special case of subject F. He had been traumatized, probably due to other reasons, and then, possibly as his own strategy to overcome the crisis in his life, created the desired UFO sightings in response to his wishful thinking. This was probably achieved without an external psychophysical stimulus. In this case other severe or traumatic damages would have caused the significant scores.

Such traumatic influences are present, according to the Rorschach test, and could hardly be just pretended. Thus he cannot be eliminated with certainty from credibility, although in the MMPI test some partially contradictory results appear for some of the test criteria .

Some Clinical Considerations Pertaining to UFO Abduction Reports

Rima E. Laibow, MD

March 25, 1990

UFO encounters are both social and psychological events. They may be physical events as well. But while their ultimate event-level reality status remains to be determined, it is clear that a UFO encounter is very much a psychiatric and psychological event of great potential significance. While some persons reporting UFO encounters consider themselves "chosen", "blessed" or "special", many others feel that they have been assaulted, violated, traumatized and injured both physically and psychologically in the encounter. Indeed, clinicians are well aware that even evaluations of the event which are, at face value, highly positive, may, at a deeper level of experience, carry strong negative meaning which is being denied or disavowed through an insistence on the positive meaning of the experience. This is often seen in persons who have experienced sexual and physical abuse while children: they adhere as tightly as possible to the idea that this special treatment was, in some way, "good for me" and a mark of special favor. In fact, of course, such treatment was hurtful and damaged the ability of the child to trust, to predict and to love in a way free from significant distortion.

For many individuals, the psychological and psychiatric impact on the person experiencing a close UFO encounter is very much like that of an overwhelming natural disaster or a perpetrator/victim crime on the person experiencing this encounter. In order to understand how, and why this is true, we must first consider two psychiatric syndromes which constitute responses of persons under extraordinary and overwhelming circumstances:

1., Post Traumatic Stress Disorder (PTSD), which afflicts people who have been exposed to overwhelming and intolerable levels of stress and

2., Experienced Anomalous Trauma (EAT) which may be said to be present when people show PTSD in the absence of ordinarily identifiable stressors but in the presence of indications of non-ordinary traumatic events.

PTSD is a complex physical and psychological response seen in people (who, prior to the stressor event may have been high functioning and reasonably healthy individuals) when coping mechanisms are overwhelmed

by **stressors imposed upon them by forces beyond their control**. For example, the victim of a rape, a terrorist attack, a person in a combat zone, a Holocaust survivor, an off-shore oil rig worker trapped in a flaming and collapsing rig or a murder witness can all be expected to show post event reactions of a strong and troubling nature. Each of them might reasonably be expected to have difficulty coming to terms with the terror, helplessness, violation which such an event would hold. Perhaps most basically, the Post trauma victim confronts the emotional reality of a shattered trust in the safety in the world. It is upon this trust which most of us build the structures of our lives. When it is shattered, our lives our altered in fundamental way.

Based on his/her previous psychological structures and strengths, the support received immediately post crisis and the course of subsequent events, the spectrum of reaction and disability which can be seen in different individuals can range from mild and transient to persistent and disabling. The most devastating PTSD seems to result from those traumatic events which occur at the hands of other people. Natural disasters and accidents, as distressing as they may be, rarely produce the same level of deep unsafety and distress as perpetrator/victim situations.

Since every person is an irretrievably intertwined amalgam of both physical and emotional self, it comes as no surprise that psychological trauma presents itself in both psychological and physical terms and that the two are sometimes mistaken for each other. For example, sensations associated with panic and anxiety may be experienced as gastric problems. The distress may be great enough that the sufferer may seek medical assistance to diagnose and treat an ulcer, colitis or other "physical symptoms". Sleep disturbances, a blocking of emotions ("psychic numbing"), a loss of pleasure ("anhedonia"), diminished libido, intrusive visual images of the overwhelming events ("flashbacks"), hypertension and other psychophysical responses, anxiety and panic states, each of them may represent a deep and powerful response to experiences which the individual cannot "come to terms with".

PTSD is readily understood if there has been a trauma to de-stabilize the world of the individual. By definition, PTSD can only occur following a trauma. It is not possible for internally generated states, no matter how compelling they seem to the person who experiences them, to generate true PTSD. Rather, hallucinating or imagining a trauma will lead to other sequelae quite different from those associated with an event-level ("real") trauma. Clinicians are so confident of this crucial distinction that, when the category of PTSD was added to the American Psychiatric Association's official Diagnostic and Statistical Manual, Third Version (DSM-III) in 1980,

one of the features necessarily present before this diagnosis could be made was the occurrence of an actual trauma in the life of the person[1].

But what of people who meet all the criteria of PTSD but who lack a knowable, easily identified trauma? What of these PTSD-like persons who tell stories which many people believe cannot have occurred because our world view tells us that it could never have happened in the way these people report. An easy, and facile response is that these people are mentally ill, that they are psychotic. But this is frequently not the case. What then of such people who are clearly not mentally ill but who tell stories which we could expect only from those who are seriously deranged? I have suggested the term Experienced Anomalous Trauma[2] to describe the problem with which these people are struggling to cope: they act, feel, and respond as if they have been traumatized, but there is no trauma of an ordinary sort which can be identified in their lives. For them, perplexingly enough, the trauma is real no matter whether it occurred in the way that, for example, a rape, "really" occurs. When EAT victims are asked to explain what has happened to them, they may identify one of a wide variety of traumatic episodes. They may tell the listener, and fear or believe, that they have been psychically attacked, that they are victims of a Kundalini episode, that they have encountered a poltergeist, that they are the victim of spirit possession, or that they have been contacted or abducted by the occupants of a UFO. Each of these (and other associated) types of EAT has its own particular characteristics[3]. It is worthy of note that while the stories of each category differ very widely one from another, there may be little difference in the stories within each of the categories[4], a feature which we shall consider in more depth below, but which provides intriguing questions at several levels for the student of these phenomena.

The remainder of this paper will focus upon the UFO experience. We cannot say with certainty what the reality status of such reports is, but we are faced with several serious challenges an easy understanding of these experiences when we consider these contact/abduction scenarios.

First, these stories resemble each other far too much to be fantasy or folklore. Folklore diverges, rather than converges, wherever possible and a careful analysis of the UFO abduction scenario demonstrates that this essential component of divergence is lacking[5] although secondary myths and

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[1] American Psychiatric Association: Diagnostic and Statistical Manual of Mental Disorders, 3rd ed. Washington, DC, American Psychiatric Association, 1980

[2] Laibow, R. E. and Laue, C.S., "Post Abduction Trauma" in International Handbook of Traumatic Stress Syndromes, Plenum Press, in press.

[3] Grof, S. and Grof, C. Spiritual Emergency, Tarcher Publishers, 1989

[4] *ibid.*

[5] Bullard, T. E. (1987) Folklore paper xxxxx

beliefs have sprung up around the scenarios which do constitute folklore.[6] Fantasies are constructed according to the internal needs and logic of the builder. Although similar themes (i.e., helplessness, rage, loss) may be expressed by many people, the metaphors and communication patterns chosen to express them vary widely. Each symbol and event chosen by a person to express his inner life in dreams and fantasies has extensive and significant meaning for that person. And, through the same symbol may be chosen by different people, that meaning may well differ from the creator of one dream or fantasy to another. The work of unravelling the significance of a particular symbol or element in a dream is one which often requires skill and patience as well as careful labor on the part of both dreamer and, if necessary, therapist. Yet there is little variation of the abduction scenario from person to person, given a skilled, careful and unbiased investigation. Even without such careful investigation, the reports themselves present a startling coherence. Episodes follow each other in regular sequence with numbing regularity: aliens look much the same, manipulations and procedures follow in a predictable order in the tales of people who could not reasonable be assumed to know of the other tales which have been told (e.g., very young children, peasants in remote cultures).[7,8,9]

Second, those individuals reporting these episodes are, as far as we can deduce, surprisingly free of the necessary degree of pathology or untruthfulness which would lead them to construct a psychotic (or hoaxed) version of what they have experienced. Although reports of capture and physical examinations by alien beings sound bizarre enough to suggest very serious mental health problems in the reporter, the interesting fact here is that most people reporting such events do not show enough pathology to account for their stories on this basis.[10,11,12,13]

Third, while it is tempting to attribute the scenario content to the influence of hypnosis, about 30% of all abduction scenarios are obtained

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[6]Kottmeyer, M.

[7]Bullard, T. E. (1987) UFO Abductions: The Measure of a Mystery The Fund For UFO Research, 2 Vols

[8]Haines, R.T., Human Engineering and EAT, presented at TREAT II, 1990

[9]Bullard, T.E. (1987) On Stolen Time: A Summary of a Comparative Study of the UFO Abduction Mystery. Washington, D.C. The Fund For UFO Research

[10]Laibow, R., Clinical Discrepancies in Persons Reporting UFO Abduction Scenarios, submitted.

[11]Slater, E., Ph.D. "Conclusions on Nine Psychologicals" in Final Report on the Psychological Testing of UFO "Abductees" Mt. Ranier, MD, 1985

[12]Parnell, June "Psychological Studies of UFO Experiencers" xxxxxx

[13]Sprinkle, Leo personal communication with the author

without the use of hypnosis, in part or totally.[14,15] Further, although it has been postulated that the expectations and belief system of the hypnotist shapes the events reported in the reported scenario, this has been demonstrated to be false since the same material emerges in the same order whether a knowledgeable or naive hypnotist is conducting the session, whether the hypnotist is a believer or a skeptic, whether the hypnotist "leads the witness" or sharply challenges each assertion made by the witness.[16,17] Although about a quarter of the known recent abduction cases are further elaborated through hypnosis, the relationship between the information thus obtained and the belief or wishes of the hypnotist is a surprising one. A study which compared the scenarios and their content with the belief structures of the hypnotist found that there is no relationship between these variables and the content of the stories whatsoever.[18]

Fourth, the problem of how and why this particular type of event, if not part of ordinary reality, can produce its PTSD-like sequellae is very puzzling. Let us suppose that the UFO scenario and its sequellae were somehow a product of the internal life and imagination of the reporter. Let us also assume that this particular fantasy is somehow able to engender the symptoms and signs of a PTSD-like disorder. Let us again assume that the fantasy scenario in this particular person somehow converges, through unknown mechanisms, on the peculiar fantasies of other similarly (mal)functioning men, women and children from a wide variety of cultures. Having assume all this, then we find another aberration (which represents a very peculiar aspect of this experience) needs to be accounted for as well. How is it, we must then ask, that once this set of peculiar fantasies and imaginings is brought forward from the unconscious, symptoms which have been associated with it (i.e., disabling phobias and anxiety states, psychophysiologic equivalents, sleep and libido disturbances, intrusive visual images and other profoundly disturbing events) resolve themselves in a way which they have resisted previously?[19] It is clear from abundant clinical experience in a wide variety of settings that the unearthing of ordinary fantasies will not bring about the resolution of symptoms associated. For example, suppose a child is so terrified of the dangers she

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[14]Bullard, T.E. (1989) Hypnosis and UFO Abductions: A Troubled Relationship

[15]Webb, David F. "The Influence of Hypnosis in the Investigation of Abduction Cases" MUFON 1985 Symposium Proceedings, Seguin, TX p.88-96.

[16]Bullard, Hypnosis and UFO Abductions: A Troubled Relationship *loc. cit.*

[17]Laibow, R. Psychodynamic and Psychopysiological Aspects of EAT, presentation at TREAT II, 1990

[18]Bullard, E. Hypnosis and EAT, presentation at TREAT II, 1990

[19]Laibow, R. E., Clinical Discrepancies, *Op. Cit.*

feels in the dark that her parents have brought her to a therapist to work on this area of distress. She will will not be relieved of that panic when she tells her therapist that monsters lurk there although it is important that she trust someone enough to share those fears. If, however, her therapist can help her to understand the meaning of those monsters in her inner life, and if the levels of mastery and trust which the child experiences can be healthily increased, then perhaps the phobia no longer has meaning and the symptom will be dissolved. In other words, the meaning behind the symptom will have become apparent and the symptom, a code for the meaning, will no longer be necessary.

On the other hand, what of the child who has been attacked and raped while she walked home in the dark and has repressed the memory of that dark night and its horrible events? Retrieval of the night's events and the resultant decompression and detoxification which results from sharing and processing them in a completely safe environment is a vitally important part of dissolving the panic symptom. This comes about when the **partial** component of her fear, the dark, no longer needs to be substituted for the **total** component, the attack which occurred in the dark. Where the dark stood as a fear-laden shorthand for the whole reality, through a de-repression this is no longer necessary.

Thus, the resolution of symptoms following the telling of the scenarios and their rapid working-through which frequently occurs in UFO abduction cases makes it appear that the events thus recounted are, indeed real ones. This, of course, supposes a customary level of "reality" which we, in our cultural matrix, agree upon. Yet this type of internal evidence, while suggestive, is hardly conclusive. It does imply, though, that if these scenarios are not real in the ordinary meaning of that word, then there may be something rather special about the internal reality value which they hold for the experiencer.

The understanding of this group of experiences is a very important goal for behavioral, as well as physical scientists since, whether the scenarios result from UFO encounters or not, they do seem to have unique qualities which may help us unravel the ways in which we humans function within ourselves and, perhaps, beyond. A clinical case history may be useful to illustrate some of the points made above:

Eleanor is a 51 year old European International Law and negotiations specialist. Her career has been a distinguished one with professional and personal recognition coming to her frequently. In addition to her international and national professional contributions , she has given generously of her personal time and effort to charities and humanitarian organizations at the national and international levels.

Married, but widowed early, she is actively involved with a circle of loving friends and family members. Deeply psychologically minded, she

entered therapy when she lost her husband and successfully completed a course of psychoanalysis of 4 years' duration. She is, except as noted below, free of phobias and panic states. She lives alone, travels widely and independently. On the Global Assessment of Functioning Scale (GAF Scale) she earned a score of 92[20]

Yet, alone one night in her home in 1988, she awoke to a series of strange, interrupted whistles or high pitched beeps with a sense of absolute terror, feeling that "I had somehow not been alone". The sound "seemed to be familiar although I could not determine why or how". Her dog was behaving strangely and was hard to calm. This sequence of events recurred a total of three times in approximately 90 days.

Eleanor came to me hoping to find some way to understand those experiences. In the course of our work together, which involved both discussion and hypnosis, she noted that she was suddenly reluctant to verbalize her thoughts. Her previous experience as an analysand, however, allowed her to identify and overcome her resistance and share the fact that, incredibly, somehow the sounds seemed associated with "non-human things".

She sought, and received, my assurance that I would not think she was insane. Eleanor was then able to allow herself to share a description of these non-humans which seemed to be associated with both the strange sounds and her sense of terror. They, and their behaviors, were typical of the UFO abduction scenario so frequently reported elsewhere including movement through the window into the waiting craft, an examination table, procedures both reproductively and neurologically focused, visual images of startling reality and complexity, the presentation of babies and other expected items, all in the "proper" sequence. Eleanor is a fully credible reporter who asserts, with convincing sincerity, that she had neither read nor heard of any such material before our work together. Her reliability seems to me to be impeccable.

Our continued work led to her retrieval of a "memory" of being floated out of her bed when about 3 by these or similar beings and being subjected to an oral probe which was inserted rapidly and forcefully down her throat causing great discomfort, gagging and difficulty breathing. Both idiomotor signals and vocalized recall were employed. The oral procedure was recalled during the session fully in the experiential present-tense with tremendous distress amid vivid and painful somatic re-experiencing.

After that session, she confided that although it caused her only occasional difficulty, and although she had tried hard to drain the intensity of it, she had a life-long terror of oral insertion and procedures of any sort.

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[20]American Psychiatric Association, DSM-III-R,American Psychiatric Association, DSM-III-R, 1987, APA, Washington, DC. p. 12

In fact, at about 7 she had developed what was feared to be "strep throat". The doctor wanted to take a throat swab in order to produce a throat culture. When he came near her with the swab, she became so frightened that the doctor, her mother, the nurse, a parent from the waiting room and a male passerby (urged in off the street) were unable to hold down the terrified, flailing, fighting child long enough to get the sample. Eleanor admitted that a dental procedure was a horrible trial for her although she had never told any one about this fear in her adulthood and did succeed in somehow getting the dental care she needed despite her discomfort.

Shortly after this session and the processing which this allowed, she returned home. Not long thereafter, she required visits to both her dentist and her internist. Both visits were accomplished without terror or distress even though the internist had to take a throat culture, an event which previously would have occasioned overwhelming dread. She reported that she was, in advance of these visits, completely certain that there would be no panic or distress and was actually anticipating these visits with a sense of eager, self-observant curiosity to see what the outcome would be. In fact, neither anxiety nor distress were occasioned by these procedures, only a sense of delighted freedom from fear. This detoxification has proved durable.

Although a diagnosis of simple phobia might be suggested by a superficial examination of the symptoms here, it is not supported by the data. A diagnosis of a Simple Phobia (DSM III-R 300.29)[21] can be made only if the avoidant behavior interferes with the person's normal routine, with usual social activities or relationships with others, of if there is marked distress about having the fear. Although most phobias that start in childhood disappear without treatment, those that persist into adulthood rarely remit without treatment.[22]

Extensive evaluation and exploration of Eleanor and her inner life failed to reveal either lacunae of pathology or pervasive symptomatology. Her anxious and avoidant behavior did not meet the criteria for a simple phobia, yet she produced memory material of terrifying, complex and concordant events. The recall of these events, plus some assisted processing afterwards, allowed her to discharge the terror and inhibition of activity which previously had resided in them. Her affective and experiential response to them was not that they were fantasies (which, by their very definition, stand for other events and realities) but completely real events in themselves. These, recalled from their dissociated or amnestic position, could be processed, as it were, in the light of day.

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21 *ibid.* 243-245

22 *ibid.*.

This is a fairly typical sequence in the treatment of UFO-related EAT. Cases like this one suggest that this is an area ripe for exploration. These issues open a window on the further understanding of human reality and of UFO events and their relationship to that reality.

Basic Ideas of Burkhard Heim's Unified Field Theory

by

H. Beck and Illobrand von Ludwiger

Abstract – Heim's theory is defined in a 6–dimensional world. Two of the 6 dimensions measure and guide organizational processes in the 4 dimensions of our experience. A very small natural constant, called a "metron", is derived, representing the smallest area existing in nature. This leads to the conclusion that space must be composed of a 6–dimensional geometric lattice of very small cells bounded on all sides by metrons. The existence of metrons requires our usual infinitesimal calculus to be replaced by one of finite areas.

The unperturbed lattice represents empty space. Local deformations of the lattice indicate the presence of something other than emptiness. If the deformation is of the right form and complexity, it acquires the property of mass and inertia. Elementary particles are complex dynamical systems of locally confined interacting lattice distortions. Thus, the theory geometricises the world by viewing it as a huge assemblage of very small geometric deformations of a 6–dimensional lattice in vacuum. The theory results in a very precise determination of the experimental masses of elementary particles. It also has significant consequences for cosmology.

Using a method of multivalued logic, Heim is able to extend the purely physical theory into the non–material, transcendental domain and to describe in a formal way the properties of life and related processes. Only a brief summary of the ideas underlying the transcendental theory is presented. This forms the basis of a projector theory, which describes a possible way of exchanging information between points lying far apart and to cover interstellar distances without the need of physically traversing space.

1. Introduction

Heim's theory encompasses the entire field of physics as well as aspects not generally accessible to precise treatment, such as life and all higher processes associated with it. The purely physical part of the theory is contained in two volumes (Heim, 1984, 1989) and concentrates in particular on the structure of elementary particles and cosmology. This work culminates in the derivation of formulas for calculating the mass spectrum of elementary particles. Numerical results are in

excellent agreement with measured values. The theory also provides a highly accurate value of the quantum mechanical fine structure constant α (alpha). A third volume about particle interactions is presently in preparation (Heim, private communication). Heim published three resumés of his theory (Heim, 1977, 1985, 1990a), one of them in cooperation with W. Dröscher. In addition, one of the authors has written a number of summary articles describing the essential features of Heim's work (v. Ludwiger, 1976, 1979a, 1979b, 1981, 1983).

A brief survey of the difficulties encountered by past and present physical theories will serve to illustrate the significance of Heim's contribution to our understanding of nature.

Till the end of the last century, Newtonian mechanics and Maxwell's theory of electromagnetism dominated the field of physics. The small precession of Mercury's orbit about the sun did not fit into the picture, but it was thought to be the result of some essentially unimportant exterior disturbance. However, when the atomic structure was slowly unraveled and showed that, contrary to theory, atomic electrons could revolve about the central nucleus only in certain, predetermined orbits, in which they did not radiate, it became evident that some deep-seated fault was inherent in classical Newtonian theory.

During the first quarter of this century physics underwent two very fundamental modifications: Einstein developed first his special and then his general theory of relativity (the special theory is a simplified version of the general theory), and De Broglie, Bohr, Schrödinger, and Heisenberg worked out the principles of quantum mechanics applicable to atomic configurations. In the thirties and forties further development of this work resulted in quantum field theory, describing the characteristics of elementary particles. Efforts to improve and generalize quantum field theory are still in progress.

Classical physics was shown to be a special case of both relativity and quantum theory, valid when dimensions, speeds, and masses are "normal", i.e. within the range of human experience. It loses its validity beyond these limits and does not apply, for instance, to atomic or intergalactic dimensions, or when velocities approach the speed of light. This is due to the omission in Newton's theory of some very fundamental aspects. New concepts included in relativity but neglected by Newton are the constancy of the speed of light and the effect of masses on the geometry of space. Quantum theory involves the novel concepts of wave-particle duality, uncertainty, probability distributions, and others.

In the normal range mentioned above, both relativity and quantum theory reduce to classical physics. This proves the latter to be a special case of the former. Strangely enough, though, the two modern theories seem to be incompatible with each other. While special relativity and quantum theory go over into each other in their respective ranges of validity, heroic efforts during the past half century have failed to unite

general relativity and quantum theory. This was the first hint that even these theories may not represent the ultimate approach to physics.

Meanwhile, there appeared a few additional discrepancies. The origin of the universe in a "big bang" explosion is a notion about which many physicists feel uncomfortable (Van Flandern, 1993), although the theory has been able to explain many experimentally confirmed phenomena. More serious is the fact that the application of quantum field theory to elementary particles and their mutual interactions in many instances yields only very approximate numerical results, especially for the more exotic members of the particle spectrum. In addition, theories about the internal particle structure require matter to have a surprisingly large number of very special properties. This is hard to believe, for nature may be complex mathematically, but conceptually it should exhibit the aspect of unity and simplicity. Finally, quantum theory gives rise to some paradoxical situations, as was already pointed out by Einstein and collaborators (Einstein et al. 1935). To this day, these have not found a satisfactory explanation.

The difficulties mentioned above, as in the case of classical physics, appear to indicate that even the advanced modern theories are still subject to certain limitations. They do not seem to apply to the very distant past of the universe or to the interior of elementary particles. Apparently, in the hierarchy of physical theories, relativity and quantum field theory are themselves only special cases of a still more general and all-inclusive approach to physics, which considers certain fundamental aspects of nature ignored by existing methods.

It is Heim's privilege to have recognized life and related phenomena as the feature being disregarded in today's theories. The meaning of this statement will presently be explained.

Life processes themselves are too complex to be expressible in terms of precise mathematical formulations. In order to describe them, Heim has had to develop a new formal language of multivalued mathematical logic. In this view life does not result from the mechanistic extension of conventional physics and chemistry to very complex organic systems, nor is it an ethereal quantity incapable of exercising any influence on pure physics.

Heim's theory may be divided into two parts: A purely mathematical section, treating all aspects of classical and modern physics, and a second part, termed the "transcendental" theory, dealing with life and related phenomena by means of the specially developed method of multivalued logic.

The two parts of Heim's theory satisfy an essential correspondence principle, requiring the two parts to be compatible. The laws of nature form a single unit, and hence the laws of pure physics must go over into those governing transcendental processes in the appropriate domain, just as the laws of relativistic quantum mechanics go over into those

of special relativity in the classical limit of large masses and high velocities. In order to satisfy the correspondence principle, Heim's theory, designed to encompass both non-living and living matter, has to share certain basic concepts in both areas, even though the two forms of existence may require different mathematical formalisms to describe them.

In addition to the 6-dimensionality of space (extended to 12 dimensions in the latest version of the theory), Heim introduces several other new concepts into physics. These will be discussed in the following sections.

Heim's theory, as far as it applies to events in pure physics, ranging from cosmology to internal particle structures, has an existence of its own, independently of the presence or absence of life. But the important point to note is that life is known to exist and to form an essential and inseparable part of this universe. Therefore, any physical description of the cosmos *must* obey the principle mentioned above. Heim's theory satisfies this criterion, while other theories do not. This line of reasoning is behind the assertion that the neglect of life phenomena is indirectly responsible for the limitations exhibited by relativity and quantum field theory. The very good agreement with experiment of Heim's calculated mass spectrum of elementary particles may be regarded as verification of his physical theory. Since it joins smoothly to the theory of life processes, by inference his description of the latter in terms of a multivalued logic should also be correct.

Due to the inclusion of life, Heim's theory is more comprehensive than conventional descriptions of nature and sheds some light on phenomena which so far have resisted efforts to accommodate them in today's world view. This is particularly true of the whole range of paranormal effects, whose very existence is doubted by many because they do not fit into the picture of modern science. As it turns out, what appears to be "paranormal" when perceived by our senses, limited to register processes in only 4 dimensions, is perfectly normal in 6 dimensions.

Until now, no satisfactory explanation has existed for the phenomenon of life, consciousness, and intelligence. It is more than doubtful that chemical and physical reactions alone are responsible for the development of a single cell into a human being of incredible structural complexity and with a brain capable of creating the most inspired and ingenious works of art, literature, science, and technology. The mystery of paranormal effects is no greater than that of "normal" life, and we should not be surprised that the interpretation of one automatically leads to an interpretation of the other. Thus, Heim's theory quite naturally covers not only the world of non-living and living matter, but also the domain of pure ideas and transcendental phenomena.

Unfortunately, the transcendental part of Heim's theory, describing processes beyond the purely physical realm, only exists in the form of an unpublished manuscript, but several of its main features have been published by Heim in the form of small booklets (Heim 1980, 1982,

1990b). Additional summaries are published by one of the authors (v. Ludwiger, 1979c, 1992), and Senkowski (1983).

Sections 2–11, covering the theory's basic philosophy and its application to the structure of elementary particles, are based to a large extent on a paper published in the *Journal of Scientific Exploration* (Auerbach and v. Ludwiger, 1992). A few formulas are included in the main text, but the reader may skip them, since they are not essential for an understanding of the article. Most technical details are deferred to the appendices. Sections 12 and 13 briefly describe the extension of Heim's theory to the transcendental domain and the projector theory of one of the authors (v.L.) about the exchange of information across interstellar distances and a possible mode of transportation for spacecraft.

2. Field Mass and Heim's Modified Law of Gravitation

It is well known in physics that energy is stored in the gravitational field surrounding any material object. Heim concludes that in accordance with Einstein's relation $E = mc^2$ (E = energy, m = mass, c = velocity of light = 300'000 km/s) this field energy must have associated with it a field mass, whose gravitation modifies the total gravitational attraction of an object. Einstein realized this, too, but ignored the field mass because of its small magnitude.

The existence of field mass leads to a modification of Newton's simple law of gravitation. Newton's law specifies the force F between two masses in terms of the distance r separating them. If one mass is equal to 1 kg and the other is denoted by M, then the force between them is,

$$\text{Newton's law:} \qquad F = \gamma \frac{M}{r^2} , \tag{1}$$

where γ (gamma) = 6.67221×10^{-11} $m^3/kg\ s^2$ is the gravitational constant.

Due to the existence of field mass, the gravitational force in Heim's theory is the solution of a so-called "transcendental" equation, i.e. an algebraic equation having no simple solution (cf. Appendix B). Nevertheless, approximate analytical solutions, i.e. formulas, can be derived for various ranges of the distance between two masses. According to Heim, the gravitational force in the normal, macroscopic range, which a mass M exerts on a mass of 1 kg, is given approximately by the expression,

$$\text{Heim's law:} \qquad F \approx \gamma \frac{M}{r^2} \left[1 - \frac{r^2}{\rho^2} \right] , \tag{2}$$

the value of ρ (rho) being about 150 million light years or 1.42×10^{21} km (1 light year = 9.46 trillion (10^{12}) km).

As is to be expected, the force given by Eq. (2) is virtually indistinguishable from that of Eq. (1) out to distances of many light years. Thereafter, the force of Eq. (2) begins to weaken more rapidly than Newton's law and goes to zero when $r = \rho$. At still greater distances it becomes weakly repulsive. The repulsion is of a special kind: Objects moving towards M are repelled, but objects moving away from it are not. Finally, at very large distances the approximation of Eq. (2) becomes invalid. It can be shown, however, that the gravitational force at a very great maximum distance goes to zero and stays zero, because at distances exceeding it the force becomes unphysical. This is further discussed in Appendix B. The greatest possible distance in 3 dimensions, denoted by D, is the diameter of the universe.

3. The 6–Dimensionality of the World

In addition to the normal gravitational field described by Eq. (2) the field mass gives rise to a second gravitational field, whose relation to the first is very similar to the relation between magnetic and electric fields. In the literature the second field sometimes is referred to as the "mesofield". In free space the two fields are orthogonal to each other.

The result of this is a set of equations governing the two dissimilar gravitational fields quite analogous to those describing the electromagnetic fields (Maxwell's equations). The main difference is the appearance of the field mass in the gravitational equations in the place where zero appears in Maxwell's equations. The zero in the latter is due to the non–existence of magnetic monopoles.

This difference renders Heim's gravitational equations less symmetric than the electromagnetic ones. The same lack of symmetry also applies to a unified field theory, combining electromagnetism and gravitation, which cannot be more symmetric than its parts.

In the macroscopic world the general theory of relativity has introduced a new concept into physics. It assumes that the properties of space itself are modified in the presence of masses. However, the equations of relativity are restricted in the sense that they only govern gravitation. In addition, they are too symmetric to satisfy the above asymmetry criterion, and they cannot be extended to the microscopic world of quantum theory. For this reason Heim regards relativity as an incomplete description of nature. He does, however, accept its basic philosophy of space being capable of deformation.

On passing from the macrocosm to the microcosm of elementary particles, Heim relates quantities describing the deformation of space to the energy states of the system responsible for the deformation, in analogy to general relativity. Energy states are known to occur in discrete, so–called "quantum" steps, like the discrete energy levels of hydrogen atoms. These considerations determine the general form of equation describing the microscopic states of a system in Heim's theory.

Einstein's general relativity results in a set of 16 coupled equations (6 of which occur twice). The figure 16 is equal to the square of the number of dimensions. Hence, according to relativity, our world appears to be 4–dimensional (because $16 = 4^2$) and consists of 3 genuine dimensions and one dimension proportional to time.

In contrast, Heim finds at least 36 equations describing the microcosm. Again, this must equal the square of the number of dimensions, so that the microscopic world appears to be at least 6–dimensional. Since there can exist only one set of laws in nature, it must be possible by appropriate transformations to carry the microscopic equations over into the macroscopic domain. The conclusion, therefore, is that the universe we live in is at least 6–dimensional and not 4–dimensional. *All 6 coordinates are orthogonal to each other*, i.e. the angle between all coordinate axes is 90°. Some details of the concepts discussed above are presented in Appendix A.

The macroscopic equations of unified field theory, coupling together the fields of electromagnetism and gravitation, could be derived if a 6 by 6 array of 36 quantities, known as the 6–dimensional "field tensor" of the unified field theory were known. The resulting equations would show how gravitation (or antigravitation) could artificially be produced from magnetic fields. Unfortunately, the field tensor is not known. Heim's published version of a unified field theory is confined almost exclusively to the microscopic domain of elementary particles. An attempt to derive a macroscopic 4–dimensional set of equations is presented in the article *The Generation of Antigravity* in this volume, where a 4–dimensional field tensor is shown in Eq. (A40). However, the tensor and the equations derived from it are only approximations of the true situation.

4. The 5th and 6th Dimensions

It can be shown that the number of genuine dimensions, i.e. those measurable with yardsticks, is limited to 3. A space of more than 3 true dimensions leads to unstable atomic and planetary orbits. For this reason higher dimensions cannot be genuine. The 4th dimension, for example, is proportional to time, which is measured with clocks and not yardsticks. The 5th and 6th dimensions have to be something different again, because more than a single time dimension again leads to unphysical results (Cole, 1980). According to Heim, the two higher dimensions are associated with organizational properties. They will be called "transdimensions" or "transcoordinates", to distinguish them from the four dimensions with which we are all familiar. For brevity, they are denoted by x_5 and x_6.

Modern superstring theory, describing the interactions between elementary particles, also involves the use of more than 4 dimensions. However, following a suggestion by Kaluza and Klein, all but 4 of them curl up

in such a manner that they exist only in dimensions of the order of 10^{-35} m. Thus they are hidden and do not manifest themselves in the macroscopic world.

x_5 is a coordinate designating the degree of organization of a system. It is known in physics that entropy, which is a measure of *dis*organization, can be expressed in terms of a logarithm of the probability that the system is in a certain organizational state. The 5th coordinate expresses the opposite of disorganization, hence it is measured in units of the *negative* logarithm of a probability, multiplied by a constant giving it the dimension of length.

The function of x_5 can be demonstrated by using the living cell as example. Its interior consists of various regions having very different degrees of organization. The liquid cell plasma consists mainly of water having a low order of organization, unless one goes down to the atomic level, which we shall not do here. Cell nucleus and organelles, on the other hand, are complex, highly organized structures. If we had a mathematical expression for the material density of the cell's interior, it would yield a fairly constant value throughout the cell volume, since most cell constituents have the approximate density of water (actually, the cell is much too complex to allow a mathematical description).

Quite a different answer is obtained if we ask for the density of *organized* matter inside the cell. This would require a revision of our hypothetical formula and the introduction into it of x_5, the organizational coordinate. Choosing a numerical value for x_5 specifies the organizational state of the material whose density throughout the cell volume is given by the formula. Suppose we choose a low value for x_5. By so doing, we ask the formula to give us the distribution of matter inside the cell having a low degree of order. As a consequence, the formula will yield normal density in the cell plasma only. In the cell nucleus and the organelles the density will turn out to be close to zero, because these are not regions of low organizational order. Conversely, if x_5 is given a large numerical value, implying high structural organization, the *same* formula will give normal density in the nucleus and the other structured regions of the cell, but very low density in the plasma.

The structure of an elementary particle has a whole range of organizational features in various localities in its interior. Specifying a numerical value for x_5 each time isolates the density of that portion of the internal particle structure whose organization corresponds to the chosen value of x_5.

Many material objects have the tendency to change their structure and hence their organization as a function of time until they reach a final, stationary state. The dependence on x_5 of the mathematical expressions describing such configurations is a measure of the degree of organiza-

tional order prevailing in a system during the various phases of its evolution in time until it reaches the final state of stability. Organizational states evolving in time towards a final goal were defined already in antiquity as "entelechial" systems. Accordingly, Heim calls x_5 the *entelechial* coordinate.

The above interpretation of x_5 is valid in the purely physical domain. Highly complex systems such as living beings, which cannot be described in mathematical terms, require a different interpretation of x_5. This will be discussed in Section 12.

The 5th and 6th coordinates work together as a team and always appear in combination. The task of x_6 in this team is to guide the structure evolving in time, whose organizational condition is specified by x_5, towards the stationary, dynamically stable configuration.

Most physical systems are guided by x_6 towards a state of maximum disorder. A house, for example, is a highly organized structure, but if left alone it eventually ends up as a disordered pile of rubble. In this example, x_6 guides states of high order towards those of low organizational order. *Life processes, on the other hand, are guided in the opposite direction, i.e. from disorder to order!*

Due to its function of directing the development in time of each individual system, x_6 fulfills the important task of guiding the evolution of the entire universe. This is illustrated by the following example: Let each picture of a film strip show an instantaneous state of a 3-dimensional world. Then the film as a whole represents the development in time of a possible universe. Now imagine a great number of other films stacked up all around the first one. Each of them again pictures the world, but with at least one single change compared to its neighboring strips. A line drawn arbitrarily through the block of films is called a "world line". Each film strip represents a possible sequence of uniquely determined events in our universe, and a world line intersects the pictures corresponding to the actual development of the universe in time. If there exists no intention, usually on the part of intelligent beings, of providing some guidance to world events, then the world line is confined to a single film strip, indicating a world history that is determinate. However, if intelligent guidance is provided, the line "jumps" from film strip to film strip. The actual world line is guided by the 6th coordinate through the block of films, intersecting the pictures corresponding to the true temporal development of the cosmos. At each time step the 6th coordinate determines which state of the universe is to become reality.

Both transdimensions always act together, no event of any kind can involve only one of them. In fact, every event *must* involve both dimensions. All structures existing in the 3-dimensional world of our experience (4 if time is included) extend into the two transdimensions.

x_6 is called the *aeonic* coordinate for reasons to be explained in Section 9.

It should be noted that the meaning of x_5 and x_6 is by no means obvious, but has had to be deduced by Heim from his formalism on the basis of circumstantial evidence. For this reason the definition of both transdimensions is not as sharp and clear-cut as that of, for instance, length and time. This is especially true with respect to higher than purely physical structures, for there the transcoordinates appear as qualities and not as quantities. Qualities are always difficult to define in precise terms.

5. Minimum Distance and Metron

Heim's gravitational law differs from Newton's not only at very large distances but also at very small ones. There exists a very small minimum distance, R_-, below which the force again becomes unphysical. An approximate expression for this distance is (cf. Appendix B),

$$R_- \approx \left(\frac{3\,e}{16}\right)\frac{\gamma\, M_0}{c^2}\ , \quad e = 2.71828...\ , \tag{3}$$

where M_0 is the mass confined within R_-. The subscript 0 indicates that the field mass is not included in M_0. R_- is about 4 times smaller than the so-called Schwarzschild radius of general relativity, R_S,

$$R_S = 2\,\frac{\gamma\, M_0}{c^2}\ , \tag{4}$$

closely related to the formation of black holes.

Even more significant than the maximum and minimum distances is a third distance relation derived from Heim's gravitational law. In the limit of vanishing mass, i.e. in empty space, a non-vanishing relation can be derived, involving the product of the minimum distance R_- and another small length, known in quantum theory as the Compton wavelength λ (lambda), given by,

$$\lambda = \frac{h}{M_0\, c}\ . \tag{5}$$

Here h is Planck's constant equal to 6.62608×10^{-34} kg m^2/s. The product cannot be obtained by simply multiplying Eq. (3) by Eq. (5), because the former is an approximation. Using the exact formula and letting M_0 go to zero, results in a quantity which Heim calls a "metron" and designates by the symbol τ (tau),

$$\tau = \frac{3\,\gamma\,h}{8\,c^3} \quad . \tag{6}$$

Being the product of two lengths, τ clearly is an area measured in square meters (m^2). It is composed of natural constants only and, therefore, is itself a constant of nature. The expressions above are derived in Appendix B. The present size of a metron, according to Eq. (6), is

$$\tau = 6.15\times10^{-70}\ m^2 \quad . \tag{7}$$

(The figure 6.15×10^{-70} has 69 zeros behind the decimal point, followed by the number 615), The significance of a metron is the fact that it exists in empty, 6–dimensional space. This leads to the conclusion that space is subdivided into a 6–dimensional lattice of metronic cells. Each cell is finite in size and bounded on all sides by metron–sized areas. This is a radical departure from the generally held view that space is divisible into infinitely small cells. Independently of Heim, other authors in an attempt to quantize gravitation have found elementary areas of dimensions similar to that of a metron (Ashtekar et al. 1989).

The sense in which a 6–dimensional cell is surrounded on all sides by 2–dimensional metrons may require some further explanation. A 3–dimensional cube will serve as example. It is bounded by six 2–dimensional surfaces. Each surface in turn is bounded by 4 edges or lines, forming what may be called 1–dimensional surfaces having length as their only dimension. Finally, each edge is bounded at its ends by two point–like corners or surfaces of dimension 0. This illustrates the fact that a cube may be bounded by "surfaces" of dimensionality 2, 1, or 0. The model of a cube made from solid material will emphasize its 2–dimensional surfaces, but a wire model displaying only the edges represents the cube just as well. The cube size is determined either by the size of its 6 surfaces or, alternatively, by the length of its 12 1–dimensional sides.

The example above shows that surfaces always have one dimension less than the volume they bound. A 4–dimensional cube, for instance, is bounded by 3–dimensional surfaces, which to us would appear as cubes. Clearly, it is impossible to visualize a cube as a 3–dimensional surface. This demonstrates the characteristic difficulty of trying to form a mental picture of configurations having more than 3 dimensions.

Nevertheless, the example above can now be generalized to a 6–dimensional cube. It is bounded on all sides by 5–dimensional "surfaces". These in turn have surface–like boundaries of dimensionalities 4, 3, $\underline{2}$, 1, and 0. The 2 is underlined to indicate that 2–dimensional metrons clearly belong to the areas bounding a 6–dimensional cell. Just like a 3–dimensional cube can be constructed from 1–dimensional wires, so a 6–dimensional volume can be built up from 2–dimensional metrons, and just like the side lengths limit the volume size in the 3–dimensional case, so the very small metronic size limits the volume of 6–dimen–

sional cells bounded by them.

It should be borne in mind that a 6–dimensional cube is very different from a 3–dimensional one. In the most general case, if the cube is n–dimensional and N is the number of k–dimensional surfaces bounding it, then N is given by the formula,

$$N = 2^{n-k} \frac{n!}{(n-k)!\,k!} \quad . \tag{8}$$

(The quantity n! is called n–factorial and equals the product of all integers from 1 to n. For example, $5! = 1 \cdot 2 \cdot 3 \cdot 4 \cdot 5$). For $n = 6$ and $k = 2$ one finds 240 metrons bounding a 6–dimensional metronic cube!

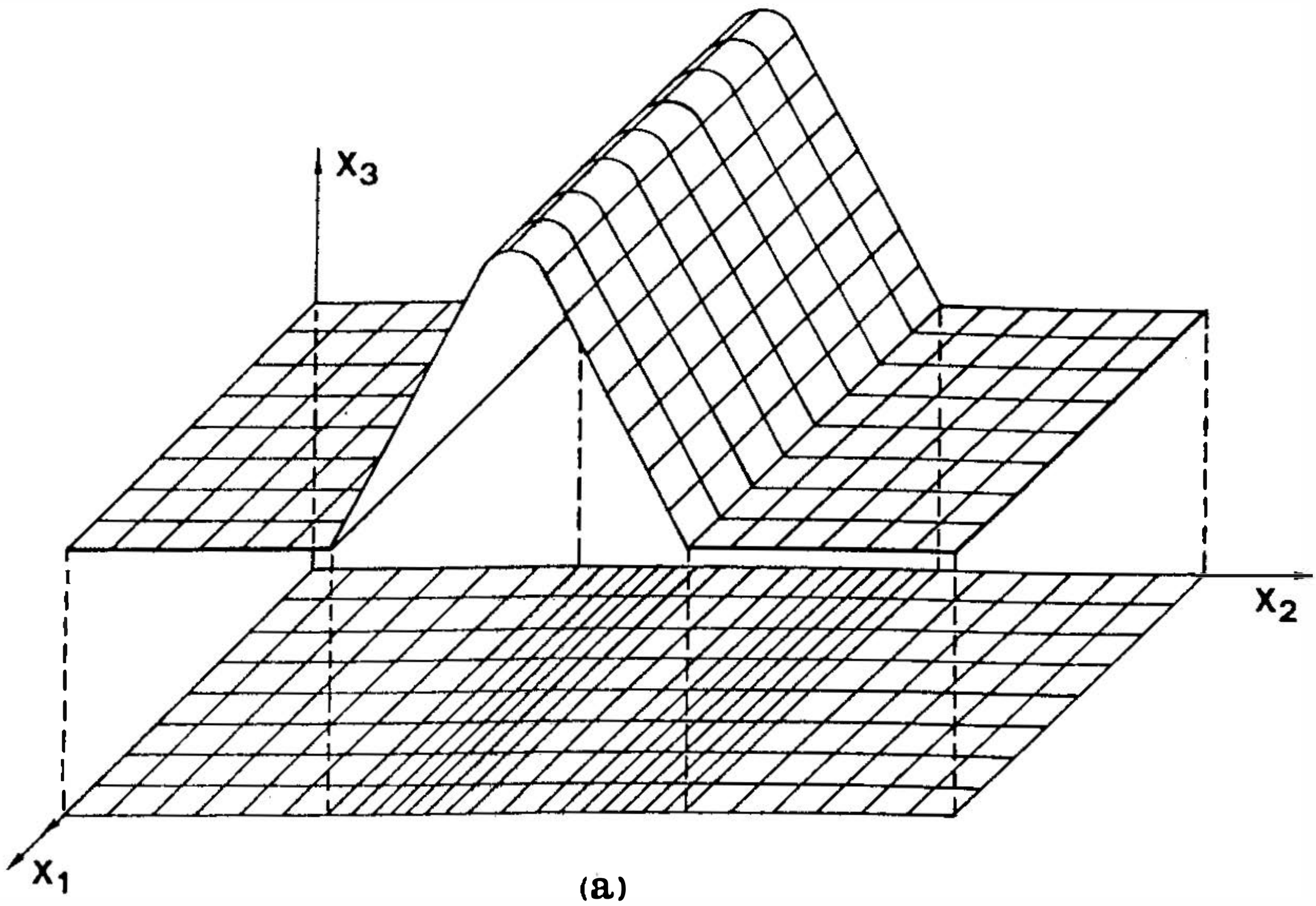
6. Metronic Mathematics

The result that no area in Heim's 6–dimensional universe can be smaller than a metron requires a revision of some branches of mathematics. Differentiation, for example, assumes that a line can be decomposed into an infinite number of infinitely small segments. Conversely, integration recomposes the infinitely small segments back into a line of finite length.

In Heim's theory, differentiation and integration must be changed to comply with the metronic requirements mentioned above. A line cannot be subdivided into infinitely small segments, because an infinitesimal length normally is not part of an area of finite, metronic size. Similarly, integration is changed into a summation of finite lengths. While the mathematics of finite lengths has been developed in the literature (Nörlund, 1924; Gelfond, 1958), the novel feature of Heim's metronic theory is that it is a mathematics of finite *areas*.

Obviously, the metronic area of 6.15×10^{-70} m^2 is exceedingly small. To get an idea of the smallness of τ, consider a sphere whose surface area is just equal to one metron, making its radius equal to 7×10^{-36} m. If the radius of this metronic sphere were enlarged to one meter, then a proton to the same scale would have a radius of 23'000 light years, or half the radius of our Milky Way galaxy! Just for comparison, if the radius of a proton at the center of a hydrogen atom were enlarged to one meter, then the atomic electron would revolve about it at an approximate distance of "only" 35 kilometers.

A metron is so tiny that for many applications it may be regarded as infinitesimal in the mathematical sense. In such cases Heim's metronic mathematics goes over into regular mathematics. There are instances, however, when it becomes obligatory to use metronic differentiation and integration.



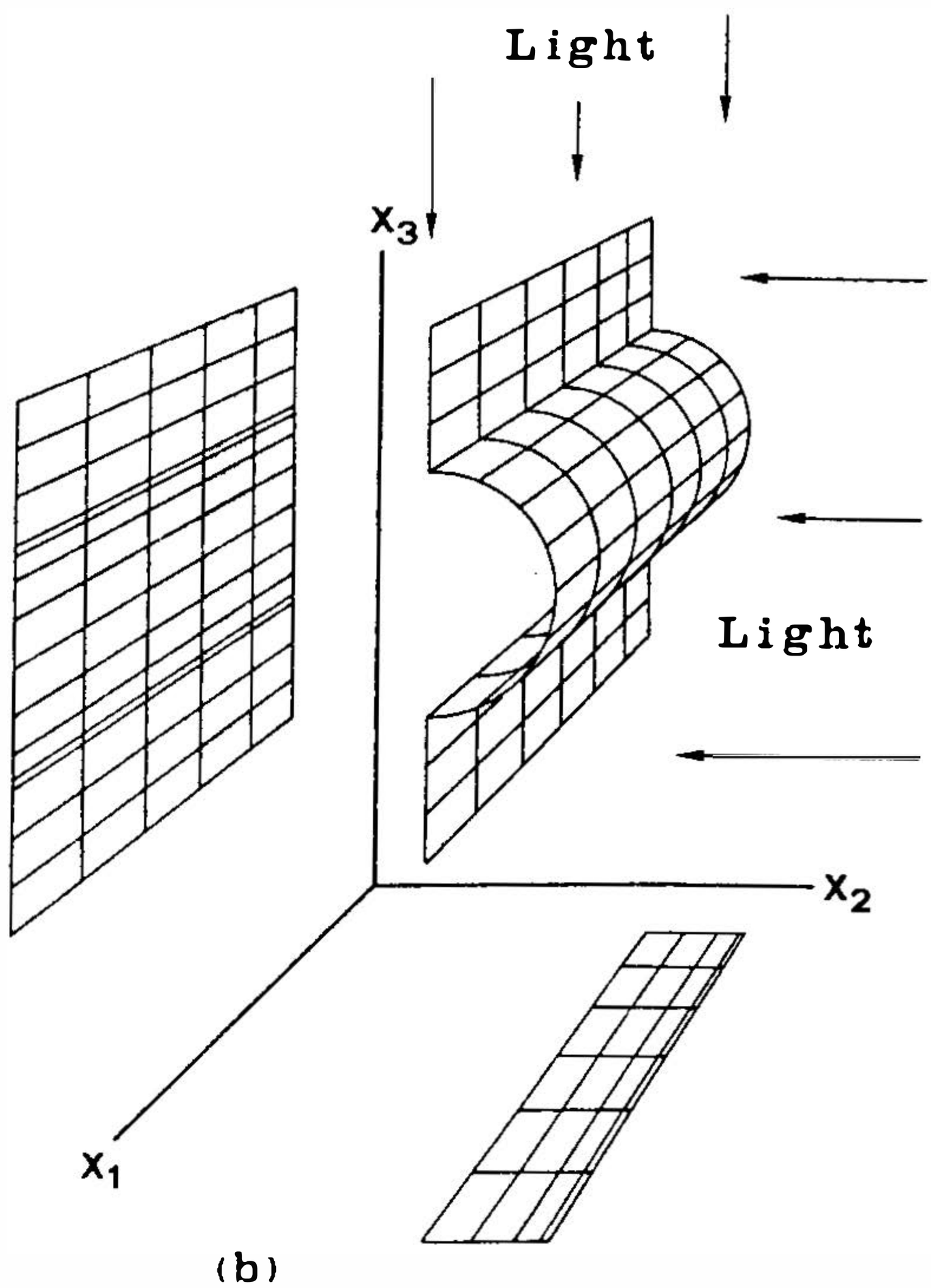


Fig. 1. Two-dimensional condensations (projections) of 3-dimensional metronic sheets.

7. The Building Material of Elementary Particles

Empty space has been shown to consist of an invisible lattice of metronic cells. One can visualize them as little volumes, whose walls are metrons, touching each other and filling all of space. The orientation of the areas is related to the quantum mechanical concept of spin.

Uniformity of the lattice signifies emptiness. Conversely, if the lattice is locally deformed or distorted, this deformation signifies the presence of something other than emptiness. If the deformation is complicated enough it might, for example, indicate the presence of matter. This implies that there really is no separate substance of which particles are composed. What we call "matter" is nothing but a locally confined geometric structure in vacuum. Pure vacuum has the ability to deform its 6–dimensional lattice structure into geometrical shapes. That portion of it, which extends into the 3–dimensional space perceived by our senses, is interpreted by us as matter.

The situation is somewhat analogous to the formation of a vortex in air. Still air corresponds to complete emptiness, having no recognizable geometric properties. A tornado, on the other hand, is a fairly well defined geometric structure in air. Its funnel–like shape clearly differentiates it from the surrounding atmosphere, which is not in rotation, but it still consists of air only and not of any separate material.

The same is true of geometrical structures in space. They clearly differ from complete emptiness, but their "construction material" nevertheless is vacuum. It should be emphasized, however, that a mere deviation from uniformity of the metronic lattice does not automatically constitute matter.

The metronic lattice should be viewed as a dynamic structure. It is in a state of constant pulsation and vibration, forming regions of greater and lesser density. This dynamic activity gives rise, among other things, to the well–known phenomenon of vacuum fluctuations.

8. Metronic Condensations

The term metronic "condensation" is frequently used by Heim in connection with the structure of elementary particles. Since the concept cannot be visualized in 6 dimensions, it will be explained with the aid of a 3–dimensional model.

Figures 1a and 1b illustrate transparent sheets, each having a central bulge. The sheets are covered with a square lattice of straight lines. Each of the many squares formed in this manner is supposed to represent a metron, so that each figure illustrates what may be called a "metronic sheet". Note that the metrons are not deformed, although the sheets are. Three rectangular coordinate axes are drawn in Fig. 1, denoted respectively by x_1, x_2, and x_3. They may be thought of as

marking three corners of a room, whose floor is the x_1–x_2–plane, and two of whose vertical walls are the x_1–x_3– and x_2–x_3–planes.

If the sheets are illuminated from above, the grid lines will cast shadows on the floor, as shown in the drawings. Illumination from the right in Fig. 1b also casts a shadow on the left wall. In technical language these shadows are called projections of the grid on the respective walls. It is immediately evident that the square metrons in certain regions of the projected images become narrow rectangles. These regions are the metronic condensations referred to in the heading, because the squares are compressed, or condensed, in one direction.

There exist areas of maximum condensation, where the projected metrons are compressed into thin rectangles, and other areas, where they project essentially as uncompressed squares. Note that some areas on the metronic sheet in Fig. 1b, showing minimum condensation in the x_1–x_3–plane, show maximum condensation in the x_1–x_2–plane.

Actually, Figs. 1a and 1b even in 3 dimensions are convenient simplifications of the true situation. The unperturbed metronic lattice, as mentioned in Section 7, is a network of cells. A disturbance would create a distorted *volume*, which might be pictured as a sequence of distorted parallel metronic sheets, the most deformed of which are pictured in the drawings. The distortion diminishes with increasing distance of the sheets from the ones drawn, until the undisturbed cubic lattice is re–established.

According to general relativity, a material object distorts space. This is illustrated in Fig. 2 for the earth–moon system. Space is pictured as a rubber sheet into which the heavy earth and the much lighter moon sink in to different depths. In Heim's theory the sheet is covered with a net of metronic squares. This enables one to express the space curvature, as the distortion is called in general relativity, by examining the density of compressed metrons in the projection of the sheet on a 2–dimensional plane, as shown in Fig. 2. Again, the distortion affects a large volume and not just a single sheet.

The deformations need not be static. They can rotate or pulsate or change shape in some other dynamical way, with the projections following suit.

This picture can now be generalized to a 6–dimensional lattice with a localized static or dynamic deformation, forming a condensation in our space, i.e. projecting a 3–dimensional pattern into our world. The 3–dimensional projections in 6–space are the generalizations of the 2–dimensional projections in 3–space illustrated in Figs. 1 and 2. Such condensations form the basis of matter and elementary particles. A

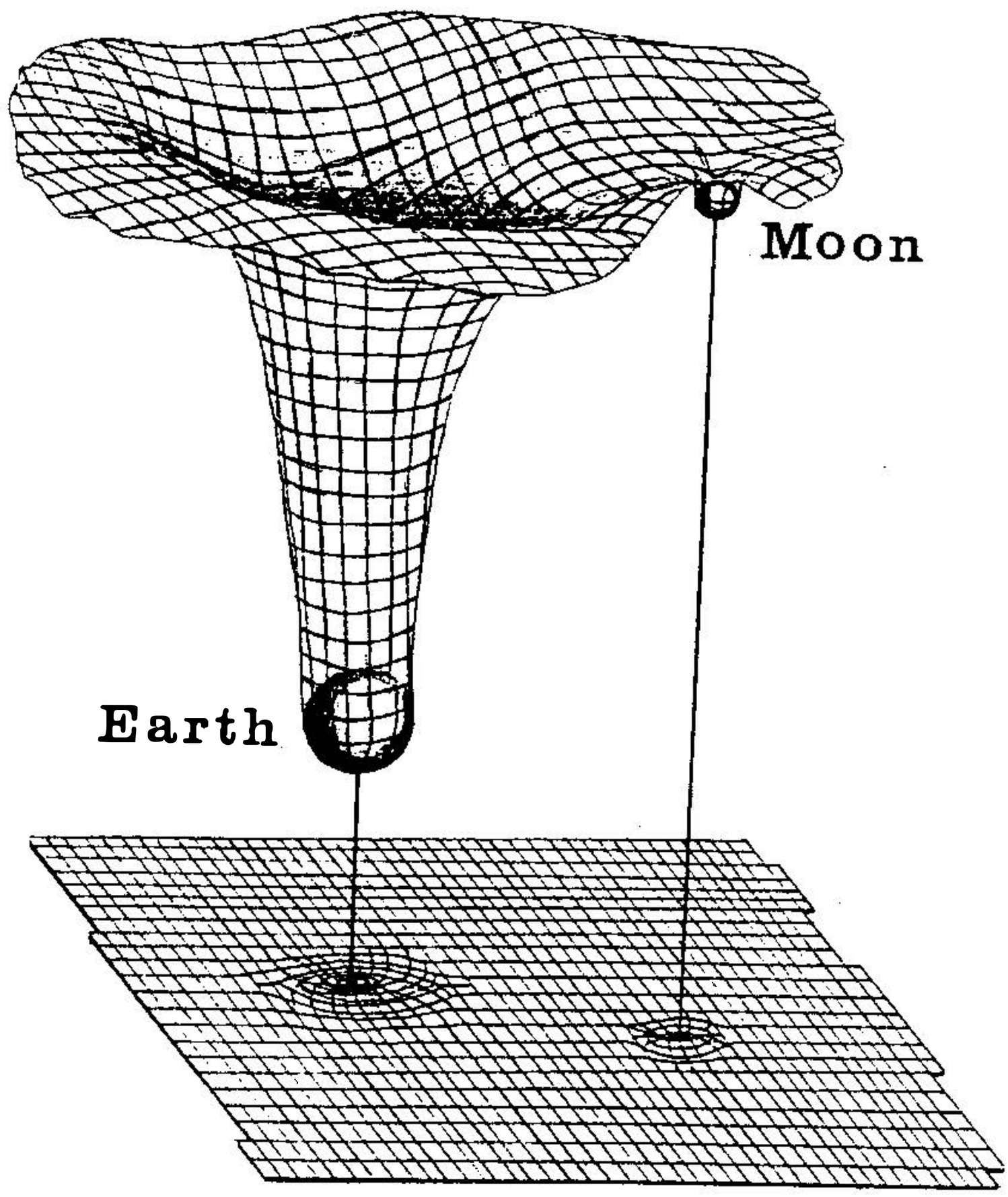


Fig. 2. 3–dimensional space curvature caused by the earth–moon system and its 2–dimensional projection.

piece of matter that can be seen, touched, and weighed is merely the projection into our 3–dimensional space of the true, 6–dimensional lattice deformation, just as the shadow of a tree is the 2–dimensional projection of its true 3–dimensional shape.

9. Cosmology

In Heim's theory, both the cosmic diameter D and the metronic size τ depend on the age of the universe, T. The dependence is such that D is presently expanding and τ is contracting, so that D was smaller in the past and τ was larger. It stands to reason that at one time in the distant past the area πD^2 of a sphere of diameter D in our 3–dimensional world was equal to the metronic area τ. This instant marks the origin of the universe and the beginning of time.

The mathematical relation between D and τ is not simple. If the surface of diameter D is much greater than τ, the relation is given approximately by (cf. Appendix C)

$$D \approx \frac{\pi}{e}\left(\frac{3}{32}\sqrt{\frac{3}{2}}\frac{\pi}{e}\right)^{\frac{4}{3}}\frac{E^{7/3}}{\tau^{11/6}}\ , \qquad e = 2.71828\ldots\ . \tag{9}$$

In the equation above, $E = 1\ \mathrm{m}^2$. In numerical calculations, E may simply be set to unity, but it is important to keep it in the formula for dimensional reasons, since without it D would not have the dimension of length.

When πD^2 is equal to τ, the relation between D and τ is much more complicated and involves the solution of a seventh order algebraic equation. Three different values of D are found to satisfy this equation at the beginning of time. It follows that the universe started out as a trinity of spheres, whose diameters turn out to be (in meters),

$$D_1 = 0.90992\ \mathrm{m}\ , \qquad D_2 = 1.06426\ \mathrm{m}\ , \qquad D_3 = 3.70121\ \mathrm{m}\ . \tag{10}$$

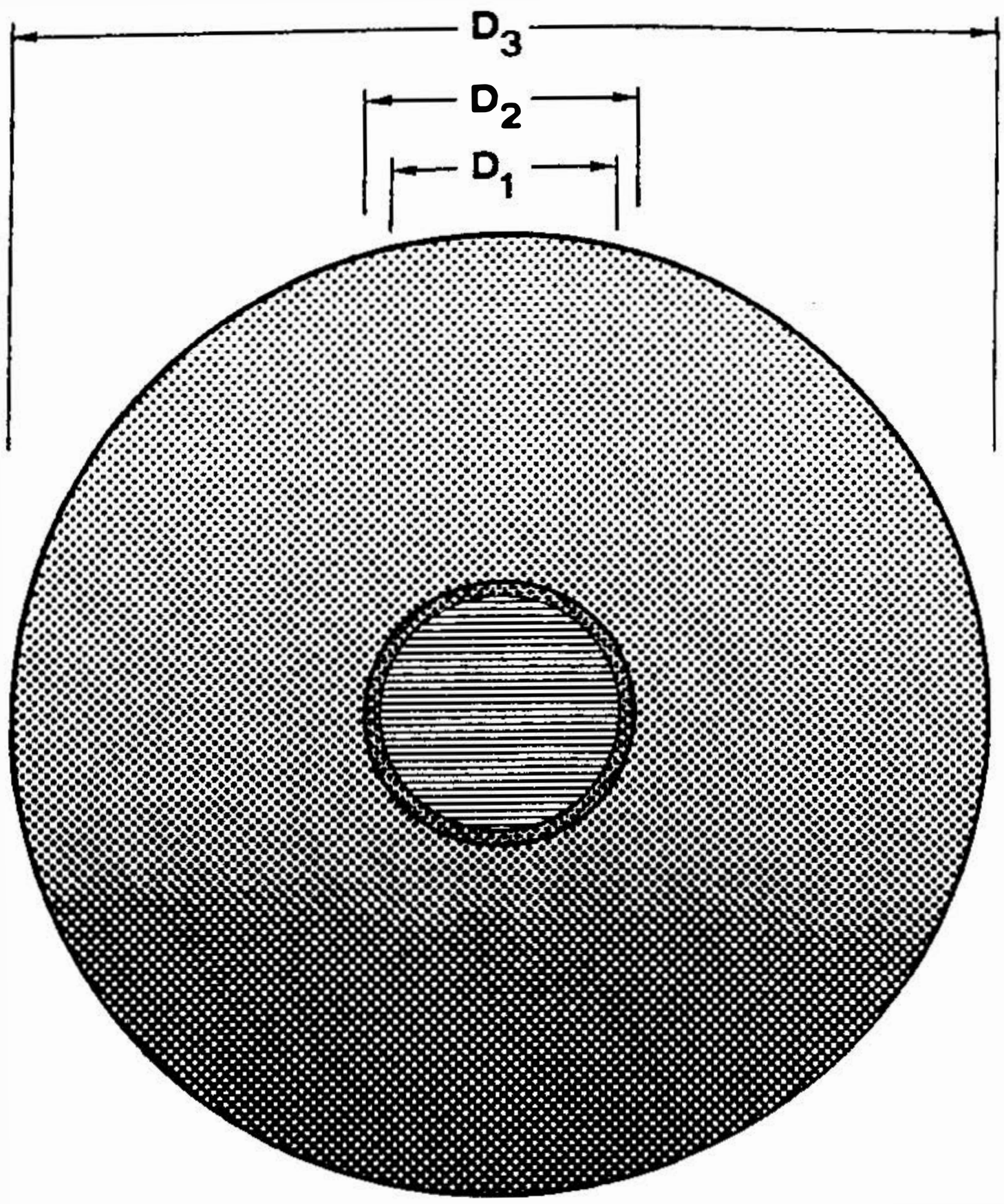


Fig. 3. Diameters of the initial trinity of spheres drawn to scale.
$D_1 : D_2 : D_3 = 0.91 : 1.06 : 3.70$.

These figures are derived in Appendix C. The ratio $D_1 : D_2 : D_3$ is illustrated in Fig. 3. It is a strange coincidence that the size of the uni-

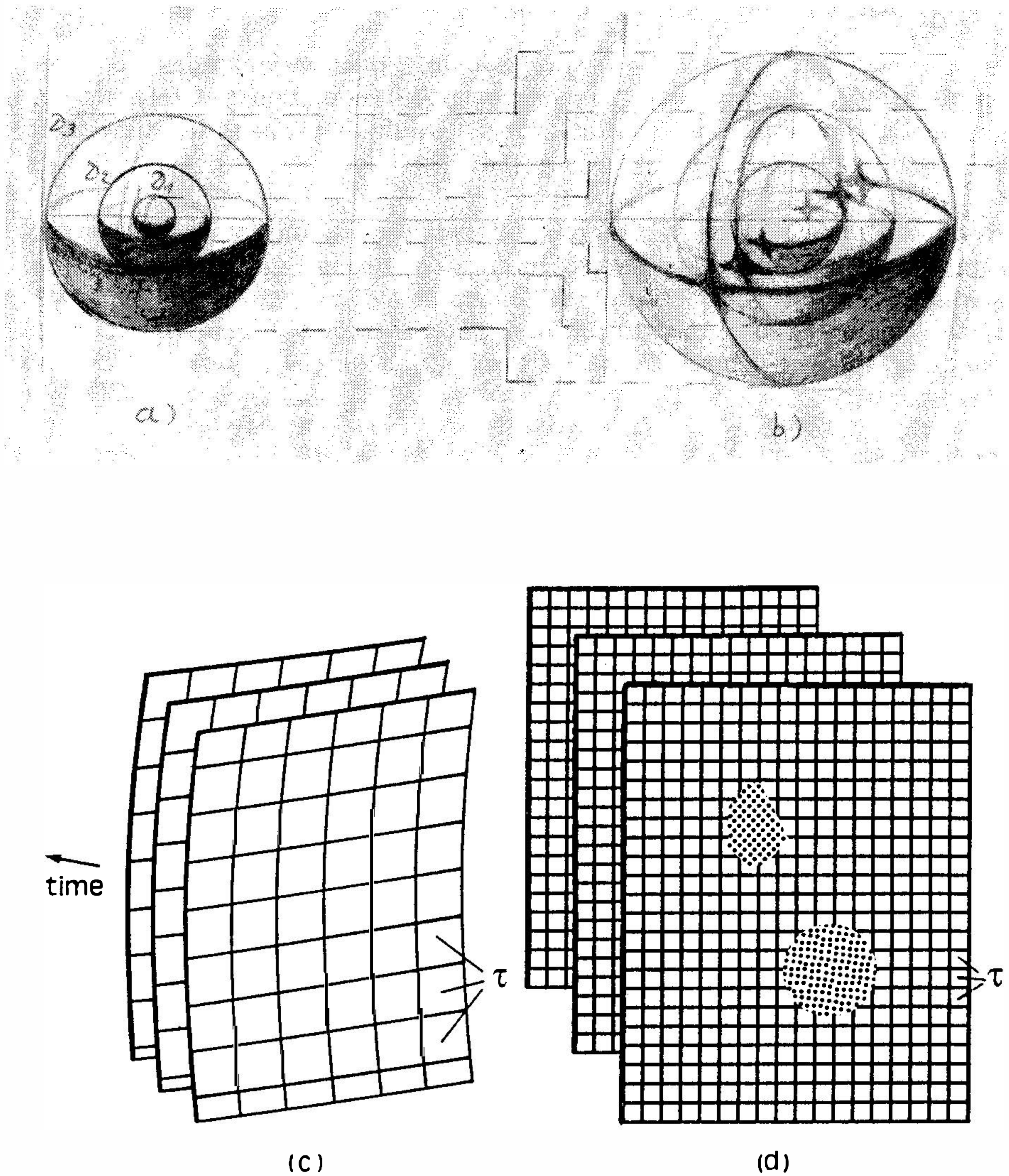


Fig. 4. Development of the original trinity of spheres in time. (a) The initial configuration at time $T = 0$ with $\pi D_3^2 = \tau$. (b) One chronon later. The spheres have expanded and the outer one is subdivided into metrons, symbolized by quadrants. (c) A portion of the expanding metron–covered spheres at a much later time. The metrons have grown smaller. (d) A part of the 3 expanding spheres at a time when metrons are small enough to form condensations and matter.

verse at the start, according to theory, has had dimensions easily visualized by us.

The magnitude of τ at the beginning of time, $T = 0$, $D = D_3$, was 43.04 m^2. Since then it has shrunk to 6.15×10^{-70} m^2, and, since all constants of nature are functions of the metronic size, they too have changed in accordance with their dependence on τ.

The development of the universe may be followed from the original trinity of spheres to its greatest diameter and back to the origin. In Heim's theory time is quantized, i.e. time proceeds in finite steps. Each step corresponds to a smallest time interval, called a "chronon", δ (delta), given by the relation,

$$\delta = \frac{3}{4} \frac{e \, \tau^{5/6}}{2^{1/3} \, \pi^{1/4} \, E^{1/3} \, c} \, . \tag{11}$$

The initial steps in the development of the cosmos are expressed in terms of chronons. The first chronon at the beginning of time, when τ had a magnitude of 43.04 m^2, lasted 9.32×10^{-8} seconds according to Eq. (11). Nowadays, with τ having grown so small, its duration is reduced to 8.55×10^{-67} seconds.

Figure 4 illustrates the initial phases in the development of the universe and some of the later ones. The 3 spheres of diameters D_1 to D_3 are shown in Fig. 4a at time $T = 0$. The surface area of the outermost sphere is $\tau = \pi D_3^2$. After the first time step δ the outermost sphere expands and enters time, the middle sphere expands to diameter D_3, and the inner sphere expands to diameter D_2. This situation is shown in Fig. 4b. The surface of the outer sphere, which originally had an area equal to τ, now is subdivided into a number of metrons. This is indicated schematically by the quadrants in Fig. 4b. The exact shape of the metrons is unimportant and may differ from the one shown. After a further chronon has elapsed, the inner sphere expands to diameter D_3 and the two outer ones expand further and are covered with an increasing number of metrons. Finally, another chronon later, the inner sphere expands one more step and it, too, enters time. The last two stages are not shown in the drawing.

From this moment on, the three spherical shells expand together, the inner one always a chronon behind the middle sphere and the outer one always a chronon ahead. At the same time the number of metrons on each spherical shell multiplies and each metron becomes smaller as time goes on. The situation after a long period of time is illustrated in Fig. 4c. It shows a section of the 3 spherical shells, each a chronon

apart and covered with a great number of small metrons. The final drawing, Fig. 4d, pictures the situation at the time matter begins to appear. The spheres are so large that parts of them resemble planes, and the metrons have become so small that condensations are able to form. This is discussed in more detail further down.

It may be surprising that the visible universe should be confined to the surfaces of 3 concentric spherical shells. Actually, as we all know, the universe occupies a huge volume of many cubic light years. What happens, however, is that as soon as time enters the picture the 3–dimensional spheres of Fig. 4 become 4–dimensional, time being the 4th dimension. In reality, the visible universe is confined to the surfaces of three 4–dimensional spheres. The 3–dimensional projection of a 4–dimensional spherical surface is a 3–dimensional volume, and the corresponding projections of the square metrons in Figs. 3b to 3d become 3–dimensional cubes. Each sphere is truly 3–dimensional only during the short time its diamter is equal to D_3 and its surface area is equal to a single τ.

The three spheres are to be interpreted in the sense that the middle sphere is the present, the inner sphere is one chronon behind in the past, and the outer shell is one chronon ahead in the future. Since the 3 spheres always stay together, they have an important bearing on the structure of elementary particles.

Heim's theory results in a present age of the universe approximately equal to 5.45×10^{107} years, and a diameter D of about 6.37×10^{109} light years. This latter figure is obtained by substituting numerical values into Eq. (9).

During most of its existence the universe consisted of an empty metronic lattice, whose metrons kept getting smaller as the universe grew larger. Eventually, metrons became small enough for matter to come into existence. This may have occurred some 15–20 billion (10^9) years ago, at which time matter was created throughout the cosmic volume. Hence, according to Heim, matter did not originate very soon after a big bang explosion but more uniformly in scattered "fire–cracker" like bursts, perhaps of galactic proportions. In this way, Heim's cosmology combines the advantages of the big bang theory with those of the steady state hypothesis developed by Bondi, Gold, and Hoyle.

Spontaneous creation of matter, coupled with the partly attractive and partly repulsive force of gravity mentioned in Section 2, resulted in the observed large–scale structure of the universe.

Creation of matter continues to this day, though on a very much reduced scale. It may, for example, occur in the form of small amounts of matter, as bursts of gamma rays (very hard X–rays), as vortex motions in air, or as balls of light in our atmosphere. These lights may be responsible for UFOs of class B (cf. the introductory article *Are UFOs a New Kind of Natural Phenomenon?* in this volume).

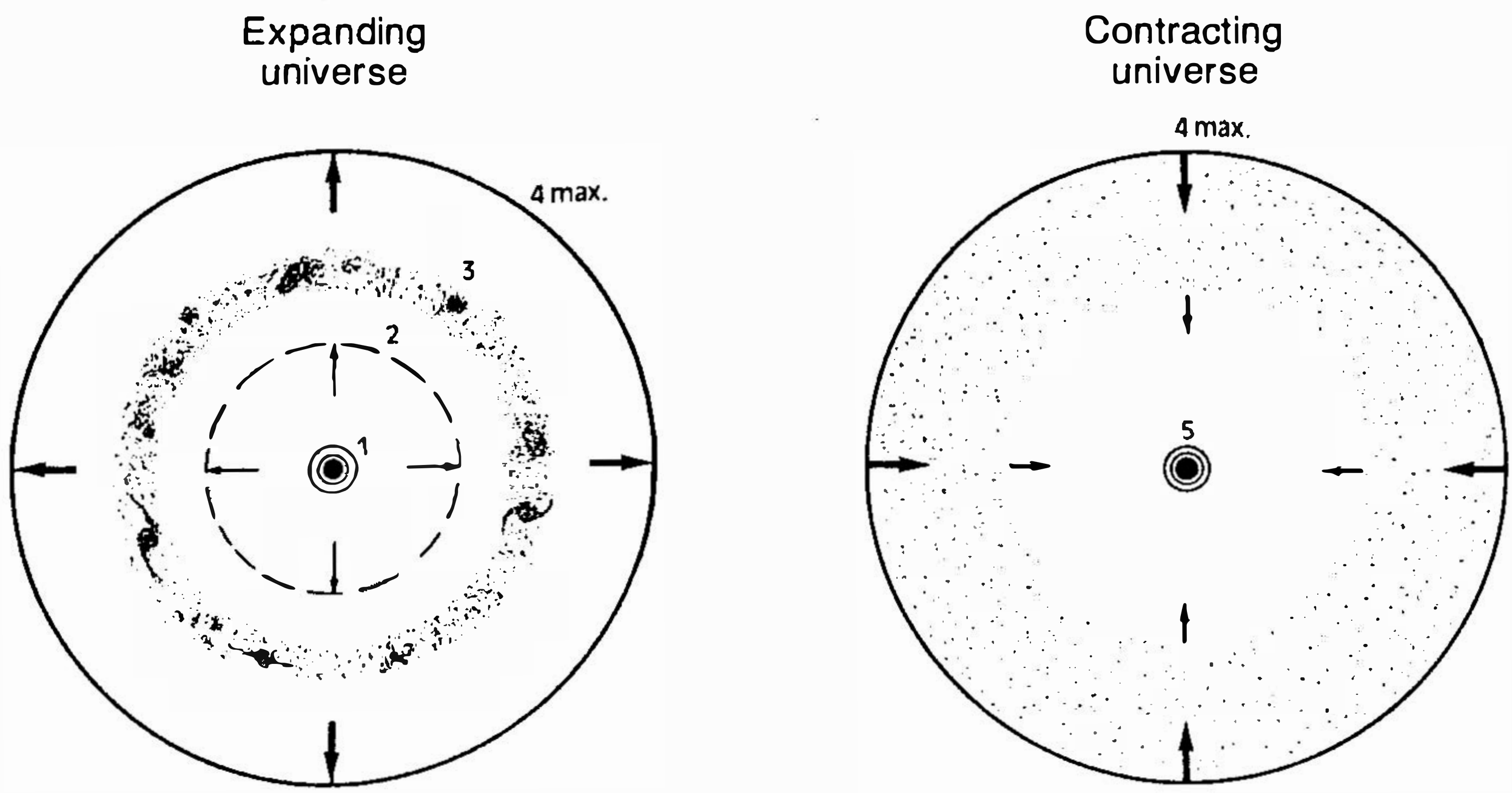


Fig. 5. History of the universe. (1) The trinity of spheres at $T = 0$. (2) The universe at the time matter comes into being. (3) The present universe at $T_{present} = 5.45\times10^{107}$ years and diameter $D_{present} = 6.37\times10^{109}$ light years. (4) Maximum expansion of the universe at $T_{max} = 8.733\times10^{109}$ years with $D_{max} = 1.651\times10^{110}$ light years. (5) The final trinity of spheres.

Figure 5 represents the history of the universe from the beginning to the end. It starts at $T = 0$ with the 3 spheres mentioned above. Expanding continuously, it reaches the present size of $D_{present} = 6.37\times10^{109}$ light years after the long period of $T_{present} = 5.45\times10^{107}$ years. Halfway through its history the universe reaches a maximum diameter, D_{max}. According to Heim's calculations, $D_{max} = 1.651\times10^{110}$ light years. This is only 2.6 times larger than the present size, but due to the very low rate of expansion it will take another 8.68×10^{109} years to get there. The age of the universe at the time of its greatest expanse will be $T_{max} = 8.733\times10^{109}$ years. This stage is indicated by the largest circle in Fig. 5. Thereafter, the universe contracts again until it reaches the final trinity of spheres after another 8.733×10^{109} years. The trinity of spheres

into which the universe collapses at the end of a life cycle is smaller than the original spheres of Eq (10), as shown in Appendix C.

Heim calls the total life span of the cosmos an "aeon". The fact that x_6 guides the destiny of the cosmos throughout this time is the reason for calling it the *aeonic* coordinate.

From the first moment on the universe began to expand, but at a lower rate than is presently predicted on the basis of the red shift of distant galaxies. In Heim's theory, light traveling through space meets more repulsive regions than attractive ones due to the special nature of the repulsive force mentioned in Section 2. This results in a net loss of energy and a shift of the spectrum towards the red. According to Heim, this accounts for the entire observed red shift, the contribution of the expanding diameter D of the universe being insignificant. His calculation of the Hubble radius is in good agreement with observation if use is made of the somewhat uncertain average density of matter in space.

10. The Structure and Masses of Elementary Particles

More than three quarters of Heim's second volume are devoted to the derivation of his final formula for the masses of elementary particles in the ground state and in all excited states. Only the barest outline of the structural complexity of elementary particles can be presented here.

The interior of an elementary particle consists of a number of correlating metronic condensations in various subspaces. The meaning of this is illustrated in Fig. 6. The drawing shows a flexible sphere, or a rubber ball. In 3 of the 4 separate drawings of Fig. 6 the ball is squeezed together in different directions. In each case two of the projections on the walls or the floor are narrow ellipses, while the third projection is undistorted. In each case, therefore, the maximum distortions in the form of narrow ellipses are correlated with the minimum distortion having the form of a circle (foreshortened to a fat ellipse). The ball itself is 3–dimensional, while the walls and the floor are only 2–dimensional. A 2–dimensional space is called a subspace of a 3–dimensional one. In general, any space having fewer than 6 dimensions is a subspace of 6–space. Technically speaking, therefore, Fig. 6 illustrates three 2–dimensional subspaces of 3–space and the way in which the distortion in each subspace, or the condensation if the ball were covered with a grid of squares, correlates with the condensations in the other two. Figure 1b shows a similar type of correlation.

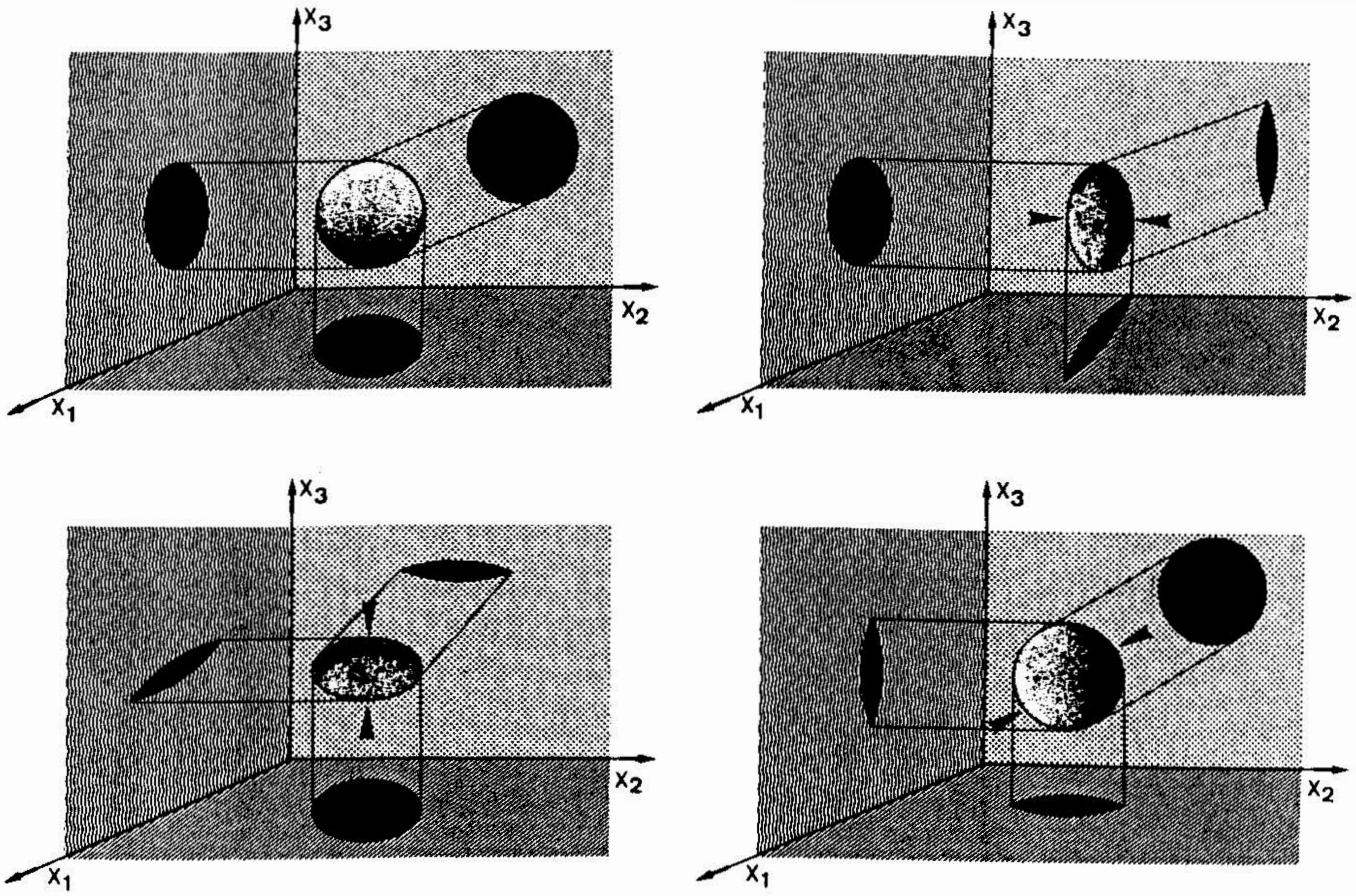


Fig. 6. Correlation of 2–dimensional projections (condensations) on 3 mutually perpendicular walls due to the compression of a flexible sphere in different directions.

The elementary particle configuration projecting into our 3–dimensional subspace of the 6–dimensional physical world consists of 4 concentric zones occupied by structural elements. The subdivision into 4 zones is a consequence of the trinity of spheres characterizing the universe from the first moment of its existence. Maxima and minima of the condensations in the sense of Fig. 6 participate in a rapid sequence of periodic, cyclic exchanges. The internal structures undergo continuous modifications during this process until, after a certain short period of time, the original configuration is re–established. This period is the shortest lifetime a particle possessing mass and inertia can have. In general, a lifetime consists of several cycles. If the initial configuration is not regained after the last period, the particle decays. A particle is stable only if its structure *always* returns to its original form. The cyclic exchanges define a spin which, in this case, is not the result of rotation.

All states of an elementary particle are characterized by 4 genuine quantum numbers. The first 3 are the baryonic number k (k = 1 or 2), the isotopic spin P, and the spin Q. The fourth number can only be

either 0 or 1. In addition, there is a number +1 or –1 characterizing particle or antiparticle, a number indicating whether a particle is charged or not, and a number N=1,2,... specifying the state of excitation. Four more quantum numbers refer to the 4 internal structural zones. These, however, cannot be chosen at will but are derived from the numbers listed above.

The actual mass and inertia of particles are not a property of the 3–dimensional structures themselves, as might be thought. Instead, they are the secondary effect of exchange processes between the 4 internal zones described above. These processes are the actual sources of mass and inertia. For this reason, Heim's elementary particles definitely are not composed of particle subconstituents such as quarks. Nevertheless, there exist certain analogies to the quark model, because each elementary particle contains $k+1$ (k = baryonic quantum number) structural units. These, however, are not individual particles such as quarks, but integral components of the internal particle structure. As such they cannot possibly exist outside the configuration they compose. This explains why quarks have never experimentally been observed outside an elementary particle.

For protons and other baryons $k=2$, so that one expects protons to contain 3 pseudo–corpuscular subconstituents. Scattering experiments would be affected by such a triple structure. This may explain why a proton is thought in modern physics to be composed of 3 quarks. Moreover, Heim's formula for the electric charge of a proton, the so–called "elementary" charge e, contains the factor 3, so that phenomenologically one could allocate one–third of the total elementary charge to each of the 3 subconstituents, corresponding to the charge of e/3 generally associated with each quark. This is further explained in Appendix E. The same arguments apply to mesons with $k=1$. They contain 2 substructures in analogy to the two quarks thought to exist in their interior.

Results for the ground states of particles are in excellent agreement with experiment. In addition to the known nuclear particles Heim predicts the existence of a stable, electrically neutral electron, e_0, and its antiparticle. Their mass of $m_{e_0} = 0.5068833$ MeV is about 1% smaller than the mass of their charged counterparts (1 electron Volt (eV) is the mass equivalent of 1.7826×10^{-36} kg, 1 keV = 1'000 eV, 1MeV = 1'000'000 eV). Furthermore, Heim predicts 6 neutrinos, denoted by ν (nu). In the traditional notation their masses are: $\nu_R = 2.003$ eV, $\nu_P = 2.03$ eV, $\nu_\beta = 4.006$ eV, $\nu_\pi = 1.441793$ keV, $\nu(e_0) = 5.375675$ keV, and $\nu_\mu = 11.28781$ keV. On the other hand, the number of excited

states each particle can have turns out to be much too large. So far Heim has not succeeded in finding a criterion which would limit the number of excited states to those actually observed.

11. The 4 Types of Elementary Structures

The uniform metronic lattice characterizing empty space can be distorted in several fundamental ways, all but one of which involve fewer than 6 coordinates. Heim finds that there exist 4 basic types of deformation in 6–space. He calls them "hermetry forms" or "hermetric" forms (*hermetry* is a condensation of "*herme*neutics [science of interpretation] of a possible world geome*try*").

a) The first type is a lattice deformation involving only the 5th and 6th coordinates. It is not a projection, but, in order to stay within our terminology, it may be called a self–condensation. In the 4 remaining dimensions the metronic lattice remains undisturbed. Physically, this may be interpreted as a structure existing in the two transdimensions. This is difficult to visualize, because our senses do not recognize x_5 and x_6 as dimensions. For this reason hermetry form (a) will be discussed more fully in Section 12.

Although the deformation exists in the transcoordinates only and does not project directly into our 3 dimensions, its effect may be felt in 3–dimensional space. Under certain conditions it will send quantized gravitational waves, so–called gravitons, into our 3 dimensions. This may be visualized by considering the example of a bell. The bell itself is confined to a small volume, but it sends sound waves through the atmosphere out to very great distances. The equations show that gravitons should propagate with 4/3 the speed of light. Thus, according to Heim, gravitational waves have a speed of 400'000 km/second. They do not correspond to the gravity waves predicted by general relativity.

b) The second type of deformation again involves x_5 and x_6, and in addition time, the 4th dimension, denoted by x_4. Again, this structure does not project directly into our 3–dimensional world but is felt here only in the form of waves. Heim derives the property of these waves and shows that they are identical to those of electromagnetic waves or photons. It follows that case (b) describes a structure in x_4, x_5, and x_6, extending into the remaining 3 dimensions in the form of electromagnetic waves, including light waves.

c) The third possible deformation involves 5 dimensions, i.e. all coordinates except time. This 5–dimensional structure projects into the 3–

dimensional space of our experience, i.e. it forms a condensation here, and it is reasonable to assume that we are sensitive to such condensations. This is indeed the case, and Heim shows that they give rise to uncharged particles with gravitational mass and inertia.

d) The final deformation involves all 6 coordinates. This again leads to 3–dimensional condensations giving rise to particles, but, as in case (b), the inclusion of time leads to electric phenomena as well. Heim can show that 6–dimensional condensations lead to charged particles.

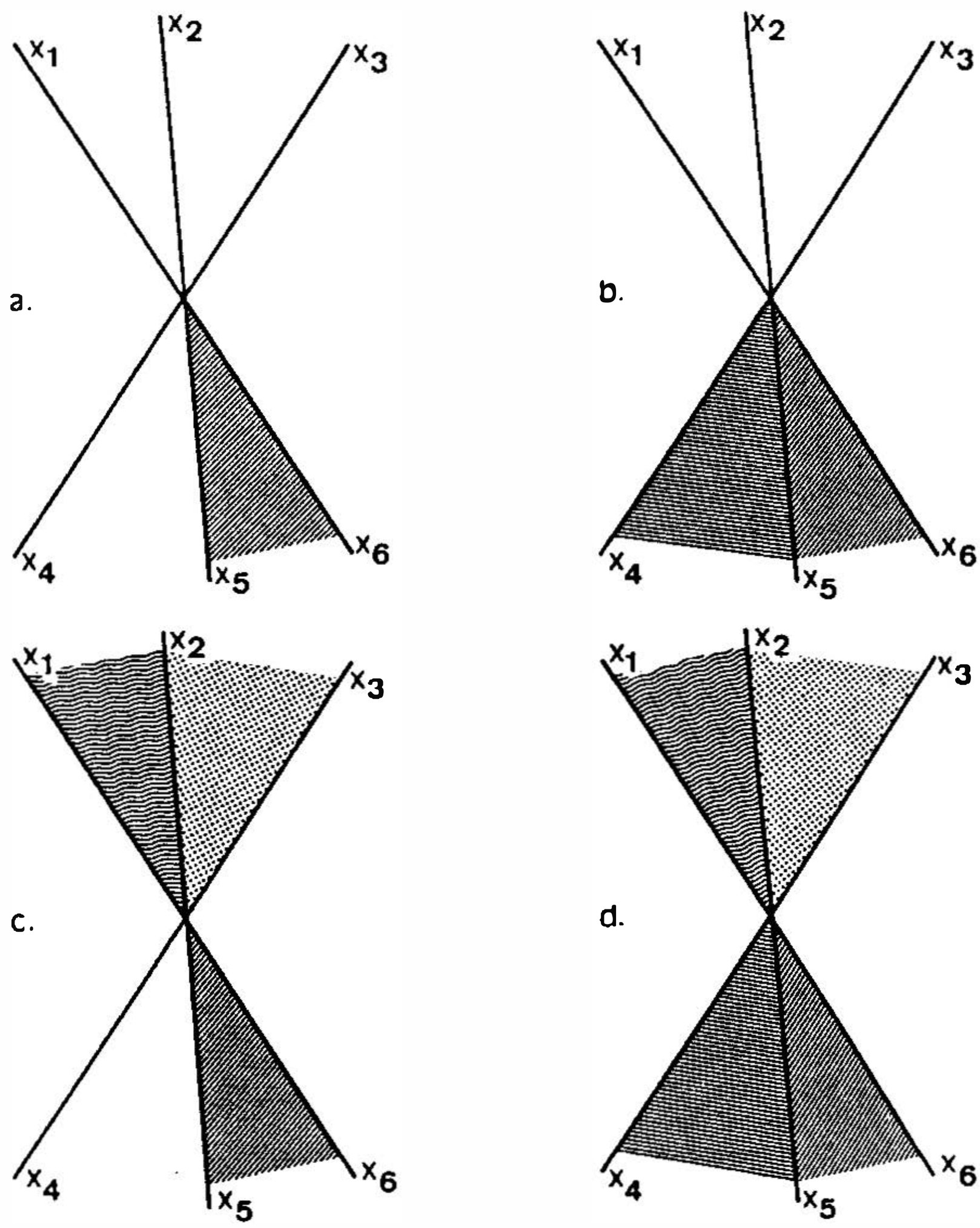


Fig. 7. Schematic representation of the coordinates involved in hermetry forms a–d. x_1, x_2, x_3 = space coordinates, x_4 = time coordinate, x_5 = entelechial (organizational) coordinate, x_6 = aeonic coordinate.

Figure 7 is a graphical representation of the 4 hermetry forms. In reality, the 6 coordinates form 90^0 angles with each other, as mentioned in Section 3, but graphically only 3 coordinates can be drawn at right

angles. For this reason a compromise representation due to R. Keller is chosen, where all 6 coordinate axes are shown but with angles of less than 90^0 between them.

A limited, but more quantitative discussion of the 4 forms of condensation is contained in Appendix E.

12. The Meaning of Self-Condensations in the Transdimensions

While hermetry forms (b), (c), and (d) in Section 11 represent respectively photons, uncharged and charged particles, the meaning of hermetry form (a) is not so clear, because it only involves the 5th and 6th coordinates, which our senses do not recognize as such. Physically, i.e. in terms of length, weight, and time, the processes in these dimensions are not measurable. However, all material structures extend into the 5th and 6th dimensions, and these extensions should, in turn, have qualitative effects on the organized states of matter in our 3 dimensions. Although such effects are not measurable, it should nevertheless be possible to observe them.

The transcendental domain is characterized by the appearance of qualities in addition to quantities. The beauty of a Beethoven symphony cannot be expressed in terms of numbers: it is a quality and not a quantity. "Quality" is a non-mathematical concept and requires a modification of our common Aristotelian logic in order to describe quantities and qualities in a formal, unified language. This is the reasoning which led Heim to develop a complete system of formal multivalued logic.

Complex configurations like macromolecules and all structures involved in life processes require a new interpretation of the 5th coordinate. Again, the new interpretation is not self-evident but has had to be deduced from the way x_5 appears in Heim's formalism.

According to the new definition, x_5 is a measure of the *significance* or *usefulness* of a complex physical structure for achieving a certain objective. To the molecule of an amino acid, for example, there corresponds a certain pattern of x_5, signifying the usefulness of its composition for the living cell. Protein molecules are composed of amino acids. Their x_5-patterns generally are higher up on the x_5-scale, because they are more useful to the cell than the amino acids alone. Different patterns of x_5 specify the significance and type of organization (and complexity) relevant to each individual structure. A garage, for example, has a different significance and complexity from a private house or a

cathedral.

In general, the extension of a very complex material object into the transdimensions is the pattern of usefulness, evaluated along x_5, of its physical configuration. In this section the terms usefulness and significance will be used interchangeably. The task in nature fulfilled by the two transdimensions is similar to that of Sheldrake's morphogenetic field (Sheldrake, 1985).

There is no absolute usefulness or significance. Both are relative concepts, since their magnitude depends on the question: For whom or for what is a certain object useful or significant? A fine painting, for example, has a great deal of significance for humans, but none whatsoever for animals.

Usefulness and information are related concepts, because the usefulness of any object may depend on the information received from it. A Chinese newspaper is not useful for someone unable to read the language, because he cannot derive any information from it. This shows that information may, among other things, be a carrier of usefulness and vice versa. The close connection between information and x_5–related activities is of paramount importance for the development of the transcendental theory, as will be seen later on.

Most objects are composed of a hierarchy of structures, displaying an increasing complexity and an increasing significance. Consider the example of a living cell: At the bottom of the hierarchy are structural condensations of metronic size. These combine to form elementary particles like protons, neutrons, and electrons. The next higher ranks are occupied by atoms, followed by a great variety of molecules. These in turn combine into organelles, and all of it together finally evolves into a cell. This model is further discussed in connection with Fig. 8.

The patterns of significance relative to the finished cell, arising from the complicated hierarchical structures making up the cell, are called *metroplexes* by Heim (*metroplex* is short for *metrophoric complex*, meaning a system of basic concepts in Heim's multivalued logic). Very generally speaking, a metroplex describes an assemblage of extensions into the transdimension x_5 of some material object. The object itself is called a *metroplex carrier*. The relative significances of hierarchical structures composing the object are measured along x_5.

It should be remembered that x_5 and x_6 are independent of distance, because the transcoordinates are not genuine dimensions. Instead of calling them dimensions in the range where they become qualities, it is

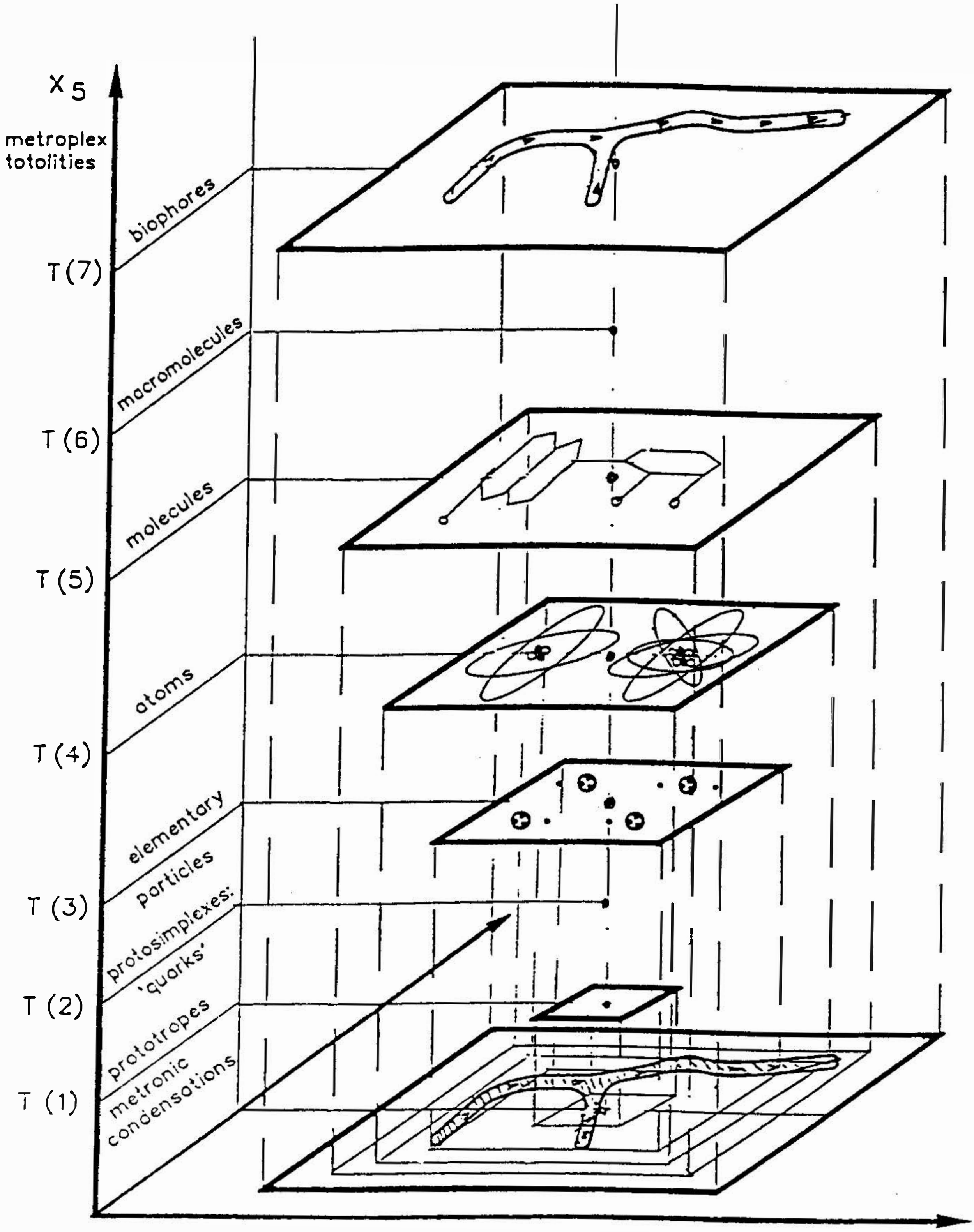


Fig. 8. Sequence of metroplexes at organizational levels T(1) – T(7) composing a biological structure.

better to simply call them stores of values that cannot be measured with yardsticks or clocks. Metroplexes, on the other hand, are bound to physical structures and events, and extend no farther out in space than they do.

Many things on earth, particularly living systems, are organized into closed, or finished, structures. A house is such a closed and finished structure, so is a flower, a mouse, a human being, etc. To every closed structure there corresponds a closed metroplex, i.e. a pattern of significances composed of the significances of the structure's various subconstituents, which together form a closed system. The usefulness of the closed system clearly is greater than that of its components. A cathedral is more useful than the bricks from which it is built, an animal is more significant than its cells or its organs, etc. A closed metroplex can be viewed as a very complex geometrical pattern of condensations in the transdimensions.

Figure 8 illustrates a system of closed metroplexes belonging to a biological system, a "biophore", as Heim calls it (a biophore is located somewhere between a virus and a microbe). Closed metroplexes are called *metroplex totalities* by him, and for this reason the vertical x_5-scale is marked T(1), T(2),...,T(7), signifying closed metroplexes, or metroplex totalities, of increasingly higher order.

The hierarchy of biological structures in Fig. 8 begins at T(1) with the simplest forms of metronic condensations ("prototropes"). These combine at T(2) into structural internal subconstituents ("protosimplexes") of elementary particles, analogous to quarks. Complete elementary particles form at (T3), still very low on the x_5-scale. When they combine into atoms they rise up to T(4). The next higher stage in the hierarchy at T(5) is occupied by simple molecules. They in turn unite to form macromolecules, thereby increasing their significance to T(6). Finally, the finished biological structure occupies the relatively highest position on the x_5-scale at T(7). The dashed vertical lines indicate that physically all components are combined into a single organism pictured in the bottom square.

An important concept involving metroplexes is that of information bridges. Two animals, say, two mice, are closed systems with two closed and very similar metroplexes. Being patterns of significance, metroplexes of a given species tend to be more similar than the purely physical body structures. This is particularly true of the lower species, while metroplexes of higher ones, especially of humans, may be more diversified.

When two closed metroplexes high up in x_5 are very similar, there occurs what may be called a "resonance reaction". It is the analog of Sheldrake's "morphic resonance". A type of morphic information bridge is established between the metroplex carriers, for instance between two animals of the same species, across which information can flow. While this effect may be more pronounced in the lower species, information bridges may be established even between humans. Resonance effects make themselves felt mainly through weak or strong telepathic interactions. Quite often both partners of a long married couple simultaneously but independently think of the same topic. A mother, whose son is involved in an accident far away, sometimes feels telepathically that something has happened to her son. This is due to the similarity of their metroplex structures or the fact that their metroplexes are in close x_5–proximity to each other. "Distance" in the transdimensions does not refer to the physical separation between metroplex carriers. Instead, it is a measure of the difference between their closed metroplexes.

The highest closed metroplexes formed are associated with humans, at least as far as we know. Their significance is represented by the highest points on the x_5–scale and lies far above the point T(7) of Fig. 8. Theoretically, the x_5–scale extends to infinity. The question naturally arises, whether anything exists beyond the highest x_5–level reached by man, something no longer tied to any existing physical structure.

This is actually the case. Not only beyond the very highest metroplex structures, but, in fact, all along the x_5–scale from zero upwards there exist free quanta of significance. They are free in the sense that they do not represent the extension into x_5 and x_6 of any material object. They are also free in the sense that they can move up and down the x_5–scale, changing their significance but without losing their informational content. While they are confined to the transdimensions and do not directly appear in our space, they do possess the important property of being able to make themselves felt in our world by means of gravitational waves, or gravitons, as mentioned under hermetry form (a) in Section 11. In fact, they *are* the hermetry forms (a).

The quanta of significance just described practically exist as ideas in the transdimensions. When they are able to couple information into gravitational waves Heim calls them *activities*, and when they move up and down the x_5–scale he calls them rising and falling activities.

The amount of information coupled into gravitational waves by hermetry form (a) depends on the location along x_5 from which the latter originates. Activities originating in metroplex regions high up on the

x_5–scale carry a great deal of information, while those coming from regions around T(1) in Fig. 8 carry very little. This is important, because gravitational waves, moderated by information, are able to interact with matter, thereby changing the probability state of a material system in accordance with the information they contain. This can be seen as follows:

In quantum theory an observable is always represented by the sum of all possible states of the quantity to be observed, each multiplied by a factor related to the probability of observing this particular state. When an experiment is performed to determine the actual state of the observable, for instance the energy of an atom, all probability factors collapse to zero except the one multiplying the state experimentally found to exist. Its factor increases to unity, i.e. certainty. Often, though not always, the factor which turns to unity was relatively large to begin with.

It is this distribution of probability factors with which gravitons are able to interact, thereby changing their distribution. As a result, some very likely states with large factors may be reduced to insignificance, while others, which are much less likely, are enhanced.

As an example, consider the simple case of an object lying on a table. Let all distances x be measured from one edge of the table and let the object rest at $x = x_1$. Quantum mechanically, the root of the probability of finding the object at an arbitrary point x is characterized by a smooth function of x, whose amplitude has a very sharp peak at x_1. Even far away from x_1, according to quantum theory, this amplitude is not zero, although it is extremely small. Now consider a falling activity, whose information content requires the object to be present at x_2 instead of x_1. If the activity is strong enough, it will be able to send gravitons into our 3–dimensional space, interacting with the probability function mentioned above and moving the peak from x_1 to x_2. Now the probability of finding the object at x_2 becomes very large and that of finding it at x_1 becomes very small. What we observe is a sudden shift of the object from x_1 to x_2. This is the somewhat complicated path along which the idea of a person may be transformed into telekinetic action.

Gravitational waves modulated by information are the analog of modulated electromagnetic waves and sound waves. Modulation, after all, is just the encoding of information in a manner suitable for its transmission by waves. Visible light waves, for example, are modulated by the surfaces from which they are reflected and carry a wealth of information regarding shape, color, and texture of the latter. Radio and televi–

sion waves prior to being broadcast or televised are similarly modulated by voices and actions in the studios of their respective stations. Sound waves may be modulated by speech or music.

Light and sound waves are able to interact with matter, for our eyes react to light and our ears to sound. Light can modify the chemical composition of photographic emulsions, and powerful radiation produced in the interior of stars is even strong enough to prevent their gravitational collapse, despite the weakness of the interaction between light and matter. Gravity waves, on the other hand, always react with matter, although the interaction is not very strong either. The prediction of Heim's theory that strong gravitational waves charged with information are able to produce very special and even unexpected results, therefore merely expresses the fact that gravity waves, too, conform to the general information–carrying ability and the interaction principle shared alike by all wave phenomena.

The purely physical constituents of a living organism correspond to organizational schemes whose values go up to T(15) on the vertical x_5–coordinate axis of Fig. 8 (not shown). The organization of the innumerable separate components of a living being down to the atomic level into a functioning whole is of such high degree of complexity and significance that it occupies the positions between T(15) and T(24) on the x_5–scale. *Activity currents* are currents of information–carrying activities flowing between metroplexes of all orders and forming a network through which the various components of a living system are interconnected. This is necessary in order for a living structure to function as a unit and not as a collection of disconnected parts.

The next higher metroplex totality, T(25), is a transition region. Beyond it one finally encounters the realm of mental and spiritual experiences, the domain of consciousness, thought, ideas, and inspiration, which are not localized in our 4–dimensional world, although they certainly have a decisive influence on us. From here, our free will issues directions to x_6, which in turn guides the action of a living entity at each moment of its existence. Our personality, residing in regions beyond T(25), leads a semi–autonomous existence, as pointed out further down. For this reason, it is given the special designation of *persona*.

In principle, the x_5–coordinate axis extends from zero to infinity. It is, therefore, entirely possible that x_5 is subdivided into many discrete levels separated by large x_5–distances, each of them representing a world parallel to our own. The condition parallel worlds have to satisfy is to occupy the same space we do and yet to be out of our reach. Consider, for example, a universe whose clocks are always a few hours

ahead of our time. It exists in our 3 dimensions, but we never notice it, because whenever we reach a certain instant in time, the other universe has already passed it. It is like a runner who always is a few steps ahead of us, so we can never catch up to him.

While parallel universes separated from us in time are unlikely to exist because they might lead to violations of causality, parallel worlds separated from us and from each other by very great distances along x_5 are entirely conceivable. Their respective organizations would be so different from ours that we would not perceive them, although they utilize the same 4 dimensions in which we, too, are at home. Such parallel worlds may be filled with higher spirituality.

The process of learning and of assimilating the many experiences we go through in life leaves an imprint on the persona mentioned above. On the one hand, the persona is connected via activity currents to the rest of our individual metroplex patterns. On the other, its semi-autonomous character manifests itself when we sleep, for then the activity currents emanating from it are gradually reduced and finally decoupled altogether, resulting first in tiredness and then in sleep. During this period the persona has an existence of its own. The process is reversible, and when the activity currents are restored we wake up again. In the event of a person's death, his persona, composed of his character and the entire wealth of mental structures accumulated during a lifetime, permanently and irreversibly decouples from the body and is withdrawn into one of the parallel worlds in a high region of x_5.

The discussion in this section is an abbreviated version of Heim's complete transcendental theory. It is sufficient, however, for an understanding of the projector theory to follow.

13. The Projector Theory

The projector theory was first developed and published in 1979 by one of the authors (v. Ludwiger, 1979c). It is a consequence of Heim's theory discussed in Sections 2–12. This fact at least removes it from the category of pure speculations.

The purpose of the theory is to point out ways of transmitting information or even objects across large distances without the need of physically traversing the intervening space.

Let us assume that information is to be exchanged between position A, where the source is located in the form of a projecting device, and a

target area B. A and B may be situated on the same planet or on different planets. Since the transmission is independent of distance, the separation in miles or light years between A and B is not important.

The first step towards the realization of a projection from A to B requires a decision regarding the type and shape of the target area B with which A wishes to exchange information. The location of B need not be known, it suffices to know the specific features the target is supposed to have. B could, for example, be a certain type of landscape assumed to exist somewhere either on the home planet or on a planet elsewhere in the galaxy.

In the next step, a metroplex structure corresponding as closely as possible to that of the desired destination B is artificially generated by the projector at A. In a technologically advanced society the problem of constructing a device able to create such metroplex patterns will have been solved.

Next, a search is made for a target area B displaying the desired characteristics and hence possessing a metroplex structure similar to the one produced artificially by the projector. The search is carried out by generating a free activity in the form of a tentacle reaching out to look for a natural metroplex resembling the artificial one. If a suitable candidate B is found, the artificial metroplex is modified until nearly perfect correspondence is attained between the natural and the artificial metroplexes. This results in a resonance reaction between them and establishes an information bridge linking source A to target B. Once A and B are connected, activities carrying information can flow across the bridge in both directions.

Now the projector can proceed to modulate rising activities with information, sending them across the morphic bridge to B. Upon descending and entering normal 3–dimensional space they transfer their information to gravitational waves able to modify the probability distribution of matter in conformity with the information they carry. This way of transmitting information is instantaneous and independent of the distance between A and B.

The entry of gravity waves from high x_5–regions into our space is accompanied by a variety of phenomena.

When a morphic bridge is established between the projector device and its own immediate neighborhood, which should be particularly easy, the descending gravitational waves will dissipate their energy near the source in the form of light bundles, fingers of light of finite length, or

balls of light.

If, upon entry into 3–dimensional space, falling activities from very high metroplex regions meet a material structure, they can interact with it, raising it into a high x_5–region. This elevates it into a parallel spacetime which is displaced from the original one by the distance along x_5 by which the structure was raised. In the course of the transition its density is altered, making the structure become transparent. The luminous head of the activity tentacle will then appear to shine through the object.

The entry region in B of gravitational waves may vary in size, or it may pulsate and increase or decrease in brightness, depending on the intensity of the projected activities, or on the amount of energy needed to reorganize the surrounding matter. Luminous volumes of air may disappear in one place and reappear in another, or they might quickly move across the landscape.

Since an exchange of information and physical interactions can proceed from A to B as well as from B to A, the projector in A can be made to operate as a receiver of signals from B. Modulation of the activities connecting A and B may be programmed so as to feed only optical and acoustic signals from B to the source at A. The projector at A will then act as a passive eye and ear, spying, as it were, on the target at B. However, the action will not go unnoticed at B, because activities descending in a limited area of B in the form of gravitational waves liberate energy, ionizing the air and causing it to emit light.

Falling activities are not without danger. When they pass through x_5–regions above T(25), where the persona is located, they may interact with the latter and create entirely new levels of consciousness. This may lead to paranormal experiences or intense feelings of anxiety and fear, or it may lead to a personality split. Strong activities can affect us physically by causing paralysis or, on the more positive side, cure injuries and lead to recovery from illness. Energetic activities will liberate heat and may cause burns if not carefully handled. A medium may be a person sensitive to gravitational waves entering our space from higher x_5–regions. For this reason it would be interesting to perform an experiment in which gravitational effects are measured near a medium in trance.

Modulation of activities rising from the source in A can be employed for projecting more substantial information into the target site. Pictorial information generated in the projector may be raised by activity currents into high x_5–regions, where they are charged with effective ideas.

Upon re–entering 3–dimensional space at the target location they can condense or regroup physical structures and by so doing materialize the ideas. The requirement for this to happen is that the effective ideas in the form of information originate from an x_5–position *above* the morphic bridge. The items projected into the target area are able to produce substantial physical effects, in contrast to purely optical projections. At the same time, the target region in B into which the activity head descends is projected back and becomes visible in A. This is the ideal type of projection and almost eliminates the need for travel between A and B.

Since the projection works both ways, an observer in A is visible in B, and his picture in turn is projected back and becomes visible in A. The observer can see himself moving like a phantom in the target landscape B. Everything he does in A becomes reality in B. If, for example, he makes a depression in the ground near the source, the depression will appear in the ground at B.

An information bridge is independent of distance. Two well separated regions in space appear to be superimposed upon each other when a bridge between them is established.

When descending gravitational waves reorganize matter they can either absorb or emit energy. In the first case they absorb heat energy from their surroundings, producing a cooling–off effect. Actually, they are more likely to dissipate energy in the form of light. An observer at B may, for example, see a metallic object surrounded by a halo of light.

As the result of a projection from A, an individual at B will observe the following sequence of events: Luminous, transparent spherical or non–spherical forms appear out of nowhere. Occasionally, they may become optically more dense, and they may pulsate and extend fingers of light or separate into two balls, uniting again a few moments later. Their appearance may be metallic, and they can depress the soil while dissolving the next instant into a diffuse mist or disappearing altogether. A variety of humanoid shapes such as giants, dwarfs, astronauts, roboters and others may emerge. However, if one tries to catch them, they will dissolve into thin air. In reality, the seemingly solid objects are nothing but phantom–like images without substance.

Gravity waves accompanying the appearance in B may give rise to mechanical effects or to plasma phenomena. They can also cause strong electric and magnetic disturbances as a result of the coupling between gravitational and electromagnetic fields. Such a coupling is predicted by unified field theories. One should expect psychological ef–

fects on humans, whose emotional balance may become totally upset. Direct transfer of information in telepathic form is also possible. Moreover, paranormal phenomena may make themselves felt.

A very important class of problems concerns the possibility of space travel. The projector theory discussed so far is able to explain the transmission of images and physical effects, but this is not enough to account for travel through space, which obviously requires the transmission of solid objects. Conventional space travel is an inefficient and costly affair. If the spaceship travels at a low speed of, say, 1/10th the velocity of light, a round trip even to the nearest star will take a lifetime. If the speed is high, say, 9/10th of the speed of light, the trip will become very expensive in terms of energy, and friction between the interstellar gas and the spacecraft will heat the latter to incandescence. For interstellar travel to be quick and easy, physical passage through space must be avoided.

The projector theory points out a possible solution, although nothing is known about the technology required for its realization.

In order to make use of information bridges forming a link between two planets regardless of distance, the spacecraft itself has to be a projector. Before the journey can begin, the metroplex pattern of a suitable planetary environment must be created by technical means, just as in the cases discussed previously. If the spaceship intends to land, the surface features of the target planet will have to be reasonably similar to those of the home planet. In order to locate a suitable object, a tentacle of activities is extended to search for a matching planetary metroplex structure. A high degree of similarity is required, but perfect identity down to the last atom is not necessary. A resonance reaction between the two metroplex configurations then establishes the morphic bridge between both planets across which free activities can flow in both directions.

Only ideas in the form of activity currents can cross the bridge. The next step, therefore, is to transform the craft into a free activity. Technically, this might require a gravity generator inside the spaceship, producing waves which, upon passage through the craft and its crew, are modulated with full information about all of their structural details. The gravity waves transform the information gathered in their passage through the spacecraft into free activity currents rising up into very high metroplex regions. As a result, the physical objects disappear from 3-dimensional space and change into a pure idea, i.e. the craft dematerializes.

The activity with its encoded information can now, metaphorically speaking, "cross" the morphic bridge built up in the previous step. Having done so, it descends and again enters 3–dimensional space, where it transforms back into gravitational waves or activity currents and transmits to them its informational content. The gravity waves in turn modify the probability distribution of their environment at the point of entry – usually the metronic space grid some distance above the target planet's surface – in accordance with the impressed information about the spacecraft. As a result, the latter rematerializes. The same procedure is employed when the spacecraft wants to return home. In order to travel in the target planet's atmosphere and to land on its surface the craft has to use a second, more conventional means of propulsion.

The possibility of dematerialization and rematerialization of physical objects is considered in scientific parapsychology as an empirical fact. The most convincing experiments on dematerialization and rematerialization of miniature transmitters enclosed in small, sealed boxes were carried out in Peking (Lin Shuhuang et al. 1983).

The projector theory accounts for the sudden appearance and disappearance of UFOs, and for their apparently effortless way of covering interstellar distances. In summary, it shows the UFO to be a device with the ability to change itself into a free activity in high regions of x_5 and x_6, to artificially create a planetary metroplex structure similar to an existing one, to cross the resulting information bridge, and to rematerialize on earth.

The task of constructing an apparatus able to accomplish all this is left as an exercise to the reader.

14. Summary and Outlook

The essence of Heim's theory is its complete geometrization of physics. By this is meant the fact that the universe is pictured as consisting of innumerable small, locally confined geometric deformations of an otherwise unperturbed 6-dimensional metronic lattice. The influence these deformations have on our 4-dimensional world constitute the structures we interpret as gravitons, photons, charged particles, and uncharged ones. The theory ultimately results in a formula from which the masses of all known elementary particles and a few unknown ones may be derived. In addition, it provides a picture of cosmology differing substantially from the established one.

Despite the insight gained into particle physics, Heim's approach is not entirely equivalent to modern quantum field theory. For this reason he has extended the theory to 12 dimensions. Only this extension allows full quantization, and as a consequence it becomes possible to unite general relativity and quantum theory. Even 6 dimensions are not sufficient to accomplish this. The 7th and 8th dimensions can be identified with informational processes, but no interpretation can be given to dimensions 9–12. In a humorous vein, Heim, quoting Goethe, calls them the location of the "Webstuhl der Zeit" (loom of time). It may be the seat of a supreme guiding agency, but this, of course, is speculation. A more detailed account of these new developments will be published in the forthcoming 3rd volume.

While the organization of elementary particles still lends itself to mathematical treatment, higher structures, in particular living beings, are far too complex to be dealt with in this manner. Nevertheless, parallel to the metron theory for calculating the masses of elementary particles, Heim has developed a completely general system of formal multivalued logic capable of making statements about both quantitative relations (i.e. mathematical aspects) and qualitative ones (organizational patterns and information). A small segment of this theory is presented in Section 12.

Based on Heim's concept of processes in the transcendental domain, a projector theory is outlined, enabling the projector device to transmit information between points far apart, or to traverse arbitrary distances in very short times without having to physically travel through space. It is conjectured that UFOs are such projectors reaching us from distant planets.

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Appendix A. *The Correspondence Between Relativity and Heim's Theory*

Einstein's field equations of general relativity have the form,

$$G_{ik} = \kappa T_{ik}$$

$$G_{ik} \equiv R_{ik} - \frac{1}{2} g_{ik} R \tag{A1}$$

$$i,k = 1,2,3,4,$$

where G_{ik} is the (divergenceless) Ricci tensor, R_{ik} is the contracted Riemann curvature tensor, R is the Riemann scalar, g_{ik} is the metric tensor, T_{ik} is the energy–momentum density tensor, and κ is a constant. Since both i and k run from 1 to 4 the equation above actually represents a set of $4^2 = 16$ coupled equations. Due to the symmetry of all tensors involved, i.e. because $G_{ik} = G_{ki}$ and $T_{ik} = T_{ki}$, the number of independent equations is reduced to 10.

R_{ik} is a given function of the metric tensor g_{ik} and its first and second derivatives, so that Eq. (A1) may be regarded as the equation which, together with appropriate boundary conditions, determines the important metric of space, i.e. its geometric properties.

In the absence of masses, $g_{11} = g_{22} = g_{33} = 1$, $g_{44} = -1$, and all other g_{ik}'s are zero. This set of metric tensor components signifies so–called "flat", or empty, space, in which unperturbed objects propagate along straight lines. In the presence of a single spherical mass space becomes curved, and the trajectories of unperturbed objects are curved orbits in a plane. This results from the fact that the 4 tensor components g_{11} – g_{44} now become functions of r and an angle θ. All other g_{ik}'s are again zero. The solution of the resulting equation of orbital motion about the central mass closely resembles the result obtained from classical Newtonian physics, except that it contains a small additional term. This term is responsible for the slow rotation of elliptical orbits about the central object. In the solar system the term is significant

only in the case of the innermost planetary orbit, where it leads to the well–known precession of Mercury.

Heim establishes a general correspondence between Einstein's macro–scopic field equations (A1) and his own equations in the microscopic domain. The Riemann tensor is conveniently written as a combination of Christoffel symbols, Γ^{i}_{km}, and their first derivatives, which are func–tions of the g'_{ik}s and their first derivatives. The correspondence is as follows (summation convention):

Einstein (macrocosmic)		Heim (microscopic)	
Γ^{i}_{km}	$\rightarrow$	φ^{i}_{km}	
R_{km}	$\rightarrow$	$C_p\ \varphi^{p}_{km}$	(A2)
$G_{ik} = T_{ik}$	$\rightarrow$	$C_p\ \varphi^{p}_{ik} = \lambda_p(ik)\ \varphi^{p}_{ik}$	

$$i,\ k,\ m = 1,\ 2,\ 3,\ 4,$$

C_p, φ, and $\lambda_p(ik)$ respectively being an operator, an eigenfunction, and an eigenvalue. Equation (A2) indicates that a transition from the mi–crocosm to the macrocosm implies a reduction of Heim's equations to those of general relativity. However, in conformity with the require–ments of a unified field theory, Heim's microscopic equations must be written,

$$C_{(p)}\ \varphi^{(p)}_{ik} = \lambda_{(p)}(ik)\ \varphi^{(p)}_{ik} = \varepsilon^{p}_{ik}\ , \tag{A3}$$

where the parantheses around p signify suspension of the summation convention. The right–hand side of Eq. (A3) represents an energy den–sity, denoted by ε^{p}_{ik}. Now, i, k, and p independently run from 1 to 4, so that Eq. (A3) represents a set of $4^3 = 64$ eigenvalue equations. The corresponding space is 8–dimensional. An appropriate energy density tensor, ε, can be constructed if i and k are allowed to vary from 1 to 8. The tensor turns out to be,

$$\varepsilon = \begin{bmatrix} \varepsilon_{11} & \varepsilon_{12} & \varepsilon_{13} & \varepsilon_{14} & \varepsilon_{15} & \varepsilon_{16} & 0 & 0 \\ \varepsilon_{21} & \varepsilon_{22} & \varepsilon_{23} & \varepsilon_{24} & \varepsilon_{25} & \varepsilon_{26} & 0 & 0 \\ \varepsilon_{31} & \varepsilon_{32} & \varepsilon_{33} & \varepsilon_{34} & \varepsilon_{35} & \varepsilon_{36} & 0 & 0 \\ \varepsilon_{41} & \varepsilon_{42} & \varepsilon_{43} & \varepsilon_{44} & \varepsilon_{45} & \varepsilon_{46} & 0 & 0 \\ \varepsilon_{51} & \varepsilon_{52} & \varepsilon_{53} & \varepsilon_{54} & \varepsilon_{55} & \varepsilon_{66} & 0 & 0 \\ \varepsilon_{61} & \varepsilon_{62} & \varepsilon_{63} & \varepsilon_{64} & \varepsilon_{65} & \varepsilon_{66} & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{bmatrix} . \tag{A4}$$

Relation (A4) above shows that 28 out of the 64 ε'_{ik}s are zero, i.e. 28 equations of the type of Eq. (A3) describe situations in which nothing of importance happens. The remaining 36 equations imply that the important space is 6–dimensional. If 6–space is denoted by R_6 and the 6 dimensions by x_1, x_2, ..., x_6, then

$$R_6 = R_6(x_1, x_2, x_3, x_4, x_5, x_6) \quad , \tag{A5}$$

where

$$\begin{aligned} x_1, x_2, x_3 &= \text{space coordinates} \\ x_4 = ict &= \text{time coordinate} \\ x_5 = i\varepsilon &= \text{entelechial coordinate} \\ x_6 = i\eta &= \text{aeonic coordinate} . \end{aligned}$$

Appendix B. *The Smallest Distance and the Metron*

In the macroscopic domain Heim finds the following expression for the gravitational potential $\varphi(r)$ due to a mass $M(r)$, including the r–dependent field mass:

$$\varphi(r) = \frac{\gamma M(r)}{r}\left(1 - \frac{r}{\rho}\right)^2$$
$$\rho = \frac{h^2}{\gamma m_0^3} . \tag{B1}$$

m_0 being the mass of a single nucleon composing the nuclei of $M(r)$. $M(r)$ is determined from the transcendental equation,

$$r\,q\,e^{-q} = A\left(1 - \frac{r}{\rho}\right)^2$$

$$q = 1 - \sqrt{1 - \varepsilon\,\varphi(r)} \qquad \text{(B2)}$$

$$\varepsilon = \frac{3}{8\,c^2}$$

$$A = \frac{3\,\gamma\,M_0}{16\,c^2}\ ,$$

where M_0 is the central mass, i.e. M(r) minus the total field mass. For $\varepsilon\,\varphi(r) > 1$, q in Eq. (B2) becomes unphysical, and hence the solution of

$$\varepsilon\,\varphi(R) = 1 \qquad \text{(B3)}$$

results in the largest and smallest radii, R_+ and R_-, between which Eq. (B1) is valid. Substituting Eq. (B3) into Eq. (B1) gives,

$$\frac{1}{\varepsilon} = \frac{\gamma\,M(R)}{R}\left(1 - \frac{R}{\rho}\right)^2\ , \qquad \text{(B4)}$$

and from the first line of Eq. (B2),

$$\frac{R}{e} = A\left(1 - \frac{R}{\rho}\right)^2\ , \qquad \text{(B5)}$$

because $q = 1$. Dividing Eq. (B4) by Eq. (B5) and substituting for ε and A from Eq. (B2) results in the following formula for M(R):

$$M(R) = \frac{e}{2}\,M_0\ . \qquad \text{(B6)}$$

With $\varphi(R)$ and M(R) given by Eqs. (B3) and (B6), respectively, one can now proceed to solve Eq. (B1) for $r = R$,

$$\frac{1}{\varepsilon} = \frac{\gamma\,e\,M_0}{2\,R}\left(1 - \frac{R}{\rho}\right)^2\ . \qquad \text{(B7)}$$

When R is the smallest possible radius, R_-, evidently $\frac{R_-}{\rho} \ll 1$, and to a very good approximation R_-, resulting from Eq. (B7), is,

$$R_- \approx \left(\frac{3\,e}{16}\right)\frac{\gamma\,M_0}{c^2}\ , \qquad \text{(B8)}$$

which is Eq. (3), Section 5, of the main text.

In order to derive an expression for the magnitude of the metron, consider again Eq. (B4) for a single small quantum of mass $m(R_-)$, including the field mass contained within R_-. Replacing R by R_- and substituting for ε Eq. (B4) can be written,

$$R_- = \frac{3\,\gamma\, M(R_-)}{8\,c^2}\left(1 - \frac{R_-}{\rho}\right)^2 . \tag{B9}$$

The Compton wavelength λ of $M(R_-)$ is defined as,

$$\lambda = \frac{h}{M(R_-)\,c} . \tag{B10}$$

Multiplying Eq. (B9) by Eq. (B10) gives,

$$\lambda\, R_- = \frac{3\,\gamma\, h}{8\,c^3}\left(1 - \frac{R_-}{\rho}\right)^2 . \tag{B11}$$

The condition for space to be empty is $\lambda \to \infty$. In this limit the right-hand side of Eq. (B11) stays finite because $\lim_{\lambda\to\infty} \frac{R_-}{\rho} = 0$. Identifying the left-hand side in the limit with the metronic area τ, Eq. (B11) becomes,

$$\tau = \frac{3\,\gamma\, h}{8\,c^3} , \tag{B12}$$

which is Eq. (6), Section 5, of the main text.

Appendix C. *Origin and Size of the Universe*

The diameter D of the universe and the metronic area τ are related through the expressions,

$$\sqrt{\frac{3}{2}}\, f\left(\frac{1}{4}\sqrt{\frac{3}{2}}\,\frac{D\, f^3}{\sqrt{\tau}} - 1\right)^2 = \frac{D}{\sqrt{\tau}} \tag{C1.1}$$

$$\left(\frac{e\, D\,\sqrt{\tau}}{\pi\, E} - 1\right) f^2 = \sqrt{\frac{e\, D\,\sqrt{\tau}}{\pi\, E}} . \tag{C1.2}$$

The diameter $D = D_0$ at the beginning of time and the corresponding metronic size $\tau = \tau_0$ are characterized by the relation,

$$\pi\, D_0^2 = \tau_0 . \tag{C2}$$

Substituting for τ_0 from Eq. (C2) into Eq. (C1) results in the following

expressions, in which f has been replaced by f_0:

$$f_0 \left(\frac{1}{4} \sqrt{\frac{3}{2\pi}}\, f_0^3 - 1 \right)^2 = \sqrt{\frac{2}{3\pi}} \tag{C3.1}$$

$$D_0^2 - \frac{\pi^{\frac{1}{4}} \sqrt{E}}{\sqrt{e}\, f_0^2} D_0 - \frac{\sqrt{\pi}\, E}{e} = 0 \quad . \tag{C3.2}$$

Equation (C3.1) is of 7th order in f_0 and has 3 real roots:

$$\begin{aligned} f_{01} &= 2.043791516 \\ f_{02} &= 1.337222089 \\ f_{03} &= 0.478616983 \ . \end{aligned} \tag{C4}$$

When each of these values in turn is substituted into Eq. (C3.2) there result 3 positive and 3 negative roots of D_0,

$$\begin{aligned} D_{01}^{+} &= 0.909917980 \text{ m} , \quad D_{01}^{-} = -0.716602317 \text{ m} \\ D_{02}^{+} &= 1.064258088 \text{ m} , \quad D_{02}^{-} = -0.612679705 \text{ m} \\ D_{03}^{+} &= 3.701211603 \text{ m} , \quad D_{03}^{-} = -0.176171860 \text{ m} \ . \end{aligned} \tag{C5}$$

The positive values of D correspond to the initial trinity of spheres listed in Eq. (10), Section 9, of the main text. At the end of its life cycle the universe collapses into a trinity of spheres whose diamters are given by the negative values of D.

Equation (C1) can be used to calculate the present diameter D of the universe. Due to the presently very small size of τ (6.15×10^{-70} m^2) and the correspondingly large size of D, to a very good approximation,

$$\frac{D\, f^3}{\sqrt{\tau}} \gg 1 \qquad \text{and} \qquad D\sqrt{\tau} \gg 1 \ . \tag{C6}$$

This reduces Eq. (C1) to,

$$\frac{3}{32} \sqrt{\frac{3}{2}} \frac{D^2}{\tau} f^7 = \frac{D}{\sqrt{\tau}} \tag{C7.1}$$

$$\frac{e\, D \sqrt{\tau}}{\pi\, E} f^2 = \sqrt{\frac{e\, D \sqrt{\tau}}{\pi\, E}} \ . \tag{C7.2}$$

Solving Eq. (C7.2) for f and substituting into Eq. (C7.1) results in the expression,

$$D = \frac{\pi}{e}\left(\frac{3}{32}\sqrt{\frac{3}{2}}\frac{\pi}{e}\right)^{\frac{4}{3}}\frac{E^{7/3}}{\tau^{11/6}} \tag{C8}$$

for the size of the universe. This is Eq. (9), Section 9, of the main text.

Appendix D. *The Elementary Charge*

Heim's formula for the elementary charge, $e_{\pm}$, is,

$$\begin{aligned} e_{\pm} &= \pm\, 3\left(\frac{1}{4\pi^2}\sqrt{\frac{\theta\, h}{\pi\, \mu_0\, c}}\right) \\ \theta &= 5\,\eta + 2\sqrt{\eta} + 1 \\ \eta &= \frac{\pi}{(4+\pi)^{1/4}}\,, \end{aligned} \tag{D1}$$

where $\mu_0 = 4\,\pi\times10^{-7}$ henry/m is the permeability of free space. The factor 3 in Eq. (D1) gives the impression of $e_{\pm}$ being composed of 3 subcharges, each of them equal to e/3. Substituting numbers results in an elementary charge of

Heim: $e_{\pm} = \pm\ 1.60216\times10^{-19}$ Coul.

Experimentally, one has,

Experiment: $e_{\pm} = \pm\ 1.60211\times10^{-19}$ Coul.

Appendix E. *The 4 Hermetric Forms*

Einstein's 4-dimensional space is described by a single metric tensor, g_{ik} (cf. Appendix A). In contrast, Heim requires 3 metrics: One for the two transcoordinates, one for time, and one for the three space coordinates. They depend on x_1–x_6 as follows:

$$\begin{aligned} g_{ik}^{(1)} &= g_{ik}^{(1)}(x_5,\ x_6) \\ g_{ik}^{(2)} &= g_{ik}^{(2)}(x_4) \end{aligned} \tag{E1}$$

$$g_{ik}^{(3)} = g_{ik}^{(3)}(x_1, x_2, x_3) \ .$$

The g_{ik} are elements of 6 by 6 matrices, which will be denoted by $g^{(\mu)}$ or $g^{(\nu)}$. From the general product of matrices $g^{(\mu)}$ and $g^{(\nu)}$ Heim constructs a basic metric tensor, $\gamma^{(\mu\nu)}$, valid in 6–dimensional hyperspace:

$$\gamma^{(\mu\nu)} = g^{(\mu)} g^{(\nu)} \ . \tag{E2}$$

Finally, 4 correlation tensors, $\hat{\gamma}_a - \hat{\gamma}_d$, representing the 4 hermetric condensations (a)–(d) of Section 11, are built up from the matrices γ and g. They are,

$$\hat{\gamma}_a = \begin{bmatrix} \gamma^{(11)} & g^{(1)} & g^{(1)} \\ g^{(1)} & E & E \\ g^{(1)} & E & E \end{bmatrix}$$

$$\hat{\gamma}_b = \begin{bmatrix} \gamma^{(11)} & \gamma^{(12)} & g^{(1)} \\ \gamma^{(21)} & \gamma^{(22)} & g^{(2)} \\ g^{(1)} & g^{(2)} & E \end{bmatrix}$$

$$\hat{\gamma}_c = \begin{bmatrix} \gamma^{(11)} & g^{(1)} & \gamma^{(13)} \\ g^{(1)} & E & g^{(3)} \\ \gamma^{(31)} & g^{(3)} & \gamma^{(33)} \end{bmatrix} \tag{E3}$$

$$\hat{\gamma}_d = \begin{bmatrix} \gamma^{(11)} & \gamma^{(21)} & \gamma^{(31)} \\ \gamma^{(12)} & \gamma^{(22)} & \gamma^{(32)} \\ \gamma^{(13)} & \gamma^{(23)} & \gamma^{(33)} \end{bmatrix} \ ,$$

where E is the unit tensor. Equation (E3) shows that only certain ones of the 6 coordinates are included in each of the 4 hermetry forms.

References

Ashtekar, A., Smolin L., Rovelli, C., and Samuel, J. (1989). Quantum Gravity as a Toy Model for the 3+1 Theory, *Classical Quantum Gravity 6*, (10), L185 – L193.

Auerbach, T., and v. Ludwiger, I. (1992). Heim's Theory of Elementary Particle Structures. *J. of Scientific Exploration 6*, 217–231.

Cole, E.A.B. (1980). *Il Nuovo Cimento 55B*, 269–275.

Einstein, A., Rosen, N., and Podolsky, B.P. (1935). *Phys. Rev. 47*, 777.

Gelfond, A.O. (1958). *Differenzenrechnung*, Hochschulbücher für Mathematik, Vol. 41, VEB Deutscher Verlag der Wissenschaften, Berlin,

Heim, B. (1977). Vorschlag eines Weges zur einheitlichen Beschreibung der Elementarteilchen, *Zeitschrift für Naturforschung 32a*, 233–243.

Heim, B. (1980). *Postmortale Zustände?* Resch Verlag, Innsbruck, Austria.

Heim, B. (1982). *Der kosmische Erlebnisraum des Menschen*, Resch Verlag, Innsbruck, Austria.

Heim, B. (1984). *Elementarstrukturen der Materie, Vol. 2*. Resch Verlag, Innsbruck, Austria.

Heim, B., and Dröscher, W. (1985). *Einführung in Burkhard Heim: Elementarstrukturen der Materie*, Resch Verlag, Innsbruck, Austria.

Heim, B. (1989 (revised)). *Elementarstrukturen der Materie, Vol.1*. Resch Verlag, Innsbruck, Austria.

Heim, B. (1990a). *Einheitliche Beschreibung der materiellen Welt*, Resch Verlag, Innsbruck, Austria.

Heim, B. (1990b). *Der Elementarprozess des Lebens*, Resch Verlag, Innsbruck, Austria.

Lin Shuhuang et al., (1983). Some Experiments with the Moving of Objects through "Exceptional Functions of the Human Body", in *PSI Research. An East–West Journal on Parapsychology, Vol. 2, 1*, A Quarterly Publication of Washington Res. Center and the Foundation for Human Science.

v. Ludwiger, I. (I. Brand), (1976). Neue Theorien der Gravitation und die qualitative Erklärung für einige physikalische Wirkungen der UFOs, in *Ungewöhnliche Gravitations–Phänomene*, MUFON–CES, Feldkirchen–Westerham, 148–220.

v. Ludwiger, I. (I. Brand), (1979a). Die einheitliche 6–dimensionale Quanten–Geometrodynamik nach Burkhard Heim, in *Ungewöhnliche Eigenschaften nichtidentifizierbarer Lichterscheinungen*, MUFON–CES, Feldkirchen–Westerham, 267–297.

v. Ludwiger, I. (1979b). Einblicke in die Heimsche einheitliche Quantentheorie 1. *Grenzgebiete der Wissenschaft*, Resch Verlag, Innsbruck, Austria.

v. Ludwiger, I. (I. Brand), (1979c). Die einheitliche 6–dimensionale Quanten–Geometrodynamik nach Burkhard Heim, in *Ungewöhnliche Eigenschaften nichtidentifizierbarer Lichterscheinungen,* MUFON–CES, Feldkirchen–Westerham, 298–358.

v. Ludwiger, I. (1981). *Heimsche einheitliche Quantenfeldtheorie,* Resch Verlag, Innsbruck, Austria.

v. Ludwiger, I. (I. Brand), (1983). Die innere Struktur elementarer Subkonstituenten der Materie, in *Seltsame Flugobjekte und die Einheit der Physik,* MUFON–CES, Feldkirchen–Westerham, 371–412.

v. Ludwiger, I. (1992). *Der Stand der UFO-Forschung,* Verlag 2001, Frankfurt am Main, 266–286.

Nörlund, N.E. (1924). *Vorlesungen über Differenzenrechnung,* Springer Verlag, Berlin.

Senkowski, E. (1983). Die Beschreibung der Paraphänomene im Rahmen der Heimschen allgemeinen Feldtheorie, *Basler Psi–Tage 83,* Basel.

Sheldrake, R. (1985). *A New Science of Life,* Anthony Bond, London.

Van Flandern, T. (1993). Major Meeting on New Cosmologies, *J. of Scientific Exploration 7,* 19–22.

The Generation of Antigravity

by

H. Beck

1. Introduction

The concept of antigravity refers to a force acting in a direction opposite to that of normal gravitation. The latter causes the earth to attract all objects towards its center, while objects under the influence of antigravity are repelled by the earth and either move upwards or experience a reduction in weight.

It has often been conjectured that UFOs might use an antigravitational drive when manoeuvring near the earth's surface without any visible means of propulsion. One indication supporting this view is the downward pressure sometimes exerted on objects underneath low-flying UFOs. Another is the appearance of strong electromagnetic fields in their vicinity. As will be seen, such fields of necessity accompany the generation of antigravity.

Apart from its possible utilization by UFOs, antigravity would find many useful applications here on earth if it could be produced in sufficient strength. The aim of the present study is to outline a method for generating antigravity and to describe the equipment needed for this. A word of caution at the very outset: The reader should not expect too much, for the effect turns out to be very small indeed if produced by present-day technology.

The calculations to follow are based on a 4-dimensional version of B. Heim's 6-dimensional unified field theory (Heim, 1989, 1984). Being 4-dimensional the theory to be presented can only be approximately correct. Previous publications on antigravity and related topics include articles by B. Heim (1959) and I. von Ludwiger (1976, 1979, 1983). Reports on observed gravitational effects due to UFOs are described by A. Schneider (1976, 1981).

The theory starts out from a set of relations very similar to Maxwell's equations, describing the interrelations between electric, magnetic, and gravitational fields, including the mesofield. The mesofield only acts on moving masses and bears about the same relation to the gravitational field as the magnetic field does to the electric field.

Two coupled equations of the set describe the phenomenon of antigravity. In Section 2 the first of these is solved separately because the resulting solution is simple and tractable, allowing modifications to be made with relative ease. The solution of both coupled equations is derived in Section 3. Section 4 contains a brief discussion of the antigravitational field and of the electromagnetic fields accompanying antigravity. In order to keep mathematics in the main text to a minimum full mathematical details are presented in Appendices A and B.

The antigravitational force turns out to be of measurable proportions only if the mass of the entire earth is utilized for repelling the device that generates the antigravity field. For this reason the theory to follow will be applied from the outset to methods of flight propulsion.

2. Dipole Solution of the First Equation

2.1. *The Basic Equation*

The equation to be solved in this section is

$$\nabla \times \Gamma = -b \frac{\partial \mathbf{B}}{\partial t} , \tag{1}$$

where

Γ = gravitational field

$\mathbf{B}$ = magnetic field

b = coupling constant.

The symbols $\nabla\times$ and $\partial/\partial t$ denote the mathematical operators curl and partial time derivative, respectively.

Reading from right to left, Eq. (1) states that a space– and time–dependent magnetic field $\mathbf{B}$ induces a space– and time–dependent gravitational field Γ (gamma). As is well known, it also induces an electric field, but the electric field has been omitted from Eq. (1) because it acts on electrical charges only. In the absence of charges it is legitimate to drop the electric field from the equations.

The gravitational field Γ acts on masses such that the product $m\Gamma$ represents a real force if m denotes a mass. A force always acts in some direction, implying that Γ is a directed quantity. This fact is expressed by the bold printing of Γ. The same is true with regard to the

magnetic field **B**.

In Eq. (1) the direction of Γ is seen to depend on that of **B**. Since the latter is to be produced artificially, care must be taken to ensure a direction of **B** inducing a repulsive gravitational field Γ, and not an attractive one. The fact that this is possible demonstrates the great advantage of Γ over ordinary gravity, whose direction is always attractive and cannot be manipulated in any way whatsoever. Gravitational and antigravitational forces merely differ in the plus– or minus–signs in front of them. For this reason the term "gravitational" in this report will often be used collectively to denote both types of forces.

Of essential importance with regard to the expected strength of antigravity is the magnitude of b in Eq. (1). Its value is given by

$$b = \sqrt{\frac{\varepsilon_0}{\alpha}} = 8.625 \times 10^{-11} \text{ coul/kg} , \qquad (2)$$

ε_0 = vacuum permittivity ($\varepsilon_0 = 8.854 \times 10^{-12}$ farad/m)
α = permittivity of space to gravity *) ($\alpha = 1.19 \times 10^9$ s^2kg/m^3) .

b is a coupling constant between the magnetic field **B** and the gravitational field Γ. Obviously, it is extremely small, so that even a strong **B** will induce a vanishingly small gravitational field. However, this is no cause for concern, because the same occurs in ordinary gravity, where a mass m creates an exceedingly weak gravitational field around itself, to which it is coupled by the small gravitational constant γ (gamma) ($\gamma = 6.67 \times 10^{-11}$ m^3/s^2kg). γ is seen to be somewhat smaller than b. Nevertheless, when the weak gravitational field of m interacts with the huge mass of the earth, the result is an attractive force – the weight of m – which is not small by any means. Evidently, the enormous mass of the earth more than compensates for the weak gravitational field of m. By analogy, it may be argued that the weak Γ–field of Eq. (1), interacting with the earth, should result in a relatively strong antigravitational force roughly equal in magnitude to that of ordinary gravity. Unfortunately, this hypothesis is not supported by the facts for reasons that will become clear later on.

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*) This name was suggested by W.K. Allan

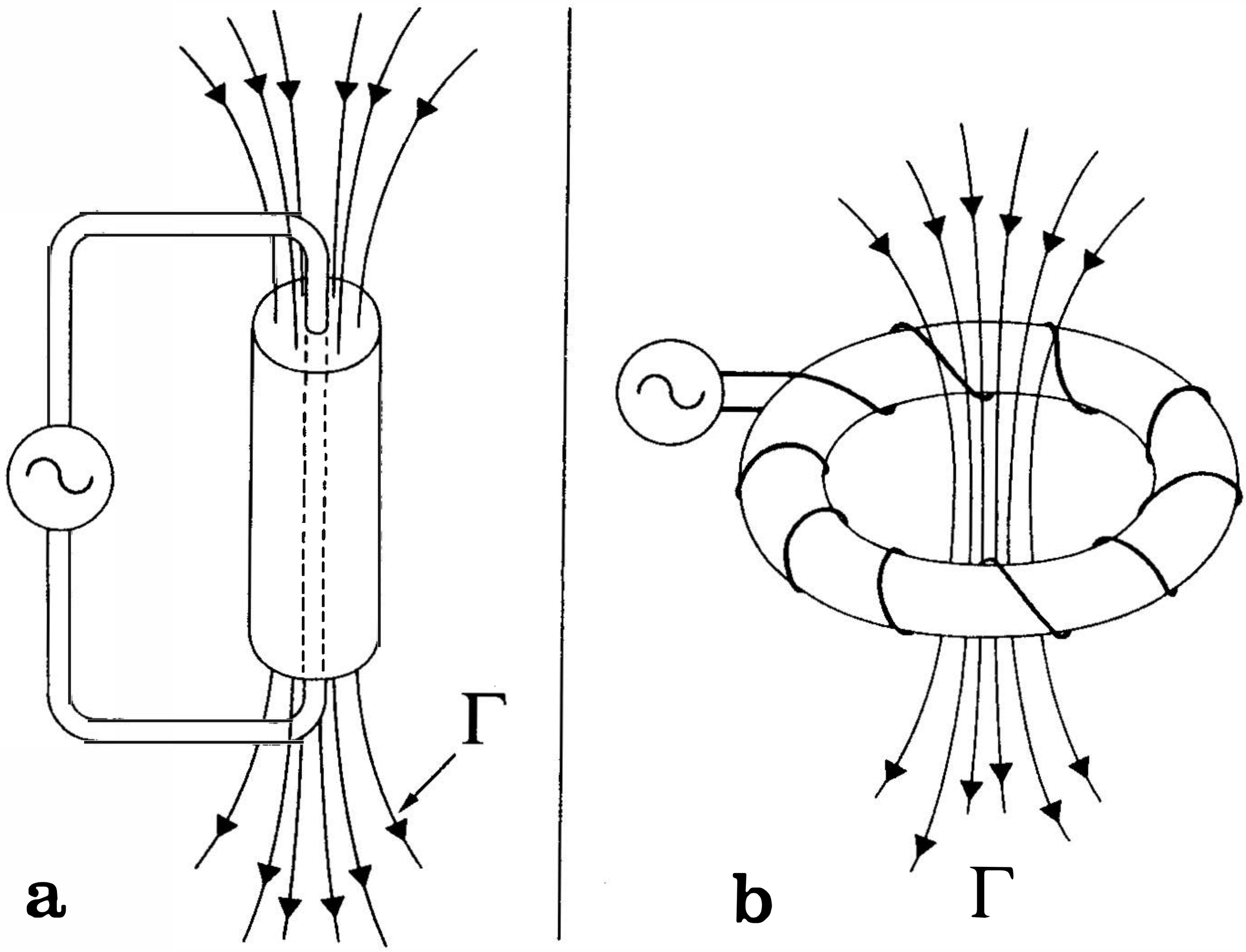

Fig. 1. Two possible configurations for the generation of an antigravitational field **Γ**.

2.2. *Equipment Needed for the Production of Antigravity*

Equation (1) can be solved after deciding on a magnetic field **B** suitable for generating antigravity. **B** is produced by an alternating current, since it has to be time–dependent. The field lines of **B** are known to be perpendicular to the current, while the field lines of **Γ** are perpendicular to those of **B**. Two possible arrangements meeting all necessary requirements are shown schematically in Fig. 1.

In Fig. 1a a rectangular current loop composed of many wires is connected to an alternating current source. The wires pass through a cylinder made of highly permeable material, such as iron. The current in–

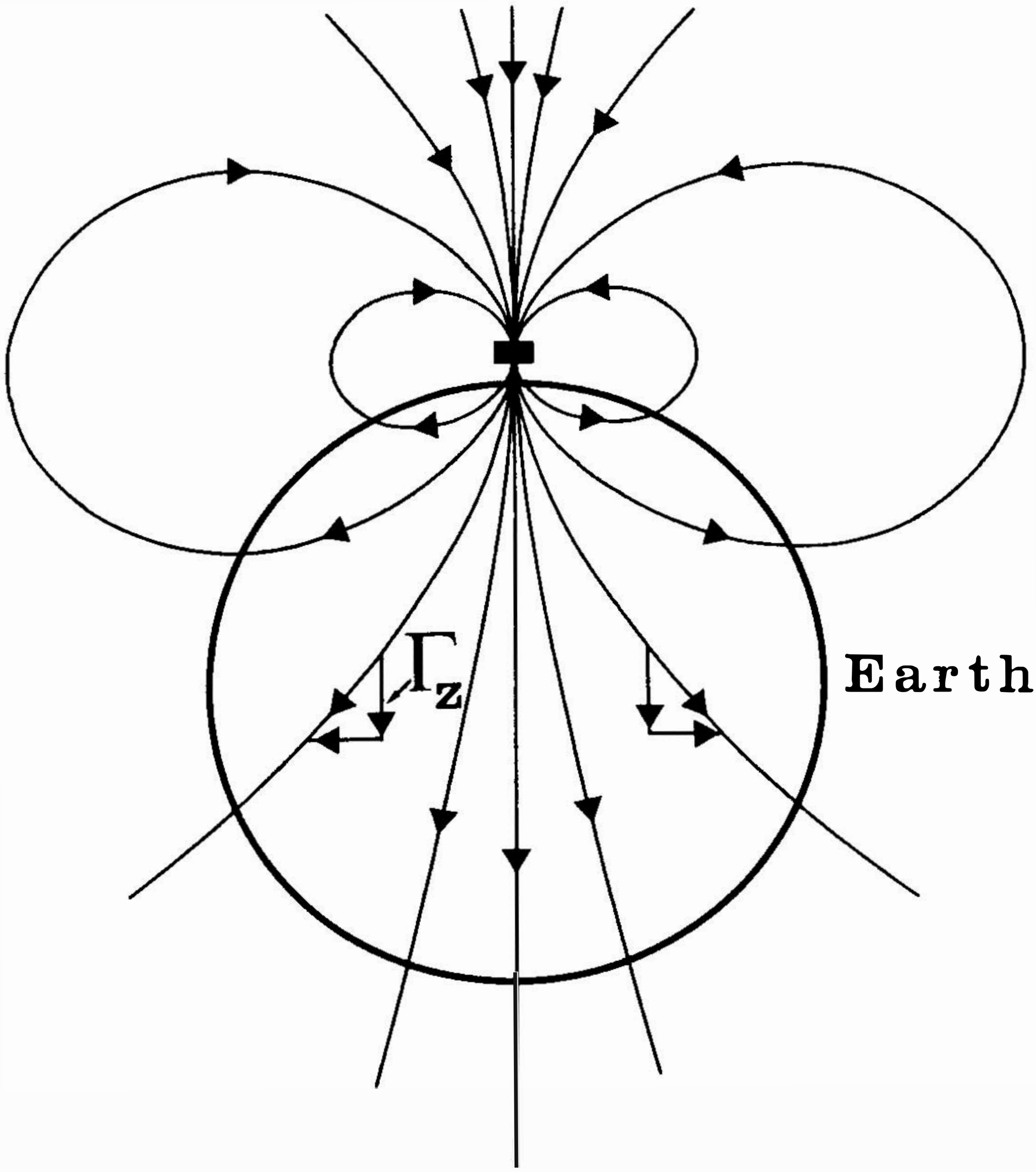

Fig. 2. Antigravitational field lines relative to the earth. Γ_z = vertical component of the antigravitational field.

duces a strong magnetic field **B**, whose field lines encircle the vertical portions of the loops in a plane perpendicular to them. The permeable material serves to increase the field strength of **B**. A strong **B** is needed because the antigravitational force is directly proportional to it. The curved field lines, belonging to Γ, in turn are induced by **B**. The gravitational force acts on any mass in the direction of the arrows tangentially to the field lines.

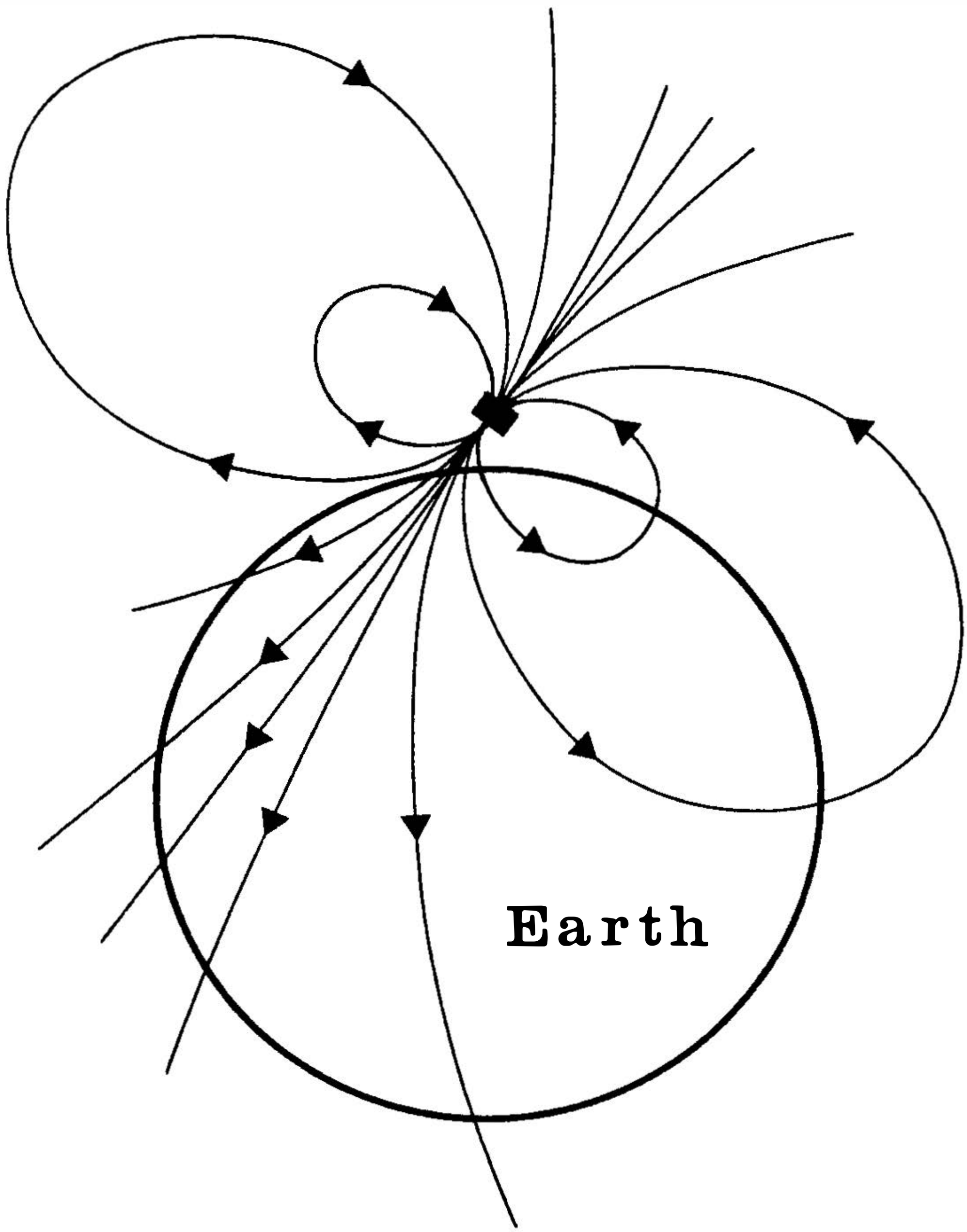

Fig. 3. A tilted magnet and its antigravitational field relative to the earth.

A second arrangement is shown in Fig 1b, where many windings surround a toroidal core of highly permeable material *). The magnetic field lines are circles inside the torus, while the field lines of Γ at some distance from the magnet are the same as in Fig. 1a. In the configuration of Fig. 1a end effects may cause a slight modification of the gravitational field relative to the field of Fig. 1b.

Calculated gravitational field lines based on the solution of Eq. (1) are shown in Fig. 2 in relation to the earth. They penetrate into the earth's

*) The author is indebted to A. Müller of MUFON–CES for suggesting the use of a toroidal magnet. See also v. Ludwiger (1979).

interior, acting on its mass at every point in the direction of the arrows. A visual inspection of Fig. 2 leads to the conclusion that the field pushes the earth away from the magnet in a downward direction. Since action equals reaction, the earth pushes the magnet with the same force in the upward direction. This is the desired antigravitational force acting on the magnet and on the entire construction attached to it.

Only the vertical component of the field, denoted by Γ_z in Fig. 2, contributes to the upward thrust. The horizontal components, pointing in opposite directions, cancel each other due to symmetry. This symmetry is disturbed if the magnet is tilted as in Fig. 3. The average force exerted on the earth by the arrows in the figure is downward and mainly to the left. In turn, the earth pushes the magnet up and to the right.

2.3. *The Vertical Field Component in Dipole Approximation*

An exact solution of Eq. (1) for the gravitational field Γ induced by the magnetic fields of Figs. 1a or 1b may be derived in the form of an infinite series of terms. If the height of the craft above the earth's surface is large compared to the dimensions of the magnet, which usually is the case, the first two terms of the series express the solution with sufficient accuracy for our purpose. The gravitational field resulting from this approximation is known as a dipole field.

The vertical component of the gravitational dipole field is given by the expression

$$\Gamma_z = -\frac{b\mu_0}{16\pi^2}\frac{3\cos^2\theta - 1}{r^3} V \frac{\mu}{\mu_0}\frac{dI}{dt} , \tag{3}$$

where r and θ are the coordinates of the point at which Γ_z is evaluated, as shown in Fig. 4, V is the volume of the magnet, μ/μ_0 is the relative permeability of its iron core, μ_0 is the permeability of free space ($\mu_0 = 1.257 \times 10^{-7}$ henry/m), I is the current producing the magnetic field, and dI/dt is the time derivative of I. Note the $1/r^3$-dependence of Γ_z. Ordinary gravity depends on $1/r^2$, i.e. it diminishes more slowly and remains stronger throughout the earth's volume. This leads us to suspect that antigravity may be a weaker force than normal gravity.

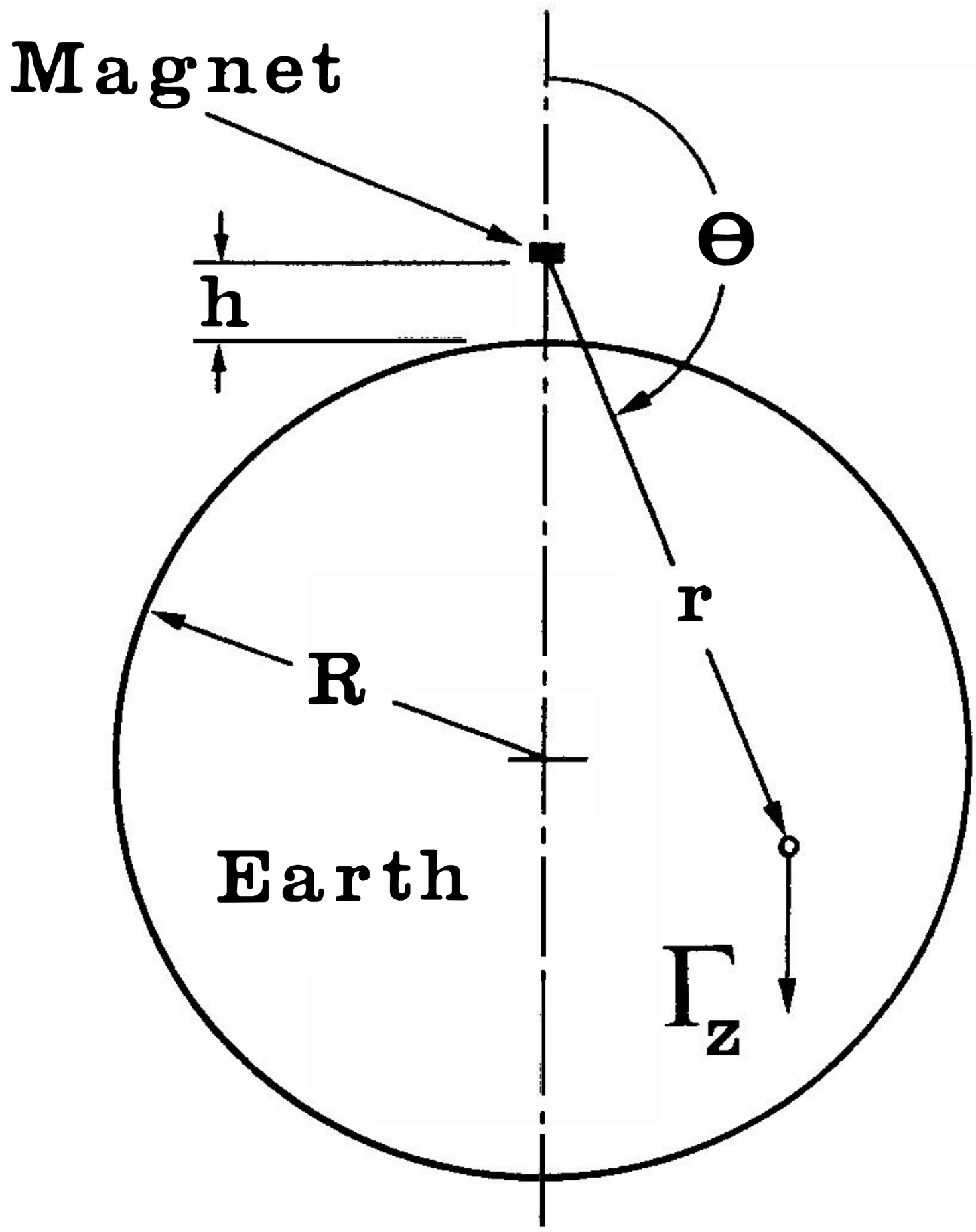

Fig. 4. Coordinate system for evaluating the vertical component of the gravitational dipole field, Γ_z.

2.4. *The Gravitational Force*

The last step in the calculation consists in evaluating the actual force acting on the magnet. To this end Γ_z of Eq. (3) is multiplied by the average density of the earth, ρ_m (rho), ($\rho_m = 5'500\ \mathrm{kg/m^3}$) and integrated over the earth's volume (an integration is a mathematical summation over many small elements). The force F resulting from this is

$$F = -3.16 \times 10^{-14} \frac{R^3}{(R + h)^3} V \frac{\mu}{\mu_0} \frac{dI}{dt} , \tag{4}$$

where R is the earth's radius ($R = 6.378 \times 10^6$ m), and h is the height of the magnet above the earth's surface (cf. Fig. 4).

The main result of integration is the quotient $R^3/(R+h)^3$ in Eq. (4). Its magnitude is nearly equal to unity, because in general h is much

smaller than R. When calculating the normal weight of an object a similar factor appears in the result, but there the denominator equals $(R + h)^2$ instead of $(R + h)^3$. Thus, if R is measured in meters, the quotient in Eq. (4) is about 6 million times smaller than the corresponding factor in ordinary gravity. Equation (4) confirms our suspicion that artificial antigravity is a much weaker force than gravity. Clearly, a fairly strong antigravitational force F can be attained only if the remaining quantities in Eq. (4) are made as large as reasonably possible.

2.5. *Elimination of the Time Dependence*

There now arises a new problem. The current I must be alternating. The simplest alternating current is sinusoidal and corresponds to the expression,

$$I = I_0 \sin \omega t$$
$$\omega = 2\pi f \ . \tag{5}$$

Here I_0 is the maximum current, t is the time, ω (omega) is the angular frequency, and f is the frequency of oscillations. As an example, if f = 100 Hz (1 Hz (Hertz) = 1 oscillation per second) then $\omega = 200\,\pi = 628$ radians/second. According to Eq. (4) the force F is proportional to dI/dt which, with I given by Eq. (5), is

$$\frac{dI}{dt} = I_0\, \omega \cos \omega t \ . \tag{6}$$

When this is substituted into Eq. (4) the extra ω in Eq. (6) increases F substantially. One certainly should be careful not to lose ω again in subsequent mathematical operations. In our example f is equal to 100 Hz, but frequencies in the megahertz (MHz) range can easily be attained (ignoring self–inductance). This will result in very large values for ω, leading to an enormous increase in the antigravitational force F.

Unfortunately, this incease is only an illusion, because $\cos \omega t$ in Eq. (6) alternates between positive and negative values as time progresses, and so does F. If a negative value refers to antigravity, then a positive F is a force in the opposite direction, i.e. gravitational or attractive. As a result, F constantly alternates between an attractive and a repulsive force, whose average value is exactly zero. No sustained flight is possible under those circumstances.

A physical argument shows that no reasonable current can ever lead to

acceptable flight conditions: The upward velocity which F is supposed to impart to the craft is the difference between two velocities: The first is the integral of F/m over time (m = mass of the craft), and the second is the velocity of free fall, gt (g = acceleration due to gravity = 10 m/s^2, t = time in seconds). If the net velocity is to be upwards, then the integral over F/m must be greater than gt. As the integral over F is proportional to I, this implies that the current should at least be proportional to t. But such a requirement is a physical impossibility, for time increases indefinitely, whereas a current may rise for a while, but eventually it has to come down again if no damage is to be done to the apparatus.

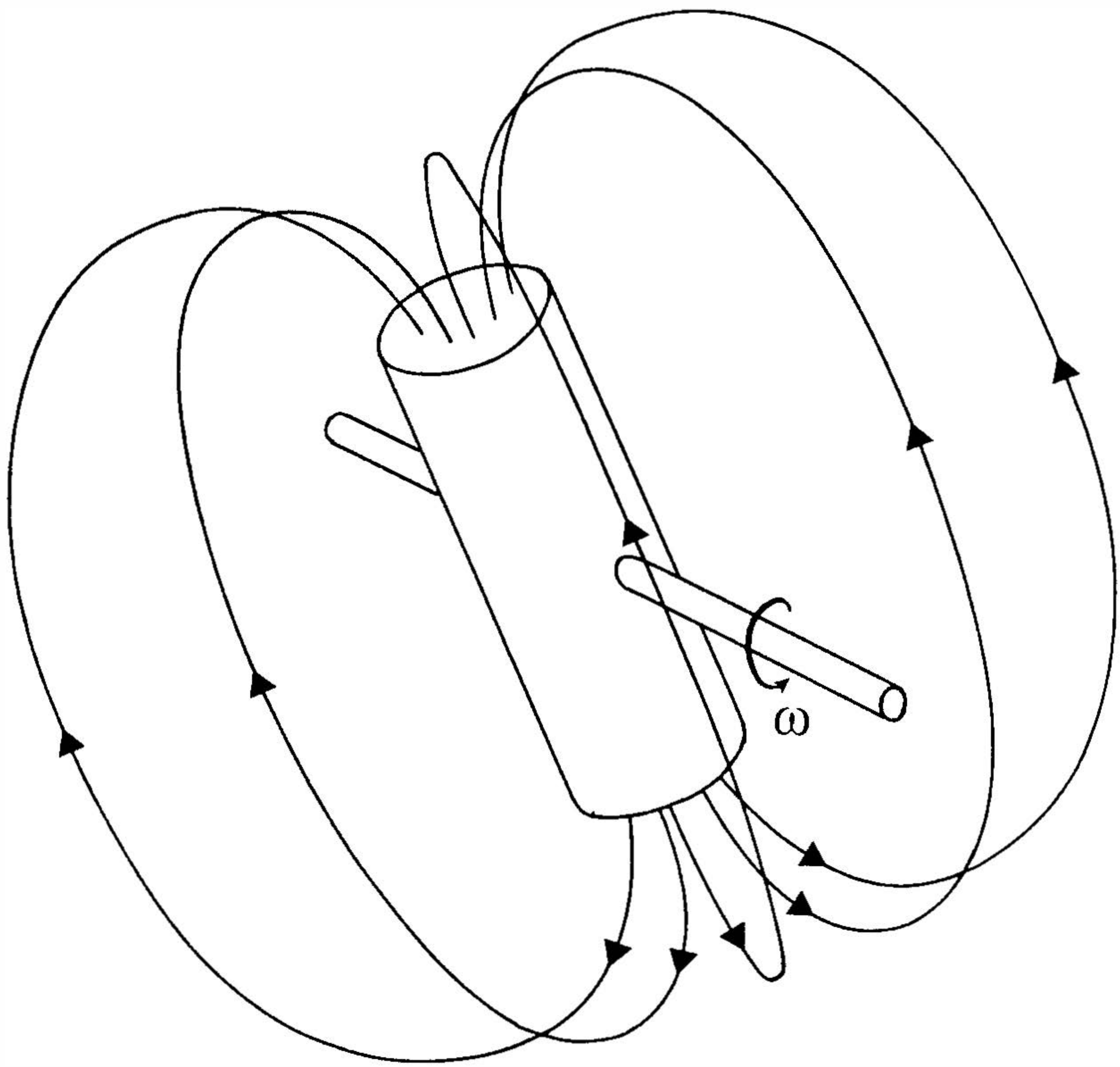

Fig. 5. Rotating magnet with its gravitational field. ω = angular frequency of rotation.

Evidently, it is impossible in principle to support sustained flight with the simple arrangement discussed so far. Brief flights of the craft may be possible during the antigravitational phase of F, followed by a hard landing as F turns gravitational, much to the passengers' discomfort. Moreover, the important factor ω in Eq. (6) is lost again when integrating over F.

Only one solution to the problem has come to mind so far, but hopefully there are others, and perhaps more elegant ones. The solution is to let the magnet rotate about a horizontal axis, together with its gravitational field, as shown in Fig. 5 for the cylinder of Fig. 1a. The rotational frequency must be the same as the current frequency, with the magnet rotating as $\cos \omega t$, i.e. 90° ahead of the sine-current.

As a result of rotation, an additional factor $\cos \omega t$ appears in Eqs. (3) and (4). Together with an $\omega \cos \omega t$ already contributed by dI/dt (cf. Eq. (6)) both the field and the force F now become proportional to $\cos^2 \omega t$,

$$\Gamma_{z'} F \approx \omega \cos^2 \omega t \quad . \tag{7}$$

The square of a number never changes sign, making F always antigravitational. When this F is integrated over time, ω is not lost, and in addition the integral contains a term proportional to t. This is precisely the time dependence needed for overcoming the velocity of free fall.

A second term resulting from the integration is proportional to $(1/\omega) \sin 2\omega t$. This term oscillates with twice the current frequency, but its effect is suppressed by the factor $1/\omega$. The angular frequency ω is restricted to relatively low values, because it has to match the rotational frequency of the magnet. As a result, the relatively slow oscillations may give rise to an uncomfortable vibration of the whole craft.

Another undesirable effect produced by the rotating magnet is a gyroscopic force affecting the craft's manoeuvrability by opposing any change in its direction of flight.

Fortunately, both problems can be solved by a single trick: Instead of using just a single magnet one uses two of them, rotating about the same axis but in opposite directions, as shown in Fig. 6. This immediately eliminates the gyroscope effect. Both magnets rotate with equal angular frequency ω, which must be the same as the current frequency. The second magnet is required to have a definite phase relation with respect to the first: Its axis must be horizontal when the axis of the

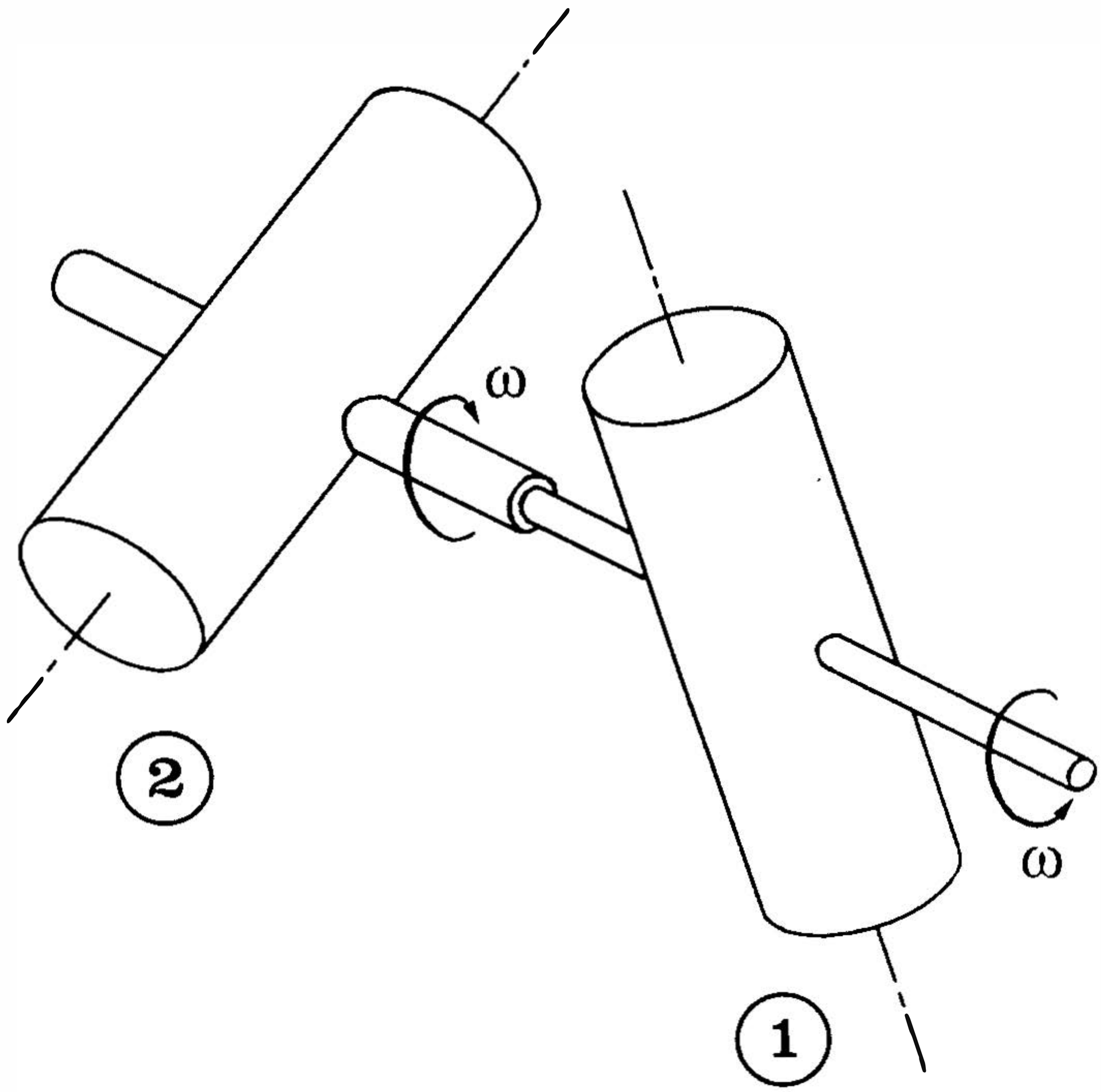

Fig. 6. Two counterrotating magnets.

first magnet is vertical and vertical when the first magnet is horizontal. Furthermore, a cosine current has to flow through the second magnet. As a result of counterrotation, an $\omega\cos^2\omega t$–term is introduced into the field of the first magnet as before, and an $\omega\sin^2\omega t$–term appears in the field of the second. When the two fields are added together the resulting force is proportional to

$$F \approx \omega(\sin^2\omega t + \cos^2\omega t) = \omega \ , \tag{8}$$

because the sum of the squares in Eq. (8) is always equal to unity.

The total antigravitational force now becomes,

$$F = -3.16 \times 10^{-14} \frac{R^3}{(R + h)^3} V \frac{\mu}{\mu_0} I_0 \omega \ . \tag{9}$$

This equation represents the ideal situation, for now F is antigravitational due to the minus–sign in front and entirely independent of time. Being constant, F is ideally suited for counteracting the constant weight of the craft. V in this and all subsequent formulas is the volume of only *one* of the two counterrotating magnets.

3. The Wave Equation

The solution of Eq. (1), represented by Eq. (9), turns out to be relatively simple. It enables one to investigate a number of schemes for eliminating the time dependence without too much effort. However, it is not yet the correct description of antigravity. As will be shown in Section 3.2, it is valid for very low frequencies only. Alternatively, it represents a much more general solution in the limiting case in which the velocity of light becomes infinite. It is this more general solution which leads to the correct expression for the antigravitational force.

It will be recalled that mention was made in the Introduction of *two* equations describing the phenomenon of antigravity. Only one of these has been solved so far. It expresses the fact that a time–dependent magnetic field induces time–dependent gravitational and electric fields. The second equation, which has not yet been solved, states that time–dependent gravitational and electric fields in turn induce a time–dependent magnetic field. The two equations are coupled, since the same fields appear in both. It is, therefore, not permissible to solve just one of them and to ignore the other.

The electric field induced in the first equation and the magnetic field induced in the second indicate that antigravitation is always accompanied by electromagnetic fields. The electric field turns out to be very strong and should result in strong electromagnetic disturbances near the rotating magnets.

The procedure for solving the two equations simultaneously again starts out by omitting the electric field for the same reason as before. Next, the magnetic field is eliminated, leaving a single relation involving the gravitational field alone. It is this equation which really must be solved and it differs substantially from Eq. (1). It turns out to be a wave equation, indicating that the gravitational field propagates away from the magnet in the form of a wave traveling with the speed of light.

The wave nature of the field has a profound effect on the gravitational force, as illustrated schematically in Fig. 7. The arrows along the vertical in Fig. 7 represent the vertical field component. The dotted line in

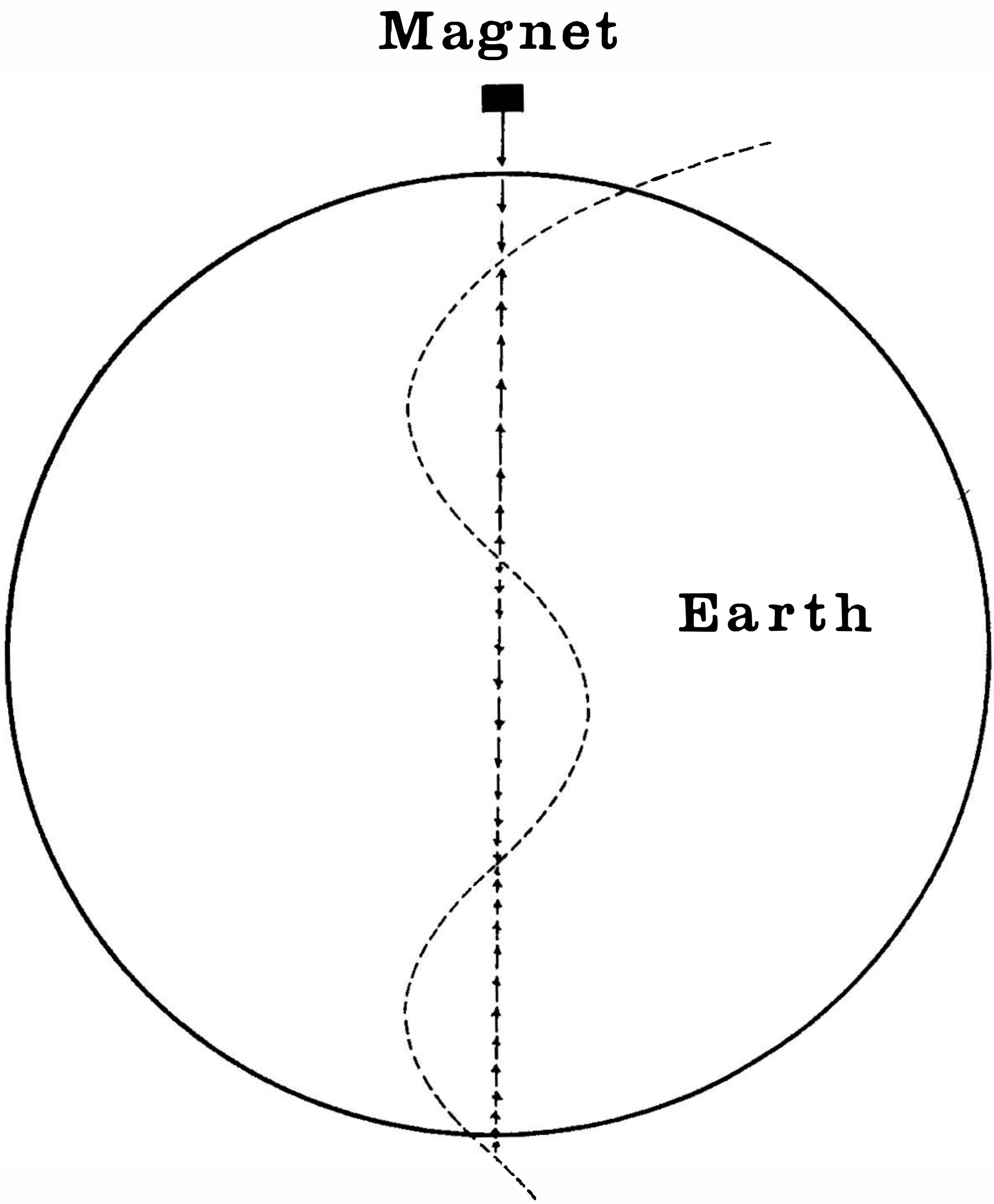

Fig. 7. Schematic view showing the wave nature of the gravitational field.

the form of a wave is merely intended as an optical aid, the actual wave being longitudinal (the wavelength in Fig. 7 is arbitrary). The whole wave pattern flows through the earth with the speed of light. Figure 7 represents a snapshot taken at the instant the antigravitational field (arrows pointing down) has a maximum at the position of the magnet. This fact is indicated by the extra long arrow underneath the magnet and by the large $1/r^3$–rise in amplitude of the dotted curve. At

points farther away from the magnet the arrows become shorter be–cause the field grows weaker due to its $1/r^3$–dependence, and because its wave nature reduces it still further. For the sake of clarity, the $1/r^3$–decrease of the dotted wave is neglected after the initial maximum. At the first node, where the dotted wave crosses the vertical axis, the field is zero. Thereafter it changes sign, becoming gravitational and hence attractive (arrows pointing up). Below the node the field is small at first, then grows larger and finally goes to zero again at the second node. This process is repeated throughout the earth and beyond. On the average, the field becomes weaker and the arrows grow shorter with increasing distance from the magnet due to the inverse–r dependence. The decrease is too rapid for the arrows in Fig. 7 to be drawn to scale.

A second snapshot, taken a fraction of a second later, would reveal a downward shift of the pattern due to its propagation with the speed of light, but again gravitational and antigravitational zones would be present in the earth's interior.

Evidently, attractive and repulsive regions are always present simulta–neously, and this is bound to reduce the antigravitational force relative to its value in Eq. (9). In that equation an antigravitational field was assumed to exist at *every* point inside the earth. The wave equation leads to an approximately similar situation only when the wavelength λ (lambda) is equal to or larger than twice the earth's diameter. In that case the first node lies on or below the earth's circumference on the bottom of the circle in Fig. 7. For very short wavelengths, on the other hand, gravitational and antigravitational zones follow each other at such short intervals that the r–dependence is not effective enough for substantially changing the field strength from one zone to the next. As a consequence, the two opposing forces in adjacent zones are almost equally large and nearly cancel each other. The conclusion is that the antigravitational effect becomes weaker the shorter the wavelength or the higher the frequency.

3.1. *Solution of the Wave Equation*

For the purpose of solving the wave equation a sine current is speci–fied in Eq. (5). The magnet is assumed to be stationary. Only the ver–tical field component is needed and the equation is solved in dipole approximation as before. The resulting vertical field component, Γ_z, is given by

$$\Gamma_z = -\frac{b\mu_0}{16\pi^2} V \frac{\mu}{\mu_0} I_0 \omega \left\{ \frac{3\cos^2\theta - 1}{r^3} \cos(\omega t - kr) - \right.$$

$$\left. - k \frac{3\cos^2\theta - 1}{r^2} \sin(\omega t - kr) + k^2 \frac{\sin^2\theta}{r} \cos(\omega t - kr) \right\} \qquad (10)$$

$$k = \frac{\omega}{c} .$$

It is obvious at a glance that Eq. (10) is much more complicated than Eq. (3). The new Γ_z has 3 terms, and each of them is more complicated than the single term of Eq. (3). Moreover, a new constant, the wave number k, appears in Eq. (10). Since the speed of light, c, is very large ($c = 3 \times 10^8$ m/s), while ω for all reasonable frequencies is relatively small, k is always a very small constant. The occurrence of kr in the trigonometric functions of Eq. (10) is responsible for the wave nature of the field.

The calculations of Section 2 made the implicit assumption that gravitational fields propagate with infinite speed. In the limit when c goes to infinity and k goes to zero in Eq. (10) the result, therefore, is Eq. (3) with dI/dt replaced by $I_0 \omega \cos \omega t$ (cf. Eq. (6)).

The r–dependence of the three terms in Eq. (10) is interesting. The first term depends on $1/r^3$, the second on $1/r^2$, and the third on $1/r$. With increasing r the last two terms decrease much more slowly than the first and should, therefore, contribute more strongly to antigravity. However, since they are multiplied by the small quantities k and k^2 their net contribution at low frequencies is small. It becomes significant only at high frequencies.

Since the current varies sinusoidally, Γ_z is a function of time and so is the force after integration over the earth. With the magnet remaining stationary, the average force again turns out to be zero, confronting us with the same problem as before. This time, however, the formulas are considerably more complicated. It would require a much greater effort to discover ways and means for eliminating the time dependence if a working scheme had not been found on the basis of the first, much simpler solution. In view of its previous success it is natural to try the method of counterrotating magnets a second time. Luckily enough, the method works again, causing ωt to disappear from most of the terms in Γ_z and leading to a completely time–independent vertical component of the antigravitational force. The corresponding expression for Γ_z is given by Eq. (B41) in Appendix B.

As a result of counterrotation the traveling waves are transformed into standing waves. The wave character of the field is retained, with alternating zones of gravitational and antigravitational forces still present in the earth's interior. The zones remain stationary, their extent being governed by the magnitude of k.

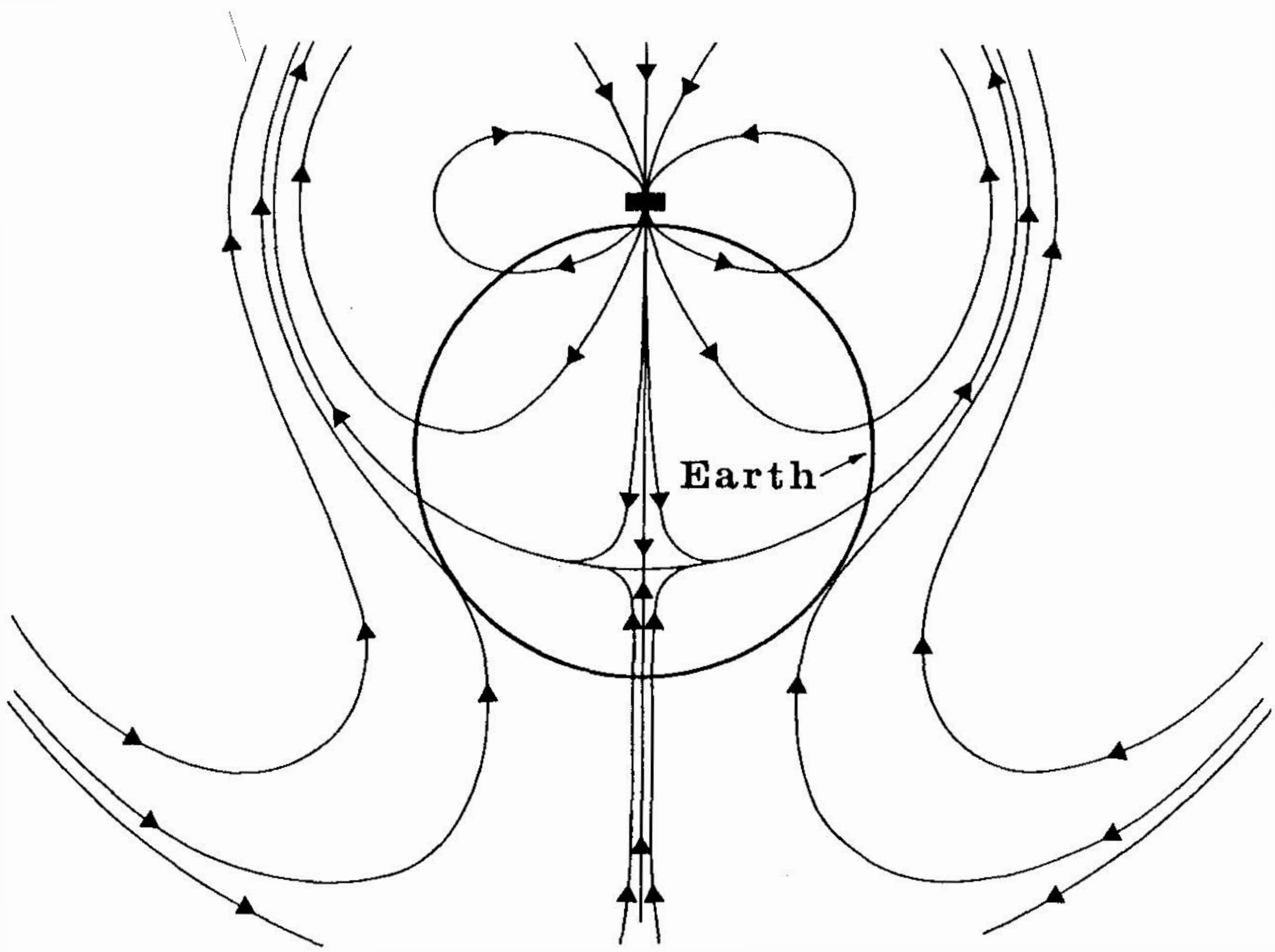

Fig. 8. Field lines in the y–z–plane produced by two magnets counterrotating at a frequency of 13 Hz. The wavelength is 2.30×10^7 m.

The field lines of Figs. 2 and 3 are now no longer correct. At distances r short compared to half a wavelength the field still retains the classical dipole shape shown in Fig. 2, but for large r the field lines change shape completely.

Figure 8 is a plot of the new field lines in a plane passing through the vertical axis and the axis of rotation (the y–z–plane). The inner zone, lying within the first circular field line, is essentially repulsive, i.e. antigravitational, as indicated by the arrows. Note that the region where the arrows point down is much narrower, and the regions where they point up are much wider, than in Fig. 2. The figure is drawn to

scale for a wavelength $\lambda = 2.30 \times 10^7$ m, corresponding to the numerical example of the following section. The zone between the first circular field line and the second, partially drawn one, is essentially gravitational but lies mostly outside the earth's volume.

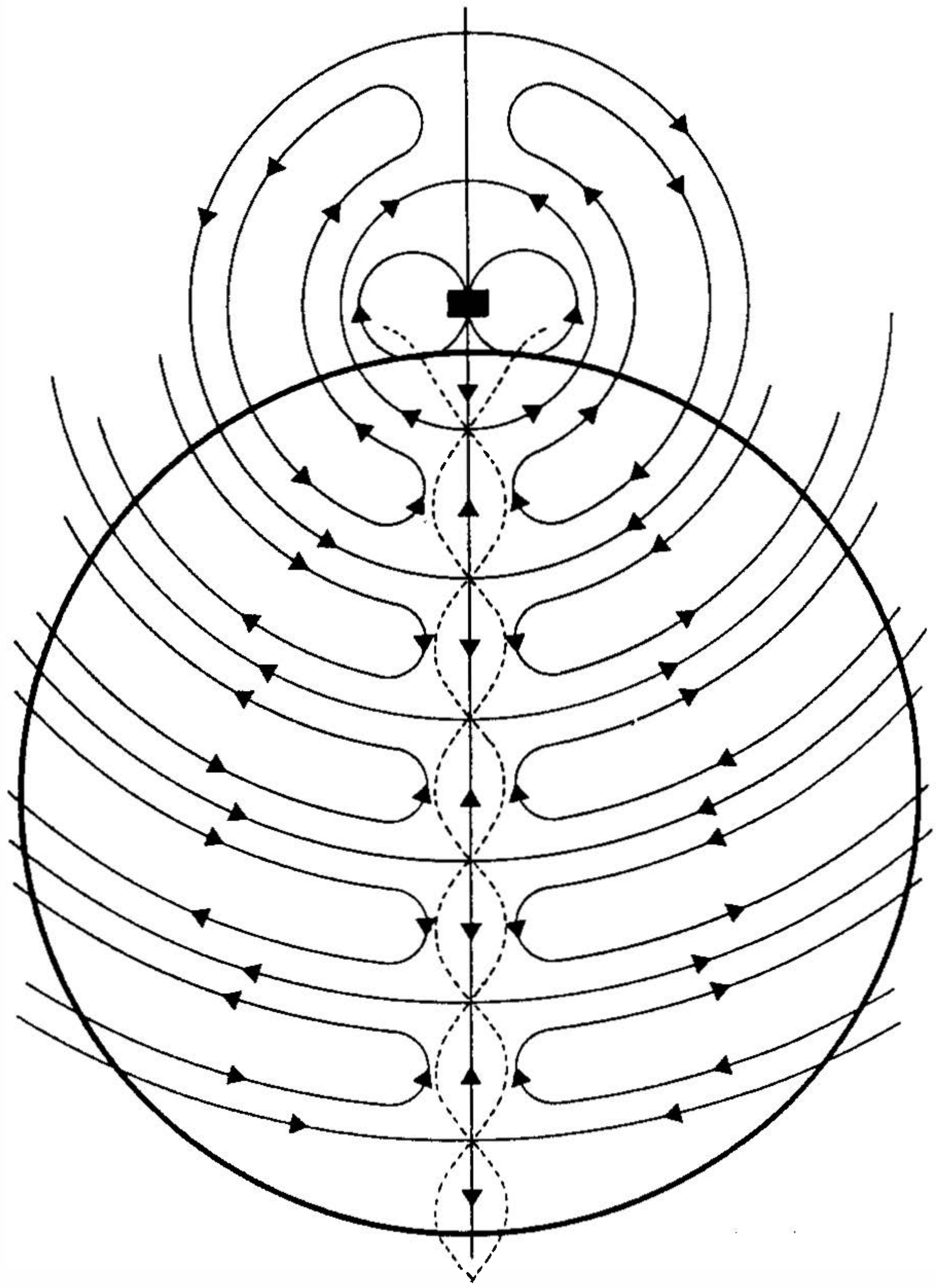

Fig. 9. Schematic view of gravitational field lines in the y–z–plane due to magnets counterrotating at 75 Hz. The wavelength is 4.0×10^6 m.

Figure 9 is a similar view of the situation when the wavelength is short. Several zones, each bounded by a circular field line, extend through the earth's interior. Gravitational and antigravitational regions alternate from one annular zone to the next, as indicated by the arrows along the vertical, although no zone is entirely repulsive or entirely attractive. The dotted curves symbolize a standing wave. Its $1/r^3$–dependence is neglected except for the steep rise near the magnet.

3.2. *The Antigravitational Force*

The final step consists, as before, in multiplying Γ_z, Eq. (B41), by the average density ρ_m and integrating the product over the earth's volume. In the result, D, the earth's diameter ($D = 1.2757 \times 10^7$ m), turns out to be a more useful parameter than the radius R. The integral contains several terms proportional to D^3, analogous to R^3 in Eq. (9), but they all cancel, leaving terms at most proportional to D^2. This results in an unfortunate loss of a factor D (about 13 million) in the formula for the antigravitational force. All terms remaining in the result are proportional either to $1/k$, $1/k^2$, or $1/k^3$. It follows that the antigravitational effect decreases with increasing k or, since k is proportional to ω, with increasing frequency or decreasing wavelength. This is precisely the effect predicted on the basis of Fig. 7.

However, the picture is not yet complete, because Eq. (B41) contains an additional ω in front of the curly brackets. After multiplying through by it the various terms in the formula for F become constant, proportional to $1/k$, and proportional to $1/k^2$, respectively. Furthermore, since $\omega/k = c$, the velocity of light, c, appears in the numerator of F. The result is a gain of $c = 3 \times 10^8$ m/s compared to a loss of $D = 1.2757 \times 10^7$ m, leading to a net gain of 23.5 s^{-1}. This may not be much, but the antigravitational force is so weak that every power of 10 counts.

Integration over the earth results in the following expression for F:

$$F = -3.555 \times 10^{-6}\, V \frac{\mu}{\mu_0} I_0\, g(k,h) \tag{11}$$

$$g(k,h) = \frac{1}{(R+h)^3}\Big\{-D(D+2h)\big[\sin kh + \sin k(D+h)\big] + \frac{4}{k}\big[h\cos kh - (D+h)\cos k(D+h)\big] - \frac{4}{k^2}\big[\sin kh - \sin k(D+h)\big]\Big\} .$$

The minus–sign in front of the formula for F makes the force antigravitational when g(k,h) is positive.

The dependence of g(k,h) on h is so weak up to, say, h = 100 km that g(k,h) may be regarded as essentially independent of h up to that height. Its dependence on the wave number k for low frequencies is illustrated in Fig. 10. Both scales in the figure are enlarged by a factor 10^7. g(k,h) and k are actually of order 10^{-7}.

In Fig. 10 positive values of g(k,h) lead to antigravitation, negative ones to gravitation. When $k = 0$, i.e. at zero frequency, the effect vanishes and F is zero. Very close to $k = 0$ the force has the form of Eq. (9), which is thus seen to be valid at very low frequencies only. As k and the frequency increase, g(k,h) reaches a first antigravitational maximum at $k = 2.73 \times 10^7\ m^{-1}$ when the wavelength λ is 2.30×10^7 m or close to twice the earth's diameter. At higher frequencies g(k,h) decreases rapidly until it is zero again. As k keeps increasing, g(k,h) changes sign and becomes gravitational, reaching a negative maximum and then again going to zero at $k = 7 \times 10^7\ m^{-1}$. This oscillation continues indefinitely.

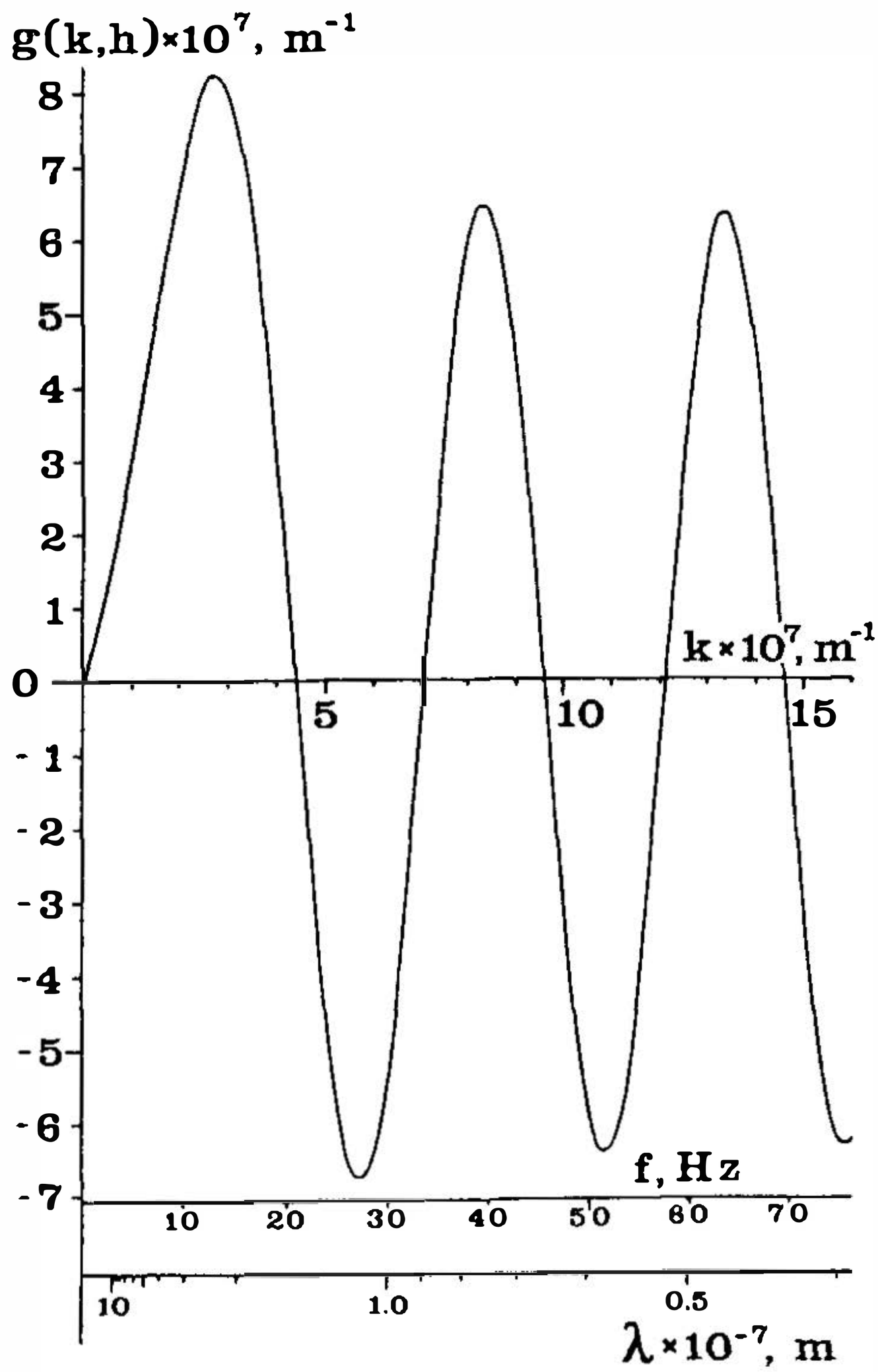

Fig. 10. The function g(k,h), Eq. (11), for $h \leq 100$ km plotted against wave number k, frequency f, and wavelength λ.

Except at extremely small values of k the expression in the first set of square brackets in Eq. (11) dominates the rest of g(k,h) because it is multiplied by the large factor $D(D + h)$. It is composed of two sine–

functions. The first of these, sinkh, oscillates slowly as a function of k (or ω) while the second, sink(D + h), oscillates rapidly. g(k,h) thus consists of a rapidly oscillating function superimposed on a slowly oscillating one, as illustrated in Fig. 11 for h = 2'500 km. The dotted line in the figure represents the slow oscillation. Apart from the first maximum at $k = 2.08 \times 10^{-7}\ m^{-1}$, the antigravitational maxima in the curve occur at approximately $k \approx 3\pi/2h$, $7\pi/2h$, $11\pi/2h$, etc., or generally at $k \approx (4n + 3)\pi/2h$, $n = 0, 1, 2, \ldots$ These maxima are higher than the first maximum by a factor that is weakly dependent on h but in general is greater than 1.5. Note that the peak waves are almost entirely either in the gravitational or the antigravitational domain.

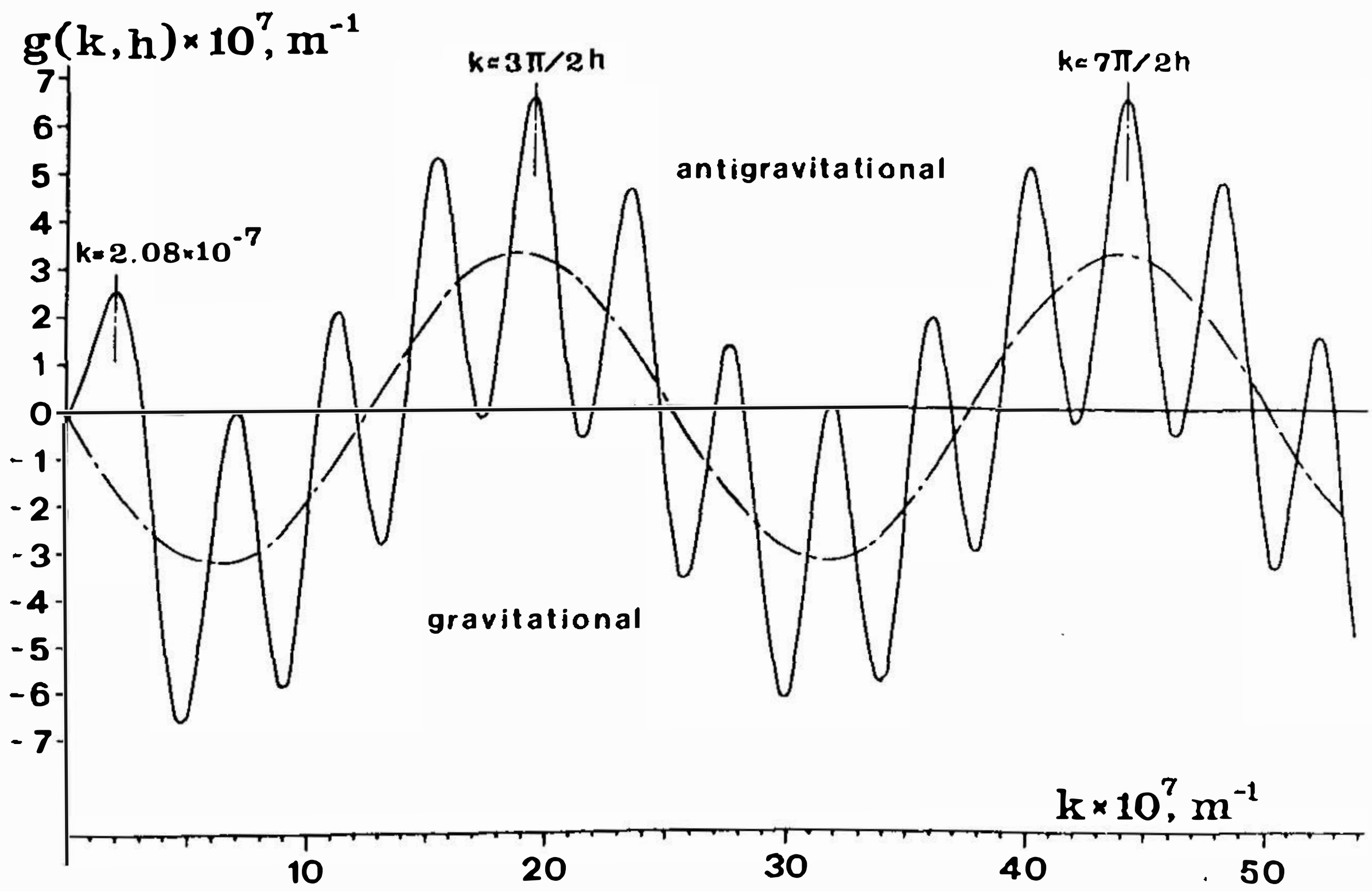

Fig. 11. The function g(k,h), Eq. (11), with h = 2'500 km, plotted against wave number k.

Originally, Eq. (9) led one to believe that F would rise indefinitely with growing frequency. Actually, as mentioned above, Eq. (9) is only valid for very low frequencies (or very small values of k) near zero. At higher frequencies, Eq. (11) is the correct expression for the antigravitational force. It demonstrates the impossibility of increasing F substantially by increasing the angular frequency ω. A modest increase by a factor between 1.5 and 2.5 may be achieved relative to the first

peak by operating at $k \approx 3\pi/2h$ ($\omega \approx 3\pi c/2h$) or at peaks belonging to still higher frequencies, as shown in Fig. 11, but rotating magnets limit ω to fairly low values for mechanical reasons. Moreover, at its optimum value of $\omega = 3\pi c/2h$ the antigravitational force is very sensititve to small deviations of ω from the optimum. When $h = 2'500$ km, as in Fig. 11, a deviation of 5% from the optimum ω reduces the force by a factor 2. The same reduction occurs in the case of $h = 10$ km when ω varies by no more than 0.026%. Only the first peak is insensitive to variations in ω and has the further advantage of mechanical stability due to low rotational speed.

A numerical example will conclude this section. In view of the smallness of the gravitational force all factors in Eq. (11) should be made as large as possible. The values chosen for the example are,

$$V = 1\ m^3$$

$$\frac{\mu}{\mu_0} = 100'000 \tag{12}$$

$$I_0 = 600'000 \text{ ampere turns} .$$

The value of μ/μ_0 is high, but highly permeable materials are available today. I_0 is calculated on the basis of 60 amps per wire of 1 square millimeter cross–sectional area and 10'000 windings. Due to saturation effects in the permeable material the high value of μ/μ_0 is not really compatible with the large number of ampere turns, I_0. However, when dealing with the futuristic topic of antigravity one may, perhaps, be allowed to use values representing an extrapolation into the future.

Substituting the numbers of Eq. (12) into Eq. (11) gives,

$$F = -2.13 \times 10^5\ g(k,h) . \tag{13}$$

For g(k,h) it is best to choose the first maximum reached at a frequency of 13.03 Hz (cf. Fig. 10). This frequency of rotation is attainable even by large magnets. The maximum of the g–function at $h = 100$ m and $k = 2.73 \times 10^{-7}\ m^{-1}$, corresponding to a frequency of 13.03 Hz, is (cf. Fig. 10),

1st maximum: $$g(k,h) = 8.193 \times 10^{-7}\ m^{-1} . \tag{14}$$

When this figure is substituted into Eq. (13) the final result is,

$$F = 0.175 \text{ Newton} \tag{15}$$

or

$$F = 17.5 \text{ gram–weight} . \tag{16}$$

Thus, the antigravitational force at the first maximum is capable of lifting a total of 17.5 grams (0.617 oz). The optimum g, reached at $k = 4.7133 \times 10^{-2}\ m^{-1}$ or $f = 2.25$ MHz, equals $1.254 \times 10^{-6}\ m^{-1}$, leading to an optimum antigravitational force of 0.267 Newton or 26.7 grams (0.942 oz).

4. The Gravitational and Electromagnetic Fields

Underneath the rotating magnets the vertical component of the gravitational field is approximately equal to

$$\Gamma_z \approx \frac{6.73 \times 10^{-6}}{r^3} \text{ Newton/kg} . \tag{17}$$

If F in Eq. (16) could be increased to, say, 10 metric tons, which may be regarded as the approximate weight of a small aircraft, this would mean an increase of both F and Γ_z by a factor of 5.72×10^5, leading to an antigravitational field

$$\Gamma_z \approx \frac{3.85}{r^3} \text{ Newton/kg} . \tag{18}$$

The acceleration due to gravity is 10 Newton/kg, so that the field would increase the weight of any mass at a distance of $r = 1$ meter by 38.5%. An upward acceleration would need a field considerably in excess of this.

The stability of the vehicle may be a problem because of a possible tendency to turn upside down under the action of the antigravitational dipole field. A similar effect has been observed in terrestrially built flying discs such as the Avro Car, constructed by the Avro–Canada Co. in the 1950's. The instability may be eliminated by mounting, say, 3 or 4 small rotating magnets at the corners of a triangle or a square along the periphery of the craft, controlling the tilt and compensating any deviation from level flight.

As mentioned in Section 3, a strong electric field attends the induced gravitational field. With the numerical values of Eq. (12) and $f = 13.03$

Hz the electric field E underneath the craft has a magnitude approximately equal to

$$E \approx \frac{78'000}{r^3} \text{ Volt/m} . \tag{19}$$

Its direction is everywhere parallel to the gravitational field. For this reason it should be possible to focus a microwave gravitational field by focussing an electromagnetic microwave field.

If it were possible to increase F by a factor of 5.72×10^5 the electric field would increase by the same factor to

$$E \approx \frac{4.46 \times 10^{10}}{r^3} \text{ volt/m} . \tag{20}$$

Since 3 million volts/meter suffice to ionize air, such a field would lead to very strong air ionization, resulting in a brilliant glow underneath and perhaps around the craft. E decreases as $1/r^3$ for small k and r, so that the field strength falls below the ionization limit at a distance of only about 24 m.

The magnetic field outside the core, being proportional to k^2, is insignificant at low frequencies, but at the optimum frequency of 2.25 MHz its strength at a distance of 1 meter is about 1'000 Gauss. It is induced by the electro–gravitational fields and falls off as $1/r^2$. Its direction is everywhere perpendicular to the electric field.

The mesofield mentioned in the Introduction has never been observed in nature, perhaps due to its extremely weak interaction with matter. On the basis of the figures in Eq. (12) it turns out to be relatively strong, but the force it exerts on any mass is still vanishingly small, even after multiplication by 5.72×10^5. In principle, the mesofield could contribute to antigravity, but the mesofield generated by the magnets of Figs. 1 and 6 does not have the right orientation.

5. Conclusions

The theory outlined in the present study has demonstrated the feasibility of generating antigravity by means of time–dependent magnetic fields, albeit of very modest strength. Basically, this was to be expected, since otherwise the effect would have been detected long ago.

The smallness of induced antigravitation may be disappointing, but it is

due in large measure to purely technological inadequacies, which some day may be overcome. New concepts could be instrumental in bringing sufficiently strong antigravitation within reach of a future technology. Electronic generation of standing antigravitational waves and the elimination of all iron cores certainly would be steps in that direction. The existence of a mathematical theory at any rate helps to eliminate guesswork and provides a basis for testing new ideas.

Some phenomena predicted by the theory correspond to effects actually observed in the vicinity of UFOs, assuming them capable of generating antigravitational fields strong enough to lift several tons. An antigravitional field is repulsive and pushes down on any object underneath the UFO. The field will bend down trees, bushes, and grasses as a UFO passes over them at low altitude. Similarly, when flying over a lake the field will cause a depression in the surface of the water. The effects have a short range due to the field's $1/r^3$–dependence and are not noticeable some distance away from the UFO. In contrast, the antigravitational force lifting the UFO has a very long range.

Of particular significance is the generation of an electric field together with the antigravitational field. If the latter is strong enough to lift a UFO, then the electric field is strong enough to ionize the surrounding air, causing a brilliant glow in the region where the field exceeds the ionization limit. Radio and television interference, dark rings around UFOs viewed through polaroid sunglasses (Roush 1968), and the prickly feeling sometimes reported by observers standing close to a UFO are further indications of the presence of a strong electric field.

When a UFO and its fields move rapidly past a stationary observer additional effects appear due to the relativistic invariance of the basic equations. The most significant of these is a magnetic pulse produced by the passing electric field. If the latter is given by Eq. (20), then the magnetic pulse has a peak strength of $v\,E/c^2$ (v = velocity of the UFO). This is not very much but still stronger than the magnetic field induced directly by the slowly rotating magnets.

As shown in Appendix B, the gravitational and electric fields generated by two counterrotating magnets have time–dependent as well as time–independent components, resulting from forming the sums and differences, $\omega t \pm \omega t$, of the rotational frequencies multiplied by the time. The time–dependent terms, therefore, oscillate with twice the frequency of rotation, or $2\omega t$ (see also Section 2.5). The most useful frequency was shown to be 13 Hz, leading to an oscillation of 26 Hz for the time–dependent field components, with a possible first harmonic at 39 Hz. Frequencies of 27 and 37 Hz have actually been observed (Schneider

1981, p.207).

The well–known vehicle interference effects caused by UFOs might be due to electric leakage fields penetrating into the space under the hood, which never is a perfect Faraday cage. Hood and chassis do not provide shielding against the gravitational field which, once inside, would induce very strong electric fields. Actually, though, the suppression of electric fields inside a Faraday cage probably goes hand in hand with a corresponding reduction of the gravitational field.

The magnetic field induced by the electro–gravitational fields at low rotational speeds is too weak to cause any measurable effects. The magnetic pulse induced relativistically by the electric field of a passing UFO might affect a compass needle but would hardly have any more significant consequences.

Clearly, there exists a considerable discrepancy between the strength of antigravitation available today and the requirement of lifting several tons. The figures of Eq. (12) are, after all, very optimistic. In reality, they may be too large by a factor of 10 or even 100. This would mean the need for increasing antigravitational forces by some 6 to 7 orders of magnitude above today's capabilities. No doubt this is a formidable task, but much room still remains for further development and improvement within the framework of the theories presented in this report or by Heim (1959).

The new effects predicted by the theory – antigravity is only one of them – are near the limit of measurability, so that experimental verification is difficult to accomplish. Some experiments have been suggested (Heim 1985, Auerbach 1983, 1985, Harasim et al. 1985), but so far none of them have been carried out. Perhaps the prospect of achieving practical results might serve as an inducement for performing an experiment in the not too distant future.

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Appendix A

In this appendix a set of equations is derived describing a 4–dimensional unified field theory of gravitation and electromagnetism. The derivation is based entirely on Heim's concepts as presented in the first volume of "Elementarstrukturen der Materie" (Heim 1989) and in a number of articles by I. von Ludwiger (1976, 1981). In his writings, Heim never presents either an explicit derivation of the equations or the equations themselves. Hence the need for deriving them in this appendix. Various remarks in Heim's book are used as guides in the process. Actually, though, Heim's theory is 6–dimensional, and a 4–dimensional version is at best an approximation. The results are presented nevertheless, since nothing else is available at the moment.

The basis of the derivation is an analogy between the gravitational field equations and Maxwell's equations. The two systems have different metrics, so that one coordinate transformation leaves Maxwell's equations invariant, while another leaves the gravitational equations invariant. Both systems of equations are represented by tensor divergences, and the idea is to find a linear combination of gravitational and electromagnetic tensor components which remain invariant under a combined coordinate transformation in Minkowski space.

1. *Maxwell's Equations*

Maxwell's equations in vacuum may be written in the following symmetric form:

$$\nabla \cdot \sqrt{\varepsilon_0}\,\mathbf{E} = c\sqrt{\mu_0}\,\rho_e \tag{A1a}$$

$$\nabla \times \sqrt{\varepsilon_0}\,\mathbf{E} = -\frac{1}{c}\frac{\partial}{\partial t}\sqrt{\mu_0}\,\mathbf{H} \tag{A1b}$$

$$\nabla \cdot \sqrt{\mu_0}\,\mathbf{H} = 0 \tag{A1c}$$

$$\nabla \times \sqrt{\mu_0}\,\mathbf{H} = \sqrt{\mu_0}\,\mathbf{j}_e + \frac{1}{c}\frac{\partial}{\partial t}\sqrt{\varepsilon_0}\,\mathbf{E} \tag{A1d}$$

$$\sqrt{\varepsilon_0\mu_0} = \frac{1}{c}\ . \tag{A1e}$$

In addition, one has to satisfy the equation of continuity,

$$\nabla \cdot \mathbf{j}_e + \frac{\partial \rho_e}{\partial t} = 0\ , \tag{A2}$$

and the Lorentz force density in vacuum,

$$\mathbf{f}_e = \rho_e(\mathbf{E} + \mathbf{v} \times \mu_0 \mathbf{H}) \ . \tag{A3}$$

The index e in these equations stands for "electrical".

The system of equations (A1)–(A3) may be represented by the divergences of an antisymmetric tensor $T_e^{\mu\nu}$, a source s_e^μ, the dual tensor $^*T_e^{\mu\nu}$, and the dual source q_e^μ:

$$T_e^{\mu\nu} = \begin{pmatrix} 0 & \sqrt{\mu_0}\,H_z & -\sqrt{\mu_0}\,H_y & -i\sqrt{\varepsilon_0}\,E_x \\ -\sqrt{\mu_0}\,H_z & 0 & \sqrt{\mu_0}\,H_x & -i\sqrt{\varepsilon_0}\,E_y \\ \sqrt{\mu_0}\,H_y & -\sqrt{\mu_0}\,H_x & 0 & -i\sqrt{\varepsilon_0}\,E_z \\ i\sqrt{\varepsilon_0}\,E_x & i\sqrt{\varepsilon_0}\,E_y & i\sqrt{\varepsilon_0}\,E_z & 0 \end{pmatrix} \tag{A4}$$

$$s_e^\mu = \left[\sqrt{\mu_0}\,j_{ex},\ \sqrt{\mu_0}\,j_{ey},\ \sqrt{\mu_0}\,j_{ez},\ ic\sqrt{\mu_0}\,\rho_e\right] \tag{A5}$$

$$^*T_e^{\mu\nu} = \begin{pmatrix} 0 & -i\sqrt{\varepsilon_0}\,E_z & i\sqrt{\varepsilon_0}\,E_y & \sqrt{\mu_0}\,H_x \\ i\sqrt{\varepsilon_0}\,E_z & 0 & -i\sqrt{\varepsilon_0}\,E_x & \sqrt{\mu_0}\,H_y \\ -i\sqrt{\varepsilon_0}\,E_y & i\sqrt{\varepsilon_0}\,E_x & 0 & \sqrt{\mu_0}\,H_z \\ -\sqrt{\mu_0}\,H_x & -\sqrt{\mu_0}\,H_y & -\sqrt{\mu_0}\,H_z & 0 \end{pmatrix} \tag{A6}$$

$$q_e^\mu = [0,\ 0,\ 0,\ 0] \ . \tag{A7}$$

The 6 equations (A1a)–(A3) are obtained from the following operations on the tensors and sources of Eqs. (A4)–(A7):

$$\frac{\partial}{\partial x_e^\nu} T_e^{\mu\nu} = s_e^\mu \qquad \text{leads to Eqs. (A1a) and (A1d)} \tag{A8a}$$

$$\frac{\partial}{\partial x_e^\nu} {}^*T_e^{\mu\nu} = q_e^\mu \qquad \text{leads to Eqs. (A1b) and (A1c)} \tag{A8b}$$

$$\frac{\partial}{\partial x_e^\mu} s_e^\mu = 0 \qquad \text{leads to Eq. (A2)} \tag{A8c}$$

$$f_e^j = T_e^{j\nu} s_e^\nu \qquad \text{leads to Eq. (A3)} \ . \tag{A8d}$$

Greek indices run from 1 to 4, Latin ones from 1 to 3. The summation convention is used throughout, except where stated. The 4 values of x_e^μ are,

$$x_e^1 = x, \quad x_e^2 = y, \quad x_e^3 = z, \quad x_e^4 = ict \ . \tag{A9}$$

Maxwell's equations are valid in Minkowski space, which Heim denotes by R_{-4} (Heim 1989). Its coordinates are given in Eq. (A9). The equations above are invariant under a Lorentz transformation, i.e. if the transformed coordinates are given by

$$\bar{x}_e^\mu = A_{e\mu\nu} x_e^\nu \tag{A10}$$

and vice versa,

$$x_e^\mu = A_{e\mu\nu}^{-1} \bar{x}_e^\nu \ , \tag{A11}$$

then $A_{e\mu\nu}$ and $A_{e\mu\nu}^{-1}$ are elements of the following 4×4 matrices:

$$A_e = \begin{bmatrix} \gamma_- & 0 & 0 & i\frac{v}{c}\gamma_- \\ 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & 0 \\ -i\frac{v}{c}\gamma_- & 0 & 0 & \gamma_- \end{bmatrix}, \quad A_e^{-1} = \begin{bmatrix} \gamma_- & 0 & 0 & -i\frac{v}{c}\gamma_- \\ 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & 0 \\ i\frac{v}{c}\gamma_- & 0 & 0 & \gamma_- \end{bmatrix} \tag{A12}$$

with

$$\gamma_- = \frac{1}{\sqrt{1 - \frac{v^2}{c^2}}} \tag{A13}$$

for a translation in the x–direction. The matrix products are $A_e^{-1} A_e = A_e A_e^{-1} = \mathbf{I}$ (unit matrix), or

$$A_{e\mu\lambda} A_{e\lambda\nu}^{-1} = A_{e\mu\lambda}^{-1} A_{e\lambda\nu} = \delta_{\mu\nu} \ . \tag{A14}$$

Heim denotes the transformation matrix A_e by $\hat{A}_-$.

2. *The Gravitational Equations*

The gravitational equations are similar in form to Maxwell's equations. The gravitational vector $\alpha\Gamma$, where Γ is the gravitational field, corresponds to the electric displacement vector in vacuum, $\mathbf{D} = \varepsilon_0\mathbf{E}$. The magnetic induction in vacuum, $\mathbf{B} = \mu_0\mathbf{H}$, is replaced by the vector $\beta\boldsymbol{\mu}$, where $\boldsymbol{\mu}$ is the gravitational mesofield, whose relation to Γ is similar to the relation of $\mathbf{H}$ to $\mathbf{E}$. According to Heim, the gravitational equations are valid in R_{+4}, which differs from R_{-4} in that $x_4 = \omega t$ and not ict. ω is an as yet undetermined velocity, which obeys the relation,

$$\omega = \frac{1}{\sqrt{\alpha\beta}} \; . \tag{A15}$$

This results in a change of sign on the right-hand side of the gravitational equation whose equivalent is Eq. (A1b). Finally, $\beta\boldsymbol{\mu}$ differs from $\mathbf{B}$ in having as source the field mass density $\rho_m - \rho_{m0}$, while $\mathbf{B}$ is source-free due to the non-existence of magnetic monopoles.

With these changes and analogies the gravitational equations in Heim's symmetric notation become (v. Ludwiger 1975),

$$\nabla\cdot\sqrt{\alpha}\,\Gamma = \omega\sqrt{\beta}\,\rho_m \tag{A16a}$$

$$\nabla\times\sqrt{\alpha}\,\Gamma = \frac{1}{\omega}\frac{\partial}{\partial t}\sqrt{\beta}\,\boldsymbol{\mu} \tag{A16b}$$

$$\nabla\cdot\sqrt{\beta}\,\boldsymbol{\mu} = \sqrt{\beta}\,\omega(\rho_m - \rho_{m0}) \tag{A16c}$$

$$\nabla\times\sqrt{\beta}\,\boldsymbol{\mu} = \sqrt{\beta}\,\mathbf{j}_m + \frac{1}{\omega}\frac{\partial}{\partial t}\sqrt{\alpha}\,\Gamma \; . \tag{A16d}$$

Here the subscript m stands for "mass", ρ_m is the total mass density, ρ_{m0} is the particle mass density, and $\mathbf{j}_m$ is the mass current density. Added to this is the continuity equation

$$\nabla\cdot\mathbf{j}_m + \frac{\partial\rho_m}{\partial t} = 0 \; . \tag{A17}$$

The force density will be derived from the tensor relations.

The tensors and sources whose divergences lead to Eqs. (A16a)–(A17) are

$$T_g^{\mu\nu} = \begin{bmatrix} 0 & \sqrt{\beta}\,\mu_z & -\sqrt{\beta}\,\mu_y & -\sqrt{\alpha}\,\Gamma_x \\ -\sqrt{\beta}\,\mu_z & 0 & \sqrt{\beta}\,\mu_x & -\sqrt{\alpha}\,\Gamma_y \\ \sqrt{\beta}\,\mu_y & -\sqrt{\beta}\,\mu_x & 0 & -\sqrt{\alpha}\,\Gamma_z \\ \sqrt{\alpha}\,\Gamma_x & \sqrt{\alpha}\,\Gamma_y & \sqrt{\alpha}\,\Gamma_z & 0 \end{bmatrix} \tag{A18}$$

$$s_g^{\mu} = [\sqrt{\beta}\,j_{mx},\ \sqrt{\beta}\,j_{my},\ \sqrt{\beta}\,j_{mz},\ \ \omega\sqrt{\beta}\,\rho_m]\ . \tag{A19}$$

$$^*T_g^{\mu\nu} = \begin{pmatrix} 0 & -\sqrt{\alpha}\,\Gamma_z & \sqrt{\alpha}\,\Gamma_y & \sqrt{\beta}\,\mu_x \\ \sqrt{\alpha}\,\Gamma_z & 0 & -\sqrt{\alpha}\,\Gamma_x & \sqrt{\beta}\,\mu_y \\ -\sqrt{\alpha}\,\Gamma_y & \sqrt{\alpha}\,\Gamma_x & 0 & \sqrt{\beta}\,\mu_z \\ -\sqrt{\beta}\,\mu_x & -\sqrt{\beta}\,\mu_y & -\sqrt{\beta}\,\mu_z & 0 \end{pmatrix} \tag{A20}$$

$$q_g^{\mu} = [0,\ 0,\ 0,\ -\omega\sqrt{\beta}(\rho_m - \rho_{m0})]\ . \tag{A21}$$

The subscript g stands for "gravitational".

The relations leading to the gravitational equations above are

$$\frac{\partial}{\partial x_g^{\nu}} T_g^{\mu\nu} = s_g^{\mu} \quad \text{leads to Eqs. (A16a) and (A16d)} \tag{A22a}$$

$$\frac{\partial}{\partial x_g^{\nu}}\, ^*T_g^{\mu\nu} = q_g^{\mu} \quad \text{leads to Eqs. (A16b) and (A16c)} \tag{A22b}$$

$$\frac{\partial}{\partial x_g^{\mu}} s_g^{\mu} = 0 \quad \text{leads to Eq. (A17)}\ . \tag{A22c}$$

In analogy to Eq. (A8d) the force density is derived from the relation

$$f_g^{j} = T_g^{j\nu} s_g^{\nu}\ , \tag{A22d}$$

resulting in the expression

$$\mathbf{f}_g = \rho_m(-\Gamma + \mathbf{v}\times\beta\boldsymbol{\mu})\ . \tag{A23}$$

In the equations above,

$$x_g^1 = x, \quad x_g^2 = y, \quad x^3{}_g = z, \quad x_g^4 = \omega t \ . \tag{A24}$$

The coordinates transform as

$$\bar{x}_g^\mu = A_{g\mu\nu} x_g^\nu \tag{A25a}$$

$$x_g^\mu = A_{g\mu\nu}^{-1} \bar{x}_g^\nu \ , \tag{A25b}$$

with the transformation matrices given by

$$A_g = \begin{bmatrix} \gamma_+ & 0 & 0 & \frac{v}{\omega}\gamma_+ \\ 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & 0 \\ -\frac{v}{\omega}\gamma_+ & 0 & 0 & \gamma_+ \end{bmatrix}, \quad A_g^{-1} = \begin{bmatrix} \gamma_+ & 0 & 0 & -\frac{v}{\omega}\gamma_+ \\ 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & 0 \\ \frac{v}{\omega}\gamma_+ & 0 & 0 & \gamma_+ \end{bmatrix} \tag{A26}$$

and

$$\gamma_+ = \frac{1}{\sqrt{1 + \frac{v^2}{\omega^2}}} \tag{A27a}$$

$$A_{g\mu\lambda} A_{g\lambda\nu}^{-1} = A_{g\mu\lambda}^{-1} A_{g\lambda\nu} = \delta_{\mu\nu} \ . \tag{A27b}$$

Heim denotes the A_g–matrix by $\hat{A}_+$.

3. *The Unified Field Tensor* $T^{\mu\nu}$

According to Heim, neither R_{-4} nor R_{+4} are true representations of reality. Instead, R_{-4} and R_{+4} are to be combined into a common space R_4 in which (a) $x^4 = ict$, and (b) the field equations are invariant with respect to the combined transformation $B = A_e A_g$. The corresponding tensor, $T^{\mu\nu}$, is a linear combination of $T_e^{\mu\nu}$ and $T_g^{\mu\nu}$ with coefficients to be determined (v. Ludwiger 1981, p. 113). Since $x^4 = ict$ the new equations are again valid in Minkowski space, as are Maxwell's equations, so that $T_e^{\mu\nu}$ need not be changed, i.e. its coefficient in the combined tensor may be set equal to unity. The ansatz for $T^{\mu\nu}$ and s^μ then becomes,

$$T^{\mu\nu} = T_e^{\mu\nu} + b_{(\mu\nu)} T_g^{\mu\nu} \tag{A28a}$$

$$s^{\mu} = s_e^{\mu} + p_{(\mu)} s_g^{\mu} \tag{A28b}$$

$$x^{\mu} = x_e^{\mu} \quad \text{(cf. Eq. (A9))} \ . \tag{A28c}$$

Parantheses around some of the lower indices indicate that the summation convention is suspended.

The new equations should again be of the form

$$\frac{\partial T^{\mu\nu}}{\partial x_e^{\nu}} = s^{\mu} \tag{A29a}$$

$$\frac{\partial^* T^{\mu\nu}}{\partial x_e^{\nu}} = q_g^{\mu} \tag{A29b}$$

$$\frac{\partial s^{\mu}}{\partial x_e^{\mu}} = 0 \tag{A29c}$$

$$f^j = T^{j\nu} s^{\nu} \ . \tag{A29d}$$

The new transformation matrices $B = A_e A_g$ and $B^{-1} = A_g^{-1} A_e^{-1}$ are

$$B_{\mu\nu} = A_{e\mu\lambda} A_{g\lambda\nu} \tag{A30a}$$

$$B_{\mu\nu}^{-1} = A_{g\mu\kappa}^{-1} A_{e\kappa\nu}^{-1} \ . \tag{A30b}$$

Equation (A29a) can be shown to be invariant under the combined transformation B.

Next, Eqs. (A28a) and (A28b) are substituted into Eq. (A29a), giving

$$\frac{\partial}{\partial x_e^{\nu}} \left(T_e^{\mu\nu} + b_{(\mu\nu)} T_g^{\mu\nu} \right) = s_e^{\mu} + p_{(\mu)} s_g^{\mu} \ . \tag{A31}$$

$T_e^{\mu\nu}$ is a solution of Eq. (A8a), eliminating the first terms on the left– and right–hand sides of Eq. (A31) and leaving the relation

$$b_{(\mu\nu)} \frac{\partial}{\partial x_e^{\nu}} T_g^{\mu\nu} = p_{(\mu)} s_g^{\mu} \ . \tag{A32}$$

The coordinates x_e^j, $j = 1,2,3$, are the same as x_g^j, so that according to Eq. (A22a),

$$b_{ij} = p_j = 1 \ . \tag{A33}$$

Only the terms in $\mu = 4$ and $\nu = 4$ require adjustment. Writing out in full the 4 equations resulting from Eq. (A32) for $\mu = 1$, 2, 3, and 4, and using Eqs. (A18) and (A19), gives

$$\mu = 1: \qquad \sqrt{\beta}\left(\frac{\partial \mu_z}{\partial y} - \frac{\partial \mu_y}{\partial z}\right) - b_{14}\frac{\sqrt{\alpha}}{ic}\frac{\partial \Gamma_x}{\partial t} = \sqrt{\beta}\, j_{mx} \tag{A34a}$$

$$\mu = 2: \qquad \sqrt{\beta}\left(\frac{\partial \mu_x}{\partial z} - \frac{\partial \mu_z}{\partial x}\right) - b_{24}\frac{\sqrt{\alpha}}{ic}\frac{\partial \Gamma_y}{\partial t} = \sqrt{\beta}\, j_{my} \tag{A34b}$$

$$\mu = 3: \qquad \sqrt{\beta}\left(\frac{\partial \mu_y}{\partial x} - \frac{\partial \mu_x}{\partial y}\right) - b_{34}\frac{\sqrt{\alpha}}{ic}\frac{\partial \Gamma_z}{\partial t} = \sqrt{\beta}\, j_{mz} \tag{A34c}$$

$$\mu = 4: \qquad \sqrt{\alpha}\left(b_{41}\frac{\partial \Gamma_x}{\partial x} + b_{42}\frac{\partial \Gamma_y}{\partial y} + b_{43}\frac{\partial \Gamma_z}{\partial z}\right) = p_4\,\omega\sqrt{\beta}\,\rho_m \ . \tag{A34d}$$

Comparing Eqs. (A34a) – (A34c) with Eq. (A16d) shows that

$$b_{14} = b_{24} = b_{34} = \frac{ic}{\omega} \ . \tag{A35}$$

$T^{\mu\nu}$ must be an antisymmetric tensor, implying the relation

$$b_{41} = b_{42} = b_{43} = \frac{ic}{\omega} \ . \tag{A36}$$

Using these values of $b_{\mu\nu}$, Eq. (A34d) becomes

$$\frac{ic}{\omega}\nabla\cdot\sqrt{\alpha}\,\Gamma = p_4\,\omega\sqrt{\beta}\,\rho_m \ . \tag{A37}$$

When this is compared with Eq. (A16a) the last undetermined coefficient, p_4, is seen to be

$$p_4 = \frac{ic}{\omega} \ . \tag{A38}$$

With all coefficients known, the results may now be substituted into Eqs. (A28a) and (A28b) from which the unified field tensors are derived. The result is best expressed in terms of the following quantities introduced by Heim:

$$\mathbf{G} = \sqrt{\varepsilon_o}\,\mathbf{E} + \frac{c}{\omega}\sqrt{\alpha}\,\mathbf{\Gamma} \tag{A39a}$$

$$\mathbf{C} = \sqrt{\mu_o}\,\mathbf{H} + \sqrt{\beta}\,\boldsymbol{\mu} \tag{A39b}$$

$$\mathbf{j} = \sqrt{\mu_o}\,\mathbf{j}_e + \sqrt{\beta}\,\mathbf{j}_m \tag{A39c}$$

$$\rho = \sqrt{\mu_o}\,\rho_e + \sqrt{\beta}\,\rho_m \ . \tag{A39d}$$

In terms of the quantities above the unified field tensor and its source are,

$$T^{\mu\nu} = \begin{pmatrix} 0 & C_z & -C_y & -iG_x \\ -C_z & 0 & C_x & -iG_y \\ C_y & -C_x & 0 & -iG_z \\ iG_x & iG_y & iG_z & 0 \end{pmatrix} \tag{A40}$$

$$s^{\mu} = [j_x,\ j_y,\ jy_z,\ ic\rho\,] \ . \tag{A41}$$

The dual tensor and its source are

$$*T^{\mu\nu} = \begin{pmatrix} 0 & -iG_z & iG_y & C_x \\ iG_z & 0 & -iG_x & C_y \\ -iG_y & iG_x & 0 & C_z \\ -C_x & -C_y & -C_z & 0 \end{pmatrix} \tag{A42}$$

$$q^{\mu} = [\,0,\ 0,\ 0,\ -\omega\sqrt{\beta}(\rho_m - \rho_{m0})] \ . \tag{A43}$$

The unified field equations are obtained by substituting Eqs. (A40) – (A43) into Eqs. (A29a) and (A29b). The result is

$$\nabla\cdot\mathbf{G} = c\rho \tag{A44a}$$

$$\nabla\times\mathbf{G} = -\frac{1}{c}\frac{\partial\mathbf{C}}{\partial t} \tag{A44b}$$

$$\nabla\cdot\mathbf{C} = \omega\sqrt{\beta}(\rho_m - \rho_{m0}) \tag{A44c}$$

$$\nabla\times\mathbf{C} = \mathbf{j} + \frac{1}{c}\frac{\partial\mathbf{G}}{\partial t} \ . \tag{A44d}$$

The equation of continuity, derived from Eq. (A29c), is

$$\nabla \cdot \mathbf{j} + \frac{\partial \rho}{\partial t} = 0 \ . \tag{A45}$$

Finally, the force density is obtained from Eq. (A29d),

$$\mathbf{f} = c\rho \mathbf{G} + \mathbf{j} \times \mathbf{C} \ . \tag{A46}$$

Two of the 3 constants, α, β, and ω still remain to be determined. Consider first Eq. (A44a). Written out in full it becomes

$$\nabla \cdot \sqrt{\varepsilon_0}\, \mathbf{E} + \frac{c}{\omega} \sqrt{\alpha}\, \nabla \cdot \Gamma = c \sqrt{\mu_0}\, \rho_e + c \sqrt{\beta}\, \rho_m \ . \tag{A47}$$

In the absence of both electric charges and electric fields the equation reduces to

$$\frac{1}{\omega} \sqrt{\alpha}\, \nabla \cdot \Gamma = \sqrt{\beta}\, \rho_m \tag{A48}$$

or

$$\nabla \cdot \Gamma = \frac{1}{\alpha} \rho_m \tag{A49}$$

by use of Eq. (A15). Since Γ is the gravitational field, Eq. (A49) must correspond to the well–known expression for the divergence of that field,

$$\nabla \cdot \Gamma = 4\pi\gamma\rho_m \ , \tag{A50}$$

from which it is evident that

$$\alpha = \frac{1}{4\pi\gamma} \ . \tag{A51}$$

Next, consider Eq. (A46). Again, writing it out in full results in the expression,

$$\mathbf{f} = \rho_e \mathbf{E} + \frac{c^2}{\omega^2} \rho_m \Gamma + \mathbf{j}_e \times \mathbf{B} + \beta\, \mathbf{j}_m \times \boldsymbol{\mu} + c \sqrt{\beta\varepsilon_0}\, \rho_m \mathbf{E} +$$

$$+ \frac{c^2}{\omega} \sqrt{\alpha\mu_0}\, \rho_e \Gamma + \sqrt{\beta\mu_0}\, (\mathbf{j}_m \times \mathbf{H} + \mathbf{j}_e \times \boldsymbol{\mu}) \ . \tag{A52}$$

The second term on the right must be the usual force density $\rho_m \Gamma$ due to the gravitational field. This implies that $c/\omega = 1$ or

$$\omega = c \ . \tag{A53}$$

The meaning of the 5th and 6th terms in Eq. (A52) is not clear. The coefficient $c\sqrt{\beta\varepsilon_0} \approx 10^{-10}$ is small, so that this term may have escaped detection, but $c\sqrt{\alpha\mu_0}$ (with $\omega = c$) is of order 10^{10}. Since such a strong coupling of the charge density to the gravitational field is completely at variance with observation, it must be assumed that this particular cross term is zero. This may be explained by assuming that Γ never directly acts on charges. The last two terms in Eq. (A52) represent interactions between mass current density and magnetic field on the one hand, and between electric current density and the gravitational mesofield on the other. The coefficient $\sqrt{\beta\mu_0}$ is of order 10^{-16} and hence extremely small, so that the contribution of these terms to the total force would usually be of negligible magnitude. Only a very sensitive experiment could detect the terms, provided they exist at all.

Finally, with use of Eq. (A15) β is given by

$$\beta = \frac{1}{\alpha c^2} . \tag{A54}$$

Using Eq. (A53) the 4 quantities of Eq. (A39) become

$$\mathbf{G} = \sqrt{\varepsilon_0}\,\mathbf{E} + \sqrt{\alpha}\,\Gamma \tag{A55a}$$

$$\mathbf{C} = \sqrt{\mu_0}\,\mathbf{H} + \sqrt{\beta}\,\boldsymbol{\mu} \tag{A55b}$$

$$\mathbf{j} = \sqrt{\mu_0}\,\mathbf{j}_e + \sqrt{\beta}\,\mathbf{j}_m \tag{A55c}$$

$$\rho = \sqrt{\mu_0}\,\rho_e + \sqrt{\beta}\,\rho_m . \tag{A55d}$$

The full set of unified field equations, written out in the usual notation and including the 3 small cross terms of Eq. (A52), is

$$\nabla\cdot\mathbf{E} = \frac{1}{\varepsilon_0}\rho_e \tag{A56a}$$

$$\nabla\cdot\Gamma = \frac{1}{\alpha}\rho_m \tag{A56b}$$

$$\nabla\times\left(\mathbf{E} + \sqrt{\frac{\alpha}{\varepsilon_0}}\,\Gamma\right) = -\mu_0\frac{\partial}{\partial t}\left(\mathbf{H} + \sqrt{\frac{\beta}{\mu_0}}\,\boldsymbol{\mu}\right) \tag{A56c}$$

$$\nabla\cdot\mathbf{H} = 0 \tag{A56d}$$

$$\nabla\cdot\boldsymbol{\mu} = c(\rho_m - \rho_{m0}) \tag{A56e}$$

$$\nabla \times \left[\mathbf{H} + \sqrt{\frac{\beta}{\mu_0}}\, \boldsymbol{\mu} \right] = \mathbf{j}_e + \sqrt{\frac{\beta}{\mu_0}}\, \mathbf{j}_m + \varepsilon_0 \frac{\partial}{\partial t} \left(\mathbf{E} + \sqrt{\frac{\alpha}{\varepsilon_0}}\, \boldsymbol{\Gamma} \right) \tag{A56f}$$

$$\mathbf{f} = \rho_e \mathbf{E} + \rho_m \boldsymbol{\Gamma} + \mathbf{j}_e \times \mathbf{B} + \beta\, \mathbf{j}_m \times \boldsymbol{\mu} + c \sqrt{\beta \varepsilon_0}\, \rho_m \mathbf{E} + $$
$$+ \sqrt{\beta \mu_0}\, (\mathbf{j}_m \times \mathbf{H} + \mathbf{j}_e \times \boldsymbol{\mu}) \ . \tag{A56g}$$

The fact that Eq. (A56c) does not reduce to Eq. (A16b) in the absence of electromagnetic fields is a consequence of the fact that Eq. (A56) exists in Minkowski space, R_{-4}, with $x^4 = ict$, whereas Eq. (A16b) exists in R_{+4} with $x^4 = ct$ $(\omega = c)$.

Appendix B

1. *The Field Equations*

In the 4–dimensional unified field theory derived in Appendix A anti–gravitational phenomena are described by Eqs. (A56c) and (A56f). In the first of these, $\boldsymbol{\mu}$ may be neglected relative to the much stronger impressed magnetic field $\mu_o \mathbf{H} = \mathbf{B}_o$. In the second equation $\mathbf{j}_m$ is zero because no mass currents are present. Finally, $\mathbf{j}_e$ may be disregarded because it is already incorporated into $\mathbf{B}_o$. With these simplifications the field equations become,

$$\nabla \times \mathbf{K} + \mu_0 \frac{\partial \mathbf{P}}{\partial t} = - \frac{\partial \mathbf{B}_0}{\partial t}$$
$$\nabla \times \mathbf{P} - \varepsilon_0 \frac{\partial \mathbf{K}}{\partial t} = 0 \ . \tag{B1}$$

The equations above are valid in vacuum and neglect the earth's di–electric properties. The fields in Eq. (B1) are,

$$\mathbf{K} = \mathbf{E} + \sqrt{\frac{\alpha}{\varepsilon_0}}\, \boldsymbol{\Gamma}$$
$$\mathbf{P} = \mathbf{H} + \sqrt{\frac{\beta}{\mu_0}}\, \boldsymbol{\mu} \ , \tag{B2}$$

where

$\mathbf{E}$ = electric field
$\mathbf{H}$ = magnetic field in vacuum
$\mathbf{B}_0$ = magnetic field inside the core
Γ = induced gravitational field
$\boldsymbol{\mu}$ = mesofield
ε_0 = vacuum permittivity ($\varepsilon_0 = 8.854 \times 10^{-12}$ farad/m)
μ_0 = vacuum permeability ($\mu_0 = 4\pi \times 10^{-7}$ henry/m) (B3)
α = permittivity of space to gravity
($\alpha = 1/4\,\pi\,\gamma = 1.19 \times 10^{9}\ s^2 kg/m^3$)
γ = gravitational constant ($\gamma = 6.67 \times 10^{-11}\ m^3/s^2 kg$)
β = $1/\alpha c^2$ ($\beta = 9.34 \times 10^{-27}$ m/kg)
c = velocity of light ($c = 3 \times 10^{8}$ m/s) .

In addition, the fields satisfy the relations (cf. Eqs. (A56a), (A56b), (A56d), and A(56e)),

$$\nabla \cdot \mathbf{K} = 0$$

$$\nabla \cdot \mathbf{P} = c\,(\rho_m - \rho_{m_0}) \qquad \text{(B4)}$$

$$\nabla \cdot \mathbf{B}_0 = 0 \ .$$

In Eq. (B4) $\rho_m - \rho_{m_0}$ is the mass density of the gravitational field produced by the mass m_0 of the craft (Heim 1989). The total field mass, $m - m_0$, is approximately equal to $1.39 \times 10^{-28}\ m_0^2\,(r - r_0)/r\,r_0$ kg if $r > r_0$, where r_0 is the equivalent radius of m_0. The density of such a small field mass can safely be disregarded on the right–hand side of Eq. (B4).

2. *The Hertz Vector*

Equations (B1) and (B4) have the well–known form of Maxwell's equations if $-\partial \mathbf{B}_0/\partial t$ is regarded as a source term in Eq. (B1). Methods of solving the equations have been known for a long time. The procedure described below follows Stratton (1941).

The fields may be expressed in terms of the Hertz vector function $\boldsymbol{\Pi}$. If $\boldsymbol{\Pi}$ satisfies the equation

$$\nabla \times \nabla \times \boldsymbol{\Pi} - \nabla\,(\nabla \cdot \boldsymbol{\Pi}) + \mu_0 \varepsilon_0 \frac{\partial^2 \boldsymbol{\Pi}}{\partial t^2} = \frac{1}{\mu_0} \mathbf{B}_0 \ , \qquad \text{(B5)}$$

then $\mathbf{K}$ and $\mathbf{P}$ are obtained from the pair of relations,

$$\mathbf{K} = -\mu_0 \nabla \times \frac{\partial \mathbf{\Pi}}{\partial t}$$

$$\mathbf{P} = \nabla(\nabla \cdot \mathbf{\Pi}) - \mu_0 \varepsilon_0 \frac{\partial^2 \mathbf{\Pi}}{\partial t^2} \qquad (\mu_0 \varepsilon_0 = \frac{1}{c^2}) \ . \tag{B6}$$

This can be verified by substituting Eq. (B6) into Eqs. (B1) and (B4) (with $\rho_m - \rho_{m_o} = 0$), making use of Eq. (B5) and the last line of Eq. (B4).

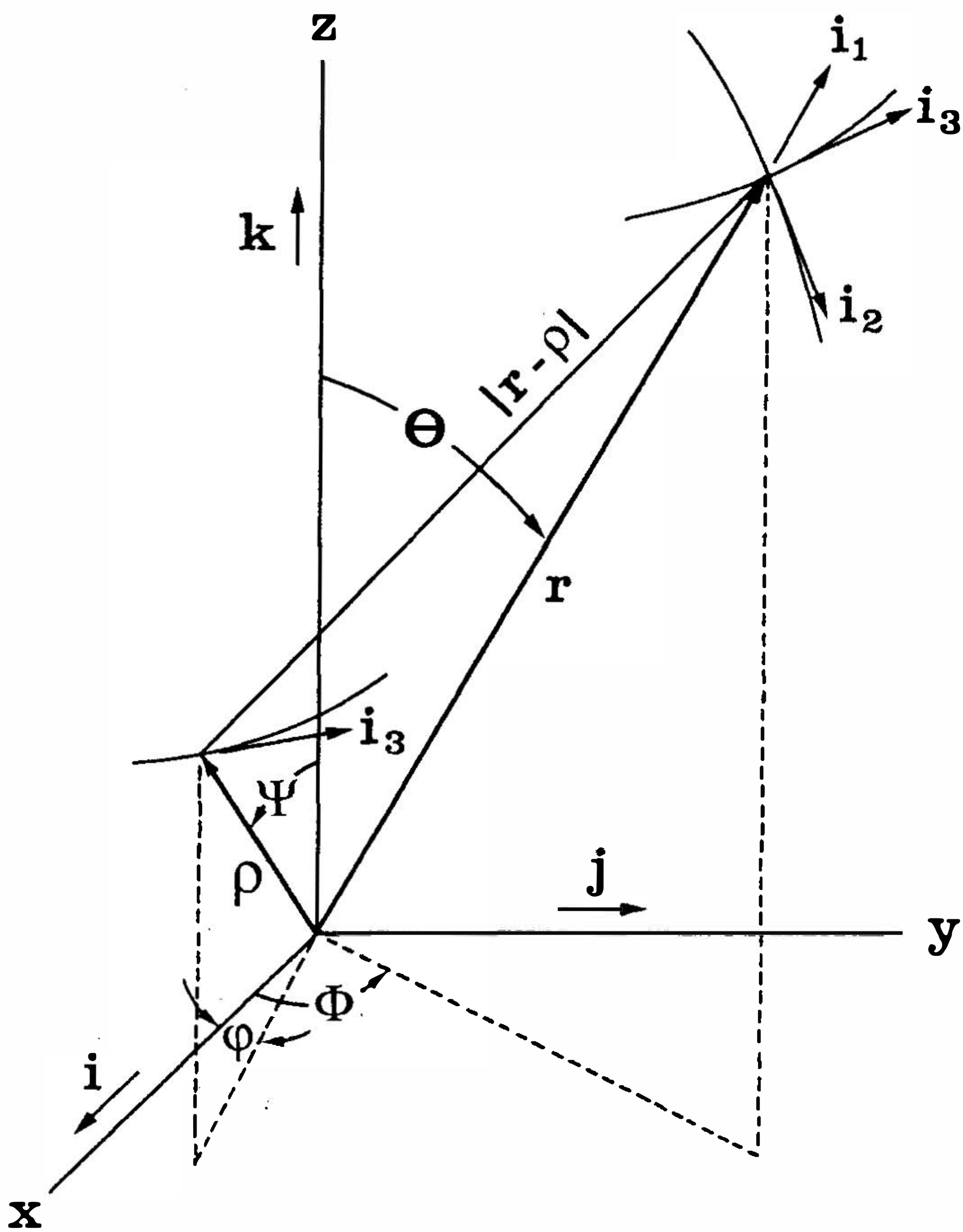

Fig. B1. Coordinate system used for calculating the fields.

In rectangular coordinates the following vector identity is valid:

$$\nabla \times \nabla \times \mathbf{\Pi} = \nabla(\nabla \cdot \mathbf{\Pi}) - \nabla^2 \mathbf{\Pi} \ . \tag{B7}$$

Use of this identity transforms Eq. (B5) into the relation below,

$$\nabla^2 \mathbf{\Pi} - \frac{1}{c^2}\frac{\partial^2 \mathbf{\Pi}}{\partial t^2} = -\frac{1}{\mu_0}\mathbf{B}_0 \ . \tag{B8}$$

Equation (B8) is solved in the coordinate system of Fig. B1. **i**, **j**, and **k** in that figure are unit vectors along the rectangular axes x, y, and z, respectively. Similarly, $\mathbf{i}_1$, $\mathbf{i}_2$, and $\mathbf{i}_3$ are unit vectors in spherical coordinates, **r** is the radius vector to the point at which $\mathbf{\Pi}$ is calculated, and $\boldsymbol{\rho}$ is the radius vector to a field point of $\mathbf{B}_0(\boldsymbol{\rho},t)$ inside the core. The shape of the latter may be either cylindrical or toroidal according to Fig. 1 of the main text. In either case the field lines of $\mathbf{B}_0$ are circles around the z-axis in a direction tangential to the outer boundary surfaces of the core. A tangential magnetic field **B** is discontinuous across a boundary. In the case of a toroidal magnet the field is zero outside. If the core is cylindrical, as in Fig. 1a, the field outside is reduced by the factor μ_0/μ relative to its value inside (μ = permeability of the core material). Since μ_0/μ is a very small quantity of order 10^{-3}–10^{-5}, $\mathbf{B}_0$ will be assumed to vanish outside the core in the cylindrical case, too.

Neglecting end effects in the case of the cylindrical core the primary magnetic field $\mathbf{B}_0$ in the arrangements of Figs. 1a and 1b is,

$$\begin{aligned} \mathbf{B}_0(\boldsymbol{\rho},t) &= \frac{\mu\, I(t)}{2\pi}\,\frac{\mathbf{j}\cos\varphi - \mathbf{i}\sin\varphi}{\rho\sin\psi} \quad \text{inside the core} \\ &= 0 \quad \text{outside} \ . \end{aligned} \tag{B9}$$

Note that $\mathbf{j}\cos\varphi - \mathbf{i}\sin\varphi = \mathbf{i}_3$ (cf. Fig. B1). The current, I(t), equals the current through a single wire multiplied by the number of wires in a loop of Fig. 1a, or by the number of windings around the toroidal core of Fig. 1b.

All derivations will be carried out for both sine and cosine currents. The subscripts s (sine) and c (cosine) denote the corresponding fields. It is convenient to express $\mathbf{B}_0$ in terms of its two Fourier components,

$$\mathbf{B}_{0s}(\boldsymbol{\rho},t) = \mathbf{B}_0(\boldsymbol{\rho})\frac{1}{2i}\left(e^{i\omega t} - e^{-i\omega t}\right)$$

$$\mathbf{B}_{0c}(\boldsymbol{\rho},t) = \mathbf{B}_0(\boldsymbol{\rho})\frac{1}{2}\left(e^{i\omega t} + e^{-i\omega t}\right) \tag{B10}$$

$$\mathbf{B}_0(\boldsymbol{\rho}) = \frac{\mu I_0}{2\pi}\,\frac{\mathbf{j}\cos\varphi - \mathbf{i}\sin\varphi}{\rho\sin\psi} ,$$

where I_0 is the maximum number of ampere turns.

A solution of Eq. (B8) is obtained, first of all, for the single Fourier component $\mathbf{B}_0(\boldsymbol{\rho})\exp(-i\omega t)$. From this the expression of $\boldsymbol{\Pi}$ for sine and cosine currents can easily be derived. Keeping only the $\exp(-i\omega t)$ – term in Eq. (B10) a single rectangular component of $\boldsymbol{\Pi}$, Π_m, satisfies the equation,

$$\nabla^2\Pi_m - \frac{1}{c^2}\frac{\partial^2\Pi_m}{\partial t^2} = -\frac{e^{-i\omega t}}{\mu_0}B_{0m}(\rho) . \tag{B11}$$

The solution of Eq. (B11) is

$$\Pi_m = \frac{e^{-i\omega t}}{4\pi\mu_0}\int B_{0m}(\rho)\,\frac{e^{ik|\mathbf{r}-\boldsymbol{\rho}|}}{|\mathbf{r}-\boldsymbol{\rho}|}\,d^3\rho$$

$$k = \frac{\omega}{c} . \tag{B12}$$

(k should not be confused with the unit vector **k**). The complete vector function now becomes,

$$\boldsymbol{\Pi} = \frac{e^{-i\omega t}}{4\pi\mu_0}\int \mathbf{B}_0(\boldsymbol{\rho})\,\frac{e^{ik|\mathbf{r}-\boldsymbol{\rho}|}}{|\mathbf{r}-\boldsymbol{\rho}|}\,d^3\rho . \tag{B13}$$

When $r > \rho$ the function under the integral can be expanded,

$$\frac{e^{ik|\mathbf{r}-\boldsymbol{\rho}|}}{|\mathbf{r}-\boldsymbol{\rho}|} = ik\sum_{n=0}^{\infty}(2n+1)\,P_n(\boldsymbol{\Omega}_\rho\cdot\mathbf{i}_1)\,j_n(k\rho)\,h_n^{(1)}(kr) , \tag{B14}$$

where $\boldsymbol{\Omega}_\rho$ is a unit vector along $\boldsymbol{\rho}$ and P_n is a Legendre polynomial. The spherical Bessel functions j_n and $h_n^{(1)}$ are given below,

$$j_n(x) = \sqrt{\frac{\pi}{2x}}\,J_{n+1/2}(x)$$

$$h_n^{(1)}(x) = \sqrt{\frac{\pi}{2x}}\,H_{n+1/2}^{(1)}(x) . \tag{B15}$$

In the equation above J and H are Bessel and Hankel functions, respectively, of half integral order.

It will be assumed that r is always large compared to the dimensions of the magnet, so that $r \gg \rho$ for all r and ρ. It is then sufficiently accurate to retain only the first two terms in the expansion of Eq. (B14),

$$\frac{e^{ik|\mathbf{r}-\boldsymbol{\rho}|}}{|\mathbf{r}-\boldsymbol{\rho}|} \approx ik\left\{ j_0(k\rho)h_0^{(1)}(kr) + 3\left[\cos\theta\cos\psi + \right.\right.$$

$$\left.\left. + \sin\theta\sin\psi\cos(\Phi-\varphi)\right] j_1(k\rho)\, h_1^{(1)}(kr)\right\} . \qquad \text{(B16)}$$

Equation (B16) leads to the dipole approximation of **K** and **P**. After inserting Eq. (B16) into Eq. (B13) and expressing $\mathbf{B}_0(\boldsymbol{\rho})$ in terms of Eq. (B10) the Hertz vector becomes,

$$\boldsymbol{\Pi} = ik\frac{I_0}{8\pi^2}\frac{\mu}{\mu_0}e^{-i\omega t}\left\{ h_0^{(1)}(kr)\iint j_0(k\rho)\rho\, d\rho\, d\psi \int_0^{2\pi}(\mathbf{j}\cos\varphi - \mathbf{i}\sin\varphi)d\varphi + \right.$$

$$+ 3h_1^{(1)}(kr)\iint j_1(k\rho)\rho\, d\rho\, d\psi \int_0^{2\pi}[\cos\theta\cos\psi +$$

$$\left. + \sin\theta\sin\psi\cos(\Phi-\varphi)]\,(\mathbf{j}\cos\varphi - \mathbf{i}\sin\varphi)d\varphi\right\} . \qquad \text{(B17)}$$

The first line of Eq. (B17) gives no contribution to $\boldsymbol{\Pi}$ because the integral over φ is zero. In the second line the $\cos\theta\cos\psi$ – term vanishes for the same reason. In the remaining integral $j_1(k\rho)$ may be approximated by

$$j_1(k\rho) \approx \frac{1}{3}k\rho , \qquad \text{(B18)}$$

because $k\rho$ is, in general, a very small quantity. This reduces the Hertz vector of Eq. (B17) to the expression,

$$\boldsymbol{\Pi} = ik^2\frac{I_0}{8\pi^2}\frac{\mu}{\mu_0}e^{-i\omega t}h_1^{(1)}(kr)\sin\theta\iint\rho^2 d\rho\sin\psi\, d\psi \times$$

$$\times\int_0^{2\pi}\cos(\Phi-\varphi)(\mathbf{j}\cos\varphi - \mathbf{i}\sin\varphi)d\varphi$$

$$= ik^2\frac{I_0}{16\pi^2}\frac{\mu}{\mu_0}e^{-i\omega t}h_1^{(1)}(kr)\sin\theta\,\mathbf{i}_3\cdot 2\pi\iint\rho^2 d\rho\sin\psi\, d\psi . \qquad \text{(B19)}$$

The double integral in Eq. (B19), multiplied by 2π, is just the volume V of the core, irrespective of its shape. Hence, the final result,

$$\mathbf{\Pi} = ik^2 \frac{I_0 V}{16\pi^2} \frac{\mu}{\mu_0} e^{-i\omega t} h_1^{(1)}(kr) \sin\theta \, \mathbf{i}_3 \ , \tag{B20}$$

applies to both configurations of Fig. 1. The direction of $\mathbf{\Pi}$ is parallel to $\mathbf{B}_0$.

The expressions for $\mathbf{\Pi}_s$ and $\mathbf{\Pi}_c$ are now obtained by repeating the procedure for the second Fourier component, $\mathbf{B}_0(\boldsymbol{\rho})\exp(i\omega t)$, or by taking complex conjugates, and combining results according to Eq. (B10). The $\mathbf{\Pi}$–vectors for sine and cosine currents then become,

$$\begin{aligned} \mathbf{\Pi}_s &= \mathbf{i}_3 \frac{I_0 V}{16\pi^2} \frac{\mu}{\mu_0} \left[\frac{1}{r^2} \sin(\omega t - kr) + \frac{k}{r} \cos(\omega t - kr) \right] \sin\theta \\ \mathbf{\Pi}_c &= \mathbf{i}_3 \frac{I_0 V}{16\pi^2} \frac{\mu}{\mu_0} \left[\frac{1}{r^2} \cos(\omega t - kr) - \frac{k}{r} \sin(\omega t - kr) \right] \sin\theta \ . \end{aligned} \tag{B21}$$

3. *The Fields Generated by a Stationary Magnet*

The field vectors $\mathbf{K}$ and $\mathbf{P}$ are derived from Eq. (B6). The curl in the first line of that equation, applied to a function $\mathbf{i}_3 F_3$ in spherical coordinates, is

$$\nabla \times \mathbf{i}_3 F_3 = \mathbf{i}_1 \frac{1}{r\sin\theta} \frac{\partial}{\partial\theta} (\sin\theta F_3) - \mathbf{i}_2 \frac{1}{r} \frac{\partial}{\partial r} (r F_3) \ . \tag{B22}$$

The divergence, $\nabla \cdot \mathbf{\Pi}$, in the second line of Eq. (B6) is zero because $\mathbf{\Pi}$ is independent of azimuthal angle Φ. The result of substituting the Hertz vectors of Eq. (B21) into Eq. (B6) is

$$\begin{aligned} \mathbf{K}_s &= -\frac{\mu_0 I_0 V \omega}{16\pi^2} \frac{\mu}{\mu_0} \left\{ \frac{1}{r^3} (2\mathbf{i}_1 \cos\theta + \mathbf{i}_2 \sin\theta) \cos(\omega t - kr) - \right. \\ &\quad \left. - \frac{k}{r^2} (2\mathbf{i}_1 \cos\theta + \mathbf{i}_2 \sin\theta) \sin(\omega t - kr) - \mathbf{i}_2 \frac{k^2}{r} \sin\theta \cos(\omega t - kr) \right\} \\ \mathbf{K}_c &= \frac{\mu_0 I_0 V \omega}{16\pi^2} \frac{\mu}{\mu_0} \left\{ \frac{1}{r^3} (2\mathbf{i}_1 \cos\theta + \mathbf{i}_2 \sin\theta) \sin(\omega t - kr) + \right. \\ &\quad \left. + \frac{k}{r^2} (2\mathbf{i}_1 \cos\theta + \mathbf{i}_2 \sin\theta) \cos(\omega t - kr) - \mathbf{i}_2 \frac{k^2}{r} \sin\theta \sin(\omega t - kr) \right\} \end{aligned} \tag{B23}$$

$$\mathbf{P}_s = \mathbf{i}_3 k^2 \frac{I_0 V}{16\pi^2} \frac{\mu}{\mu_0} \left\{ \frac{1}{r^2} \sin(\omega t - kr) + \frac{k}{r} \cos(\omega t - kr) \right\} \sin\theta$$

$$\mathbf{P}_c = \mathbf{i}_3 k^2 \frac{I_0 V}{16\pi^2} \frac{\mu}{\mu_0} \left\{ \frac{1}{r^2} \cos(\omega t - kr) - \frac{k}{r} \sin(\omega t - kr) \right\} \sin\theta \quad . \tag{B24}$$

These equations show that **K** and **P** are perpendicular to each other.

4. *Coordinate Transformations*

The effect of counterrotating magnets and the integral over the earth are best evaluated in rectangular coordinates. For this purpose the unit vectors in spherical coordinates, $\mathbf{i}_1$, $\mathbf{i}_2$, and $\mathbf{i}_3$ are expressed in terms of **i**, **j**, and **k**. The transformation formulas and the inverse transformations are,

$$\begin{aligned} \mathbf{i}_1 &= \mathbf{i}\sin\theta\cos\Phi + \mathbf{j}\sin\theta\sin\Phi + \mathbf{k}\cos\theta \\ \mathbf{i}_2 &= \mathbf{i}\cos\theta\cos\Phi + \mathbf{j}\cos\theta\sin\Phi - \mathbf{k}\sin\theta \\ \mathbf{i}_3 &= -\mathbf{i}\sin\Phi + \mathbf{j}\cos\Phi \end{aligned} \tag{B25}$$

$$\begin{aligned} \mathbf{i} &= \mathbf{i}_1\sin\theta\cos\Phi + \mathbf{i}_2\cos\theta\cos\Phi - \mathbf{i}_3\sin\Phi \\ \mathbf{j} &= \mathbf{i}_1\sin\theta\sin\Phi + \mathbf{i}_2\cos\theta\sin\Phi + \mathbf{i}_3\cos\Phi \\ \mathbf{k} &= \mathbf{i}_1\cos\theta - \mathbf{i}_2\sin\theta \quad . \end{aligned} \tag{B26}$$

Transforming the unit vectors in Eqs. (B23) and (B24) by means of Eq. (B25) leads to the following expressions for the fields:

$$\begin{aligned} \mathbf{K}_s = -\frac{\mu_0 I_0 V\omega}{16\pi^2} \frac{\mu}{\mu_0} \Big\{ & \frac{1}{r^3} \Big[3\mathbf{i}\sin\theta\cos\theta\cos\Phi + 3\mathbf{j}\sin\theta\cos\theta\sin\Phi + \\ & + \mathbf{k}(3\cos^2\theta - 1) \Big] \cos(\omega t - kr) - \frac{k}{r^2} \Big[3\mathbf{i}\sin\theta\cos\theta\cos\Phi + \\ & + 3\mathbf{j}\sin\theta\cos\theta\sin\Phi + \mathbf{k}(3\cos^2\theta - 1) \Big] \sin(\omega t - kr) - \\ & - \frac{k^2}{r} \Big[\mathbf{i}\sin\theta\cos\theta\cos\Phi + \mathbf{j}\sin\theta\cos\theta\sin\Phi - \mathbf{k}\sin^2\theta \Big] \cos(\omega t - kr) \Big\} \end{aligned} \tag{B27}$$

$$\mathbf{K}_c = \frac{\mu_0 I_0 V\omega}{16\pi^2}\frac{\mu}{\mu_0}\Big\{ \frac{1}{r^3}\Big[3\mathbf{i}\sin\theta\cos\theta\cos\Phi + 3\mathbf{j}\sin\theta\cos\theta\sin\Phi + \mathbf{k}(3\cos^2\theta - 1)\Big]\sin(\omega t - kr) + \frac{k}{r^2}\Big[3\mathbf{i}\sin\theta\cos\theta\cos\Phi + 3\mathbf{j}\sin\theta\cos\theta\sin\Phi + \mathbf{k}(3\cos^2\theta - 1)\Big]\cos(\omega t - kr) - \frac{k^2}{r}\Big[\mathbf{i}\sin\theta\cos\theta\cos\Phi + \mathbf{j}\sin\theta\cos\theta\sin\Phi - \mathbf{k}\sin^2\theta\Big]\sin(\omega t - kr)\Big\}$$

$$\mathbf{P}_s = k^2\frac{I_0 V}{16\pi^2}\frac{\mu}{\mu_0}\Big\{\frac{1}{r^2}\sin(\omega t - kr) + \frac{k}{r}\cos(\omega t - kr)\Big\}(-\mathbf{i}\sin\theta\sin\Phi + \mathbf{j}\sin\theta\cos\Phi)$$

$$\mathbf{P}_c = k^2\frac{I_0 V}{16\pi^2}\frac{\mu}{\mu_0}\Big\{\frac{1}{r^2}\cos(\omega t - kr) - \frac{k}{r}\sin(\omega t - kr)\Big\}(-\mathbf{i}\sin\theta\sin\Phi + \mathbf{j}\sin\theta\cos\Phi) \tag{B28}$$

Equation (10) of the main text is obtained by solving Eq. (B2) for Γ, putting $\mathbf{E} = 0$, replacing $\mathbf{K}$ by $\mathbf{K}_s$ of Eq. (B27), and keeping only the vertical components of $\mathbf{K}_s$. The vertical components are the coefficients of the unit vector $\mathbf{k}$.

Making use of the relations,

$$x = r\sin\theta\cos\Phi, \quad y = r\sin\theta\sin\Phi, \quad z = r\cos\theta, \quad r = \sqrt{x^2 + y^2 + z^2} \tag{B29}$$

allows the fields to be fully expressed in rectangular coordinates,

$$\mathbf{K}_s = -\frac{\mu_0 I_0 V\omega}{16\pi^2}\frac{\mu}{\mu_0}\Big\{\frac{1}{r^5}\Big[3\mathbf{i}xz + 3\mathbf{j}yz + \mathbf{k}(3z^2 - r^2)\Big]\cos(\omega t - kr) - \frac{k}{r^4}\Big[3\mathbf{i}xz + 3\mathbf{j}yz + \mathbf{k}(3z^2 - r^2)\Big]\sin(\omega t - kr) - \frac{k^2}{r^3}\Big[\mathbf{i}xz + \mathbf{j}yz + \mathbf{k}(z^2 - r^2)\Big]\cos(\omega t - kr)\Big\} \tag{B30a}$$

$$\mathbf{K}_c = \frac{\mu_0 I_0 V\omega}{16\pi^2}\frac{\mu}{\mu_0}\Big\{\frac{1}{r^5}\Big[3\mathbf{i}xz + 3\mathbf{j}yz + \mathbf{k}(3z^2 - r^2)\Big]\sin(\omega t - kr) + \frac{k}{r^4}\Big[3\mathbf{i}xz + 3\mathbf{j}yz + \mathbf{k}(3z^2 - r^2)\Big]\cos(\omega t - kr) - \frac{k^2}{r^3}\Big[\mathbf{i}xz + \mathbf{j}yz + \mathbf{k}(z^2 - r^2)\Big]\sin(\omega t - kr)\Big\} \tag{B30b}$$

$$\mathbf{P}_s = k^2 \frac{I_0 V}{16\pi^2} \frac{\mu}{\mu_0} \left\{ \frac{1}{r^3} \sin(\omega t - kr) + \frac{k}{r^2} \cos(\omega t - kr) \right\} (-\mathbf{i}y + \mathbf{j}x) \qquad \text{(B31a)}$$

$$\mathbf{P}_c = k^2 \frac{I_0 V}{16\pi^2} \frac{\mu}{\mu_0} \left\{ \frac{1}{r^3} \cos(\omega t - kr) - \frac{k}{r^2} \sin(\omega t - kr) \right\} (-\mathbf{i}y + \mathbf{j}x) \ . \qquad \text{(B31b)}$$

5. *The Rotating Fields*

The time dependence of the vertical field components is largely eliminated by employing two counterrotating magnets and adding their fields together. In order to determine the effect of rotation on the fields as seen by a stationary observer the fields of Eqs. (B30) and (B31) are attached to two coordinate systems rotating about the y-axis in opposite directions. Figure B2 shows the stationary and rotating coordinate systems of magnets 1 and 2. The angular frequency of rotation, ω, is the same for both and is also equal to the current frequency. Certain phase relations must be observed between all components of the system. The phases are so chosen that most terms in the vertical component of $\mathbf{K} = \mathbf{K}_s + \mathbf{K}_c$ become stationary.

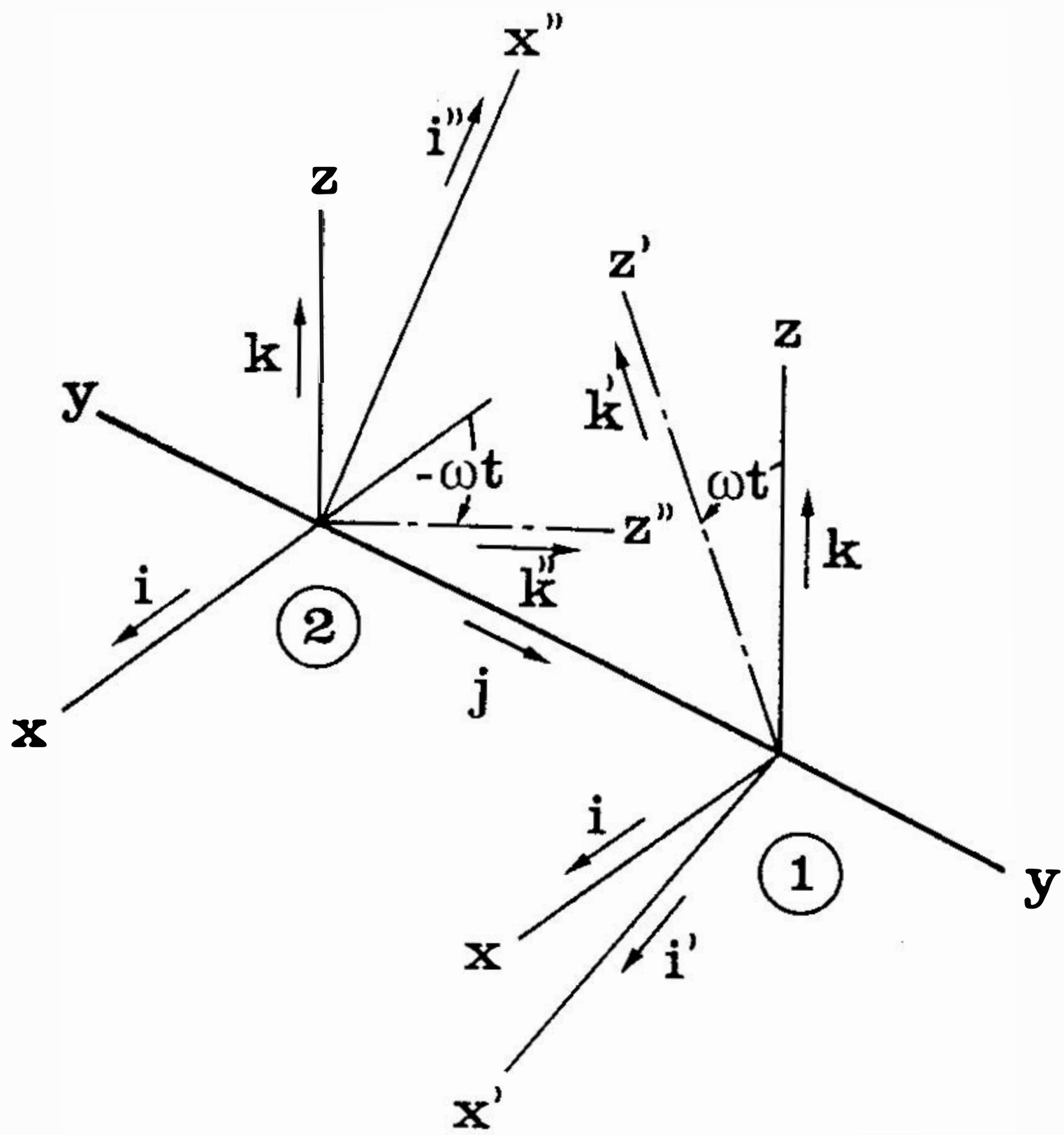

Fig. B2. Stationary and counterrotating coordinates.

The sense of rotation shown in Fig. B2 is anticlockwise in (1) and clockwise in (2). The first magnet rotates as $\cos\omega t$, the second as $\cos(-\omega t - \pi/2) = -\sin\omega t$. The coordinate transformations corresponding to these rotations are

1st Magnet

$$\begin{aligned} x' &= x\cos\omega t - z\sin\omega t & \mathbf{i}' &= \mathbf{i}\cos\omega t - \mathbf{k}\sin\omega t \\ y' &= y & \mathbf{j}' &= \mathbf{j} \\ z' &= x\sin\omega t + z\cos\omega t & \mathbf{k}' &= \mathbf{i}\sin\omega t + \mathbf{k}\cos\omega t \end{aligned} \tag{B32}$$

2nd Magnet

$$\begin{aligned} x'' &= -x\sin\omega t + z\cos\omega t & \mathbf{i}'' &= -\mathbf{i}\sin\omega t + \mathbf{k}\cos\omega t \\ y'' &= y & \mathbf{j}'' &= \mathbf{j} \\ z'' &= -x\cos\omega t - z\sin\omega t & \mathbf{k}'' &= -\mathbf{i}\cos\omega t - \mathbf{k}\sin\omega t\ . \end{aligned} \tag{B33}$$

The distance r remains invariant under the transformations above.

$$x'^2 + y'^2 + z'^2 = x''^2 + y''^2 + z''^2 = x^2 + y^2 + z^2 = r^2\ . \tag{B34}$$

In addition, the currents vary as $\sin\omega t$ through the first magnet and as $\cos\omega t$ through the second.

All coordinates and unit vectors in $\mathbf{K}_s$, Eq. (B30a), and $\mathbf{P}_s$, Eq. (B31a), are now replaced by primed quantities. Likewise, all coordinates and unit vectors of $\mathbf{K}_c$ and $\mathbf{P}_c$ in Eqs. (B30b) and (B31b) are replaced by doubly primed symbols. In this way the fields are made to rotate with the singly and doubly primed coordinate axes. The fields observed in the stationary system are obtained by replacing all singly and doubly primed quantities by their respective expressions on the right–hand sides of Eqs. (B32) and (B33). Finally, sine and cosine fields are added vectorially to give,

$$\mathbf{K} = \mathbf{K}_s + \mathbf{K}_c$$
$$\mathbf{P} = \mathbf{P}_s + \mathbf{P}_c \,. \tag{B35}$$

The final result of these operations is

$$\begin{aligned}
\mathbf{K} = -\frac{\mu_0 I_0 V\omega}{16\pi^2}\frac{\mu}{\mu_0}\Big\{ & \frac{1}{r^5}\Big(\mathbf{i}\left[3xz\cos kr + (3x^2 - r^2)\sin(2\omega t - kr)\right] + \\
& + 3\mathbf{j}y\left[x\sin(2\omega t - kr) + z\cos kr\right] + \mathbf{k}\left[3xz\sin(2\omega t - kr) + \right. \\
& \left. + (3z^2 - r^2)\cos kr\right]\Big) + \frac{k}{r^4}\Big(\mathbf{i}\left[3xz\sin kr + (3x^2 - r^2)\cos(2\omega t - kr)\right] + \\
& + 3\mathbf{j}y\left[x\cos(2\omega t - kr) + z\sin kr\right] + \mathbf{k}\left[3xz\cos(2\omega t - kr) + \right. \\
& \left. + (3z^2 - r^2)\sin kr\right]\Big) - \frac{k^2}{r^3}\Big(\mathbf{i}\left[xz\cos kr + (x^2 - r^2)\sin(2\omega t - kr)\right] + \\
& + \mathbf{j}y\left[x\sin(2\omega t - kr) + z\cos kr\right] + \\
& + \mathbf{k}\left[xz\sin(2\omega t - kr) + (z^2 - r^2)\cos kr\right]\Big)\Big\}
\end{aligned} \tag{B36}$$

$$\begin{aligned}
\mathbf{P} = k^2\frac{I_0 V}{16\pi^2}\frac{\mu}{\mu_0}\Big\{ & \frac{1}{r^3}\Big(\mathbf{i}y\sin kr - \mathbf{j}\left[x\sin kr - z\cos(2\omega t - kr)\right] - \\
& - \mathbf{k}y\cos(2\omega t - kr)\Big) + \frac{k}{r^2}\Big(-\mathbf{i}y\cos kr + \mathbf{j}\left[x\cos kr - \right. \\
& \left. - z\sin(2\omega t - kr)\right] + \mathbf{k}y\sin(2\omega t - kr)\Big)\Big\} \,.
\end{aligned} \tag{B37}$$

The field lines of **K** in the y–z–plane are plotted to scale in Fig. 8 for a wave number $k = 2.73 \times 10^{-7}\ m^{-1}$ and somewhat schematically for $k = 1.57 \times 10^{-6}\ m^{-1}$ in Fig. 9. Circular field lines, separating antigravitational from gravitational zones, occur whenever the condition

$$1 + kr\tan kr = 0 \tag{B38}$$

is satisfied. The first 5 values of kr meeting this requirement are

$$kr = 2.798386,\ 6.121250,\ 9.317866,\ 12.486454,\ 15.644128 \,.$$

The separation between $(kr)_{n+1}$ and $(kr)_n$ approaches π with increasing n.

The electric, magnetic, and gravitational fields, including the mesofield, are obtained from Eqs. (B36) and (B37) by use of Eq. (B2),

$$\mathbf{E} = \mathbf{K}$$

$$\mathbf{H} = \mathbf{P} \qquad (\mathbf{B} = \mu_0 \mathbf{H})$$

$$\Gamma = \sqrt{\frac{\varepsilon_0}{\alpha}}\,\mathbf{K} \tag{B39}$$

$$\boldsymbol{\mu} = \sqrt{\frac{\mu_0}{\beta}}\,\mathbf{P}\ .$$

The mesofield $\boldsymbol{\mu}$ acts only on moving masses, on which it exerts a Lorentz–type force (cf. Eq. (A56g)),

$$\mathbf{F}_\mu = \beta m\ \mathbf{v} \times \boldsymbol{\mu}\ , \tag{B40}$$

where $\mathbf{v}$ is the velocity of mass m and β is given in Eq. (B3).

The vertical component of the gravitational field, Γ_z, is derived directly from Eqs. (B39) and (B36). Transforming x, y, and z back into spherical coordinates by means of Eq. (B29) Γ_z becomes,

$$\begin{aligned}\Gamma_z = -\sqrt{\frac{\varepsilon_0}{\alpha}}\,\frac{\mu_0 I_0 V\omega}{16\pi^2}\,\frac{\mu}{\mu_0}\Big\{ &\frac{1}{r^3}\Big[3\sin\theta\cos\theta\cos\Phi\sin(2\omega t - kr) + \\ &+ (3\cos^2\theta - 1)\cos kr\Big] + \frac{k}{r^2}\Big[3\sin\theta\ \cos\theta\cos\Phi\cos(2\omega t - kr) + \\ &+ (3\cos^2\theta - 1)\sin kr\Big] - \frac{k^2}{r}\Big[\sin\theta\cos\theta\cos\Phi\sin(2\omega t - kr) - \\ &- \sin^2\theta\sin kr\Big]\Big\}\ .\end{aligned} \tag{B41}$$

As this equation shows, the vertical field is not independent of time. However, the time–dependent terms do not contribute to the integral over the earth because $\cos\Phi$, integrated from 0 to 2π, gives zero. On the other hand, the factors $(3x^2 - r^2)$, occurring in the x–component of **K**, do not integrate to zero. The x–component of Γ containing these terms will be denoted by Γ_x. It provides an oscillatory gravitational force in a direction perpendicular to the axis of rotation and is given by the expression,

$$\Gamma_x = -\sqrt{\frac{\varepsilon_0}{\alpha}}\frac{\mu_0 I_0 V\omega}{16\pi^2}\frac{\mu}{\mu_0}\left\{\frac{1}{r^3}(3\sin^2\theta\cos^2\Phi - 1)\sin(2\omega t - kr) + \right.$$
$$+ \frac{k}{r^2}(3\sin^2\theta\cos^2\Phi - 1)\cos(2\omega t - kr) -$$
$$\left. - \frac{k^2}{r}(\sin^2\theta\cos^2\Phi - 1)\sin(2\omega t - kr)\right\} . \qquad \text{(B42)}$$

It should be possible to eliminate this sideway oscillation by mounting a second pair of counterrotating magnets turned through 180° relative to the first.

A strong electric field **E** is induced in addition to the relatively weak gravitational field. **E**, according to Eq. (B39), is given by Eq. (B36) and contains both stationary terms and terms oscillating with an angular frequency 2ω. The electric field gives rise to the phenomena mentioned in the Conclusions of the main text.

Of particular interest from a theoretical point of view is the observation of dark rings surrounding a UFO, as seen by W. A. Webb through his polaroid sunglasses (Roush 1968). Assuming the rings to be caused by the Faraday–rotation of the plane of polarized light due to the Zeeman effect, W. K. Allan has estimated the magnetic field strength required to explain the observation. His calculations are reported by Ch. A. Maney (1965).

According to the present theory, the antigravitational field is accompanied by a strong electric field and not by a strong magnetic field. However, the same rotation of the plane of polarization may be achieved by an electric field via the Stark effect. This phenomenon is known as the Kerr effect. Since the basic form of the electric field is known from Eq. (B36) the Kerr effect can be calculated exactly. This would yield valuable information about the electric field strength, and, by use of Eq. (B39), about the strength of Γ.

6. *The Antigravitational Force*

If ρ_m is the average mass density of the earth, then the gravitational force **F** acting on the magnets is equal to the following integral of Γ_z, extended over the volume of the earth:

$$\mathbf{F} = -\mathbf{k}\rho_m \int_h^{D+h} r^2 dr \int_{(\cos\theta)_{min}}^{1} d(\cos\theta) \int_0^{2\pi} \Gamma_z(r, -\theta, \Phi, t)\, d\Phi \ , \qquad \text{(B43)}$$

where

D = diameter of the earth ($D = 1.2757 \times 10^7$ m)

h = height of magnet above the earth's surface

$$(\cos\theta)_{min} = \frac{h(D+h)+r^2}{2(R+h)r} .$$

Γ_z in this equation is taken from Eq. (B41). As mentioned above, the time–dependent terms in Γ_z do not contribute to the integral. Performing the integration of Eq. (B43) results in the expression,

$$F = -k\frac{c\rho_m}{8}\sqrt{\frac{\varepsilon_0}{\alpha}}\frac{\mu_0 I_0 V}{2\pi}\frac{\mu}{\mu_0}g(k,h) \tag{B44}$$

$$\begin{aligned} g(k,h) = \frac{1}{(R+h)^3}\Big\{ & -D(D+2h)\Big[\sin kh + \sin k(D+h)\Big] + \\ & + \frac{4}{k}\Big[h\cos kh - (D+h)\cos k(D+h)\Big] - \\ & - \frac{4}{k^2}\Big[\sin kh - \sin k(D+h\Big]\Big\} . \end{aligned}$$

The g(k,h)–function is plotted in Figs. 10 and 11 of the main text.

References

Auerbach, T. (1983, 1985). Memoranda to MBB (Messerschmidt–Bölkow–Blohm) of 3. 31. 1983, 7. 21. 1983, and 7. 19. 1985.

Harasim, A., v. Ludwiger, I., Kroy, W., Auerbach, T. (1985). Laboratory Experiment for Testing the Gravi–Magnetic Hypothesis with Squid–Magnetometers, *SQUID '85–Superconducting Quantum Interference Devices and their Applications*, H.D. Hahlbohm and H. Lübbig editors, Walter de Gruyter & Co., Berlin.

Heim, B. (1959). Das Prinzip der dynamischen Kontrabarie, *Flugkörper, Vol. 1*, 100–102, 164–166, 219–221, 244–247.

Heim, B. (1989). *Elementarstrukturen der Materie, Vol. 1*, Resch Verlag, Innsbruck, Austria (this is a thoroughly revised version of the 1980 edition).

Heim, B. (1984). *Elementarstrukturen der Materie, Vol. 2*, Resch Verlag, Innsbruck, Austria.

Heim, B. (1985). Koppelung zwischen Magnetfeld und Drehimpulsdichte (Vorschlag eines Alternativexperiments), Memorandum to MBB.

v. Ludwiger, I. (I. Brand) (1976). Neuere Theorien der Gravitation und die qualitative Erklärung für einige physikalische Wirkungen der UFOs, in *1975 MUFON–CES Symposium Proceedings*, Munich, 148–220.

v. Ludwiger, I. (I. Brand) (1979). Ansätze zu einer Theorie über die Eigenschaften unidentifizierbarer Lichterscheinungen auf der Basis der Heimschen einheitlichen 6–dimensionalen Quanten–Geometrodynamik, in *1978 MUFON–CES Symposium Proceedings*, Munich, 227–377.

v. Ludwiger, I. (1981). Die einheitliche geometrische 6–dimensionale Quantenfeldtheorie von B. Heim, MBB TN–AE 331–7/81.

v. Ludwiger, I. (I. Brand) (1983). Die innere Struktur elementarer Subkonstituenten der Materie, in *1983 MUFON–CES Symposium Proceedings*, Munich, 259–419.

Maney, Ch. A. (1965). Scientific Measurement of UFOs, *Fate*, 38.

Roush, J. E. (1968). Symposium on Unidentified Flying Objects, PB 179541, Hearings Before the Committee on Science and Astronautics, July 29, 1968, Washington, D.C., statement by J. A. Harder, 113–126.

Schneider, A. (1976). Elektromagnetische und gravitative Wirkungen unbekannter Flugobjekte, in *1975 MUFON–CES Symposium Proceedings*, Munich, 69–147.

Schneider, A. (1981). *Automatische Registrierung unbekannter Flugobjekte*, MUFON–CES Bericht No. 7, Munich.

Stratton, J. A. (1941). *Electromagnetic Theory*, McGraw–Hill, Inc., New York and London.