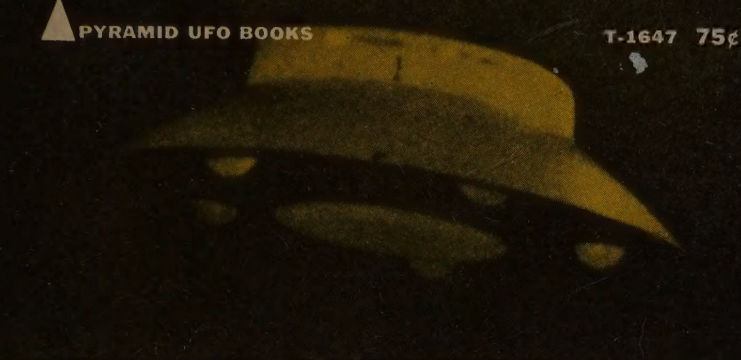




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***THE TRUTH ABOUT
FLYING SAUCERS***

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NEW YORK

THE TRUTH ABOUT FLYING SAUCERS

A PYRAMID BOOK

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Introduction

ON JANUARY 7TH, 1954, at 4:26 a.m., M. Brévert, a baker at Arras, was working in his bakehouse when he thought he would step outside for a breath of fresh air. Scarcely had he done so than a strange glow in the sky made him look upwards. At a point just above the Place de la Vacquerie behind the Town Hall, a luminous disc as big as the full moon, but much brighter, was hanging motionless. M. Brévert, startled and incredulous, rubbed his eyes, but the object was undoubtedly there and apparently not very far above the town. It remained in this position for several seconds, and then suddenly started a rocking movement, discharged a dazzling flash of light which illuminated the whole of the Place, described a semicircle and vanished at an immense speed in the direction of St. Pol-sur-Ternoize, nearer the coast, filling the sky with an enormous orange-colored radiance.

Almost at the same moment, at 4:27, a railwayman who was on duty at Orchies, about 25 miles northeast of Arras as the crow flies, saw a shining disc vanishing towards the southwest. It was moving horizontally at an enormous speed, with a vivid orange-colored light trailing behind it.

A few seconds later the whole of the Seine-Inférieure department, from Fécamp in the west to Dieppe in the north, Mailleraye in the south to Gournay in the east, was lit up by what seemed to be a huge fire in the sky. For half a minute the light was so bright that the railwaymen

at Serqueux were able to see the registration numbers of the carriages. A few minutes later Dieppe was suddenly shaken by a tremendous explosion which smashed a large number of windows and woke up most of the people in the town.

That evening a spokesman of the Astrophysical Institute of Paris made the following statement: "It is very probable that the phenomenon seen this morning in the Dieppe area was a meteorite."

For some years now scarcely a week passes in which the newspapers do not report almost a dozen incidents of this character. First a number of strange sights, some of them not beyond belief, others far more startling, then an official explanation which recognizes only the former and leaves the latter unexplained.

In the Dieppe incident, for example, a meteorite obviously provides a fair explanation of what was seen in the Seine-Inférieure department. But what do the authorities at the Astrophysical Institute say about what M. Brévert saw? Nothing at all. Experts of this kind accept nothing as a scientific fact unless there is something to show. Of course, they are quite right. This attitude is entirely in accordance with the fundamental principles of experimental science.

Still, it leaves us unsatisfied. For even though we admit, for the sake of argument, that doubts may be cast on M. Brévert's story, we cannot for ever disregard the hundreds of accounts which corroborate it and the repetition of details which could not be invented because they are meaningless until we know more about the subject. Take, for instance, the "rocking movement" which M. Brévert is supposed to have invented. Why should he have credited an illusion with a rocking movement? The fact is that this rocking movement has been reported by thousands of witnesses who have seen a flying saucer take off. The "imaginary machine" known as a flying saucer, in all the accounts culled from French Equatorial Africa, Arizona, Arras or South Africa, invariably seesaws when taking off.

For a number of reasons of this kind, anyone undertaking an unbiased investigation of the evidence collected for several years by various official bodies from every quarter

of the globe cannot help feeling, not only puzzled, but dismayed. Of course official science in France continues to deny the existence of flying saucers. But some well-known savants have deserted the sceptics and joined the ranks of the witnesses. While Professor Augé describes the flying saucer as "the aerodynamic version of the sea-serpent," and M. Evry Schatzmann, Director of Research at the National Centre of Scientific Research, alleges that the witnesses and those who report their accounts are guilty of "intellectual dishonesty,"¹ astronomers such as Seymour L. Hess of the Lowell Observatory at Flagstaff, and the eminent Clyde Tombaugh, who discovered the planet Pluto, state that they have seen flying saucers in the sky and give circumstantial accounts of their experience. Will *they* also be accused of intellectual dishonesty? If they are, we cannot help recollecting that in the history of science all who have disturbed official intellectual complacency have had to face the same charge. If M. Augé expresses doubts as to Clyde Tombaugh's or Mr. Hess's intellectual honesty, surely those of us who are not experts are entitled to think that we must form our own opinions on the subject if we are rash enough to find it exciting.

Some dismiss the whole matter as just another "sea-serpent" craze. No one can reasonably object. But what would the authorities at the Institute of Oceanography or the Natural History Museum think of the sea-serpent if Professor Piccard stated that he had seen it during one of his diving experiments? Astronomers have actually seen flying saucers. That is the first difference. The problem of the sea-serpent, moreover, is a dispute between all the romantics on one side and all the savants on the other. In such a case the ordinary man's verdict is easy. But in the case of the flying saucers, all the savants are not on the same side for the simple reason that some of them say they have seen them. The problem is thus put squarely.

Has any attempt been made to solve or at least to study this problem? It has. In this book the reader will learn of the efforts made more or less surreptitiously in the United States of America, Canada and Great Britain to investigate

¹ L'Education Nationale, No. 15, p. 11.

this mysterious phenomenon. In France little or nothing is known of these investigations. All that most of the French savants have read on this subject consists of the statement, issued in December, 1949, by "Project Saucer," the United States Air Force inquiry (see next page), and as far as they are concerned the few lines comprising this statement are the last word on the matter. They are quite unaware that when this first Project was brought to an end its functions were transferred to another body with far greater resources at its disposal, and that the investigation is still continuing.

It is plain that, in spite of widespread indifference, there is perhaps, in the middle of the twentieth century, no question of more fateful import to human destiny than this: Do flying saucers really exist? For if it is true that machines from another world are frequenting our skies, the destiny of our planet is assuredly at stake. The whole thing may be an illusion. Or it may not. It is essential for us to find out, one way or the other. If the thousands of identical accounts which day by day reach the files of the commissions of enquiry are true, truly the implication must be that we have a sword of Damocles hanging over our heads.

Such are the ideas which prompted the enquiries culminating in the writing of this book. In some respects, I must admit, the results of my endeavors are not altogether satisfactory. For one thing, I cannot claim to have solved the mystery at all. If I am asked: Do flying saucers really exist, yes or no? I can only answer by indicating the method which I followed in my research and the results of that research. Readers can form their own conclusions, if they care to do so.

First, the method. All the documents used or quoted in this work are to be found in the following sources:

1. Reports of the first Flying Saucer Commission.¹

¹ The investigation to which the author refers as the "Flying Saucer Commission" is known in this country as "Project Saucer." It was begun at the end of 1947 on the orders of Secretary Forrestal of the Air Force (then called the Army Air Force). Its official code name was Project Sign; on February

2. Communiqués or records of the Air Forces in the United States of America, Great Britain, Canada, South Africa, France, Sweden, etc.

3. Reports of the second American investigation by the Air Technical Intelligence Center (A.T.I.C.).

4. The National Meteorological Office (France and the French Union).

5. French and foreign technical periodicals.

6. Personal enquiries. In this connection I take this opportunity of expressing my thanks to M. Roger Perriard for his valuable investigations in North Africa, an area he knows so well. I should also like to thank all scientists who have helped and encouraged me in my endeavors, but asked me not to mention their names. For in France ■ savant who publicly admitted his interest in flying saucers would endanger his career.

7. I have relied on the information given by Major Donald Keyhoe in his two books,² so far as it is derived from Air Technical Intelligence sightings or records. This attitude ■■ my part must not be taken ■■ indicating any doubts about the value of Major Keyhoe's work. He is sometimes rather enthusiastic in his comments, but in recording facts he is scrupulously honest and conscientious.

The above are the main sources of the facts I have placed on record. I have offered explanations of these facts and the reader will find the explanations accompanying the individual sightings to which they refer, where they are of particular occurrences, or at the end of the book where they involve theories of ■ more general character such ■■ those of Professor Menzel and Lieutenant

11, 1949, the name was changed officially to Project Grudge, and to Project Bluebook early in 1952. Air Technical Intelligence is the division of the Air Force that receives saucer reports (as well as reports on many other subjects affecting the operation of military aircraft); headquarters for this branch of the Air Force is the Air Technical Intelligence Center, located at Wright-Patterson Field, Dayton, Ohio.—AMER. EDS.

² Donald E. Keyhoe: *The Flying Saucers Are Real* (Gold Medal Books, N. Y., 1950); *Flying Saucers From Outer Space* (Henry Holt & Co., N. Y., 1953).

Plantier. It is for my readers to decide whether my explanations of the strange phenomenon which we are investigating are plausible, or whether they merely add to the mystery.

I can at any rate assure them that I have been careful to guard against preconceived ideas either about the evidence given by witnesses or their explanations. If, after reading my book, the reader finds himself pondering more deeply on the unknown world to which he is now about to be introduced, and inclined to believe that the universe may be more complex and mysterious than he thinks, and that it has not yet surrendered its most fantastic secrets, neither his efforts nor mine will have been in vain.

PART ONE

THE AMERICAN INVESTIGATIONS

The First Reports

1

AS FAR AS I know, the expression "flying saucer" was invented by Kenneth Arnold, an American business man. On June 24th 1947, Mr. Arnold was flying solo in his private airplane above the State of Washington, in the extreme northwest of the United States, exactly halfway between Chehalis and Yakima. It was a sunny day, and twenty miles away the snowy peak of Mount Rainier was glittering under the blue sky. Mr. Arnold was looking straight in front of him when a sudden flash of light made him turn his head. Conspicuous against the white mantle of the snow, nine gleaming discs were travelling at a terrific speed, which he estimated roughly, by comparing their angular velocity with their approximate distance from the mountain, at about a thousand miles per hour. For three minutes Mr. Arnold, utterly amazed, watched the nine gleaming discs perform their evolutions between the mountain peaks, in formation, "exactly," he afterwards stated, "as if they had been linked together at a height of about 10,000 feet." Still basing his estimate on the approximate distance of the mountain, he computed that they were of much the same size as a DC-3. On reaching Yakima he added that they were shaped like a pie pan, or better still, a kind of saucer made of some metal which was silvered over and glittered in the sun.

FRED JOHNSON'S COMPASS

It will be remembered that Kenneth Arnold's story caused quite a sensation. Newspapers throughout the world reported it, and some of them added ironical comments on the vivid imagination of Americans. The mistake which they made, however, was to mention Kenneth Arnold only, for that same day, June 24th, 1947, before his story was reported in the press, a prospector named Fred Johnson, who was working in the Cascade Mountains, had noticed five or six objects in the sky exactly like those seen by Mr. Arnold. With the help of a telescope he was even able to follow their movements for several seconds. It is noteworthy that, while these objects were passing by, the magnetic needle of Fred Johnson's compass moved about in a most erratic manner.

THE FIRST INVESTIGATION

American flying authorities then started an investigation. Of course, it was their business to do so, but it is a pity that the investigators did not set about their task before the press had scoffed at Kenneth Arnold. The evidence then collected would have had much greater value if it could have been asserted that the witnesses were not prompted by the desire to go one better than Mr. Arnold for the purpose of getting into the headlines.

In any case, a pilot from Oklahoma stated that a month earlier he had seen a gleaming disc in the sky. It was speeding faster than a jet plane and without a sound. The investigators were also informed that two other flying saucers were seen on June 12th at Weiser, Idaho. They were moving in a straight line and then suddenly changed altitude. On June 21st there was a report from Spokane, then came Kenneth Arnold's on the 24th, and finally, on June 28th six flying saucers were seen in Nevada by an Army Air Force pilot.

There were a number of other reports in addition to Mr. Arnold's. The American authorities gave them a cursory examination and then, on July 3rd, 1947, despite this accumulation of information reported by eye-witnesses, published a communiqué to the effect that the accounts must be attributed to hallucinations.

MORE SIGHTINGS

But the authorities were unlucky. On July 4th, flying saucers were seen above several towns in the northwest United States (Oregon and Washington). At Portland, Oregon, there were several hundred witnesses, pilots, harbor authorities, police inspectors. All their statements agreed. They had all seen one or more discs shining in the sun and moving along at a great speed at a height which was estimated at about 40,000 feet by those most qualified to do so. On the same July 4th and also in the northwest, above Idaho, Captain Smith of United Airlines watched the flight of five saucers for several minutes. They were soon joined by four others and then moved off in group formation far ahead of Captain Smith's plane and easily seen against the setting sun.

Captain Smith was sceptical. He refused to believe his own eyes until his second-in-command, Stevens, and the air hostess, Marty Morrow, convinced him that he had not been dreaming. The three of them watched the strange sight for about ten minutes, after which the nine discs vanished.

THE ASTRONOMERS JOIN IN

This wealth of evidence, on the day after the authorities published their communiqué, created quite a stir. Some journalists suggested that the machines which had been sighted in the northwest of the United States had been sent up by the Navy, whereupon the latter, probably far from reluctant to pass the buck to the Army, stated that this was not so, and that the circular, two-engined plane XF-5-U-1, better known as ■ "Flying Flapjack," had been given up after testing. So the Navy was out of the business.

It seemed obvious that some other approach would have to be made after Vannevar Bush, the expert whom President Roosevelt had placed in charge of all scientific research connected with national defense, stated that, although he knew all about the American investigations in this field, he had never come across anything resembling flying saucers.

The astronomers were then approached. Professor Gerard Kuiper, Director of the Yerkes Observatory, at the

University of Chicago, declared that the phenomena described did not correspond to any known meteor and were obviously man made. The director of another observatory gave a similar opinion and added that, in his view, the saucers were produced by the Army. The position now was that nobody wanted to assume responsibility for the flying saucers.

THE OFFICIALS ARE ANNOYED

In the United States of America, when some question or other, however trifling, agitates public opinion, the authorities receive thousands of telephone calls and the newspapers, eager to increase their sales, pester senators, congressmen, governors and commissions with their enquiries.

At Washington this fuss about flying saucers was becoming a thorough nuisance. On July 3rd an "authorized source" there supplied the Associated Press with the following statement:

The flying saucers may be one of three things:

1. Solar reflection on low-hanging clouds;
2. Small meteors which break up, their crystals catching the rays of the sun;
3. Icing conditions that have formed large hailstones, which might have flattened out and glided a bit, giving the impression of horizontal movement, even though falling vertically.

Such was the first attempt to explain away the flying saucers. It angered those who claimed to have seen them and amused everyone else. There was so great a discrepancy between the descriptions given by the witnesses and the explanations suggested that the "authorized source" clearly seemed to be making fun of the gullible "visionaries."

MORE FLYING SAUCERS

Unfortunately for the "authorized source" the number of sightings increased and became more and more difficult to explain away. On July 8th, pilots and officers of Muroc Air Force Base, saw silvery saucers moving at great speed

across the sky. On the same day newspapers published the story of a naval rocket expert carrying out a secret mission in the New Mexico desert, who on June 29th, had watched the flight of ■ silvery disc which was moving northwards at an altitude of about 10,000 feet. This expert, C. J. Zohn, said that:

1. The object could not be ■ meteor;
2. If it was ■ machine operated by remote control, he had never heard of anything of the kind.

It may be added that C. J. Zohn was accompanied by three other technicians, all of them equally familiar with American inventions in the way of rockets and jet planes. The evidence of these four experts, although not very detailed, is among the most impressive hitherto recorded.

FIRST CONCLUSIONS

Exactly ■ fortnight had passed since Mr. Kenneth Arnold's strange experience. The investigation by the American flying authorities had produced some twenty cases reported by witnesses who could be fully vouched for: flying experts, officers at military experimental stations, staffs of control towers of military and civil airports, naval officers and members of the police force, apart from a large number of casual witnesses. If the evidence had been concerned with something quite different from these amazing flying discs—if, for example, instead of the silvery saucer which recurs in all the descriptions, the witnesses had reported ■ more plausible machine displaying, say, the red star of the Soviets—such ■■ accumulation of evidence would certainly have carried conviction both with specialists and the general public. If the sum total of evidence had indicated that the witnesses had seen Russian contrivances of one kind or another, it can hardly be doubted that such evidence would have sufficed to justify a note of protest from the American government.

Unfortunately, or perhaps fortunately, all the witnesses told practically the same story and there was nothing to suggest that the Russians were involved. Their story was also improbable. The objects seen in the sky were circular,

flattened, silvery, silent, with a diameter at least equal to the length of a Dakota, and capable of every variety of movement, from hovering in one spot to supersonic speeds in all directions, including vertical ascent. It was these powers of acceleration, their most remarkable feature, which were mainly responsible for the scepticism of official and scientific circles. Jet plane technicians, accustomed to pit their ingenuity against the "mass-ratio," which has been described by Alexander Ananoff as the bugbear of the rocket experts, refused to believe the accounts which credited a flying object with the ability to move along on a crooked course, describing an acute or obtuse angle when it changed direction, and to stop dead or to start off again at full tilt, keeping up this process indefinitely in an effortless manner and with recuperative powers which seem to be unlimited.

THE ARGUMENTS OF THE SCEPTICS

The technicians had the best of reasons for not believing in the possibility of such feats. The mass-ratio law¹ is altogether incompatible with them, unless the gas ejection velocities used approximate that of light. But in such a case the energy produced by the engine at the moment of acceleration would have been so great and released so violently that such a process could not possibly operate without noise.

Thus, the mass-ratio law clashes with the evidence. Now this law can be demonstrated by mechanical means in a manner which leaves no doubt as to its validity. It is not merely a law which is established by experiment, liable to be displaced by some other experiment. In the present state of science it is as firmly established as the fifth proposition of the first book of Euclid. The flying saucers, or at any rate, what we are told about them, were more than unlikely; they were impossible, and indeed, they still are.

BACK TO THE BEGINNING

And yet we still have among us men obstinate or sceptical enough to have doubts about matters which

¹ On this subject see pp. 191-193.

have been proved and settled and passed into a category of final scientific truths.

At that time—this was in July 1947—various individuals with an inquisitive turn of mind took it into their heads to look up the records to see whether reports like Kenneth Arnold's were really new. Whatever the explanation of the flying saucers might be—hallucination, natural phenomena and so forth—why had they not been heard of before 1947?

This point was stressed in an article in *The Washington Star*. On July 6th, 1947, after the "authorized source" at Washington had issued its suggestion about a gliding hailstone, the writer pointed out that American airmen based in England during the war had already made statements similar to that of Kenneth Arnold:

"During the latter part of World War II, fighter pilots were convinced that Hitler had a new secret weapon. Yanks dubbed these devices 'foo fighters' or 'Kraut fireballs.'

"One of the Air Force Intelligence men now assigned to check on the saucer scare was an officer who investigated statements of military airmen that circular foo fighters were seen over Europe and also on the bombing route to Japan.

"It was reported that Intelligence officers have never obtained satisfactory explanations of reports of flying silver balls and discs over Nazi-occupied Europe in the winter of 1944-45. Later, crews of B-29's on bombing runs to Japan reported seeing somewhat similar objects.

"In Europe, some foo fighters danced just off the Allied fighters' wingtips and played tag with them in power dives. Others appeared in precise formations and on one occasion a whole bomber crew saw about fifteen following at a distance, their strange glow flashing on and off.

"One foo fighter, says a war correspondent of the United Press, chased Lt. Meiers of Chicago some twenty miles down the Rhine Valley, at 300 m.p.h. Intelligence officers believed at that time that the balls might be radar-controlled objects sent up to foul ignition systems or baffle Allied radar networks."

The author of this article then went on to suggest that the Americans had discovered the secret of these contraptions at the end of the war and subsequently carried out tests over American territory. Such a development would have explained why they were seen above Washington, Oregon and Idaho. But a moment's reflection showed that this theory would not hold water:

1. If these "foo fighters" were German, why did they never display the slightest disposition to attack? Although the accounts given by the airmen differed in detail, the investigators did not discover a single case of the mysterious machines showing fight. Surely Hitler would not have used such a weapon so kindly at the very time when the V-1's were pounding London.
2. What about the famous law of mass-ratio? German technicians might ignore the dictates of humanity, but they could not get away from the laws of physics.

That is why the investigation organized in 1944-45 by the 8th American Air Force resulted in a final decision. As the investigators could discover no trace of an attack by an unknown contrivance on the American machines, they had nothing to go upon except the reports of the airmen, and they pronounced officially that hallucinations accounted for everything. As a matter of fact an odd incident occurred at the Pentagon in 1949, five years after the official decision.

Major Donald Keyhoe, who had been a Marine pilot, and later, the Chief of Information of the Air Commerce Bureau, was then carrying out an investigation into flying saucers on behalf of the magazine *True*. He applied to the Pentagon for permission to consult the report by Air Technical Intelligence on the ghost fighters, but was informed that this particular file was secret. Why?

BALLOONS?

Incidentally, it should be emphasized that the official finding of collective hallucination and fatigue was not made public until after the war. While pilots were en-

countering shining globes and discs known collectively as "foo fighters," the intelligence officers did not venture to put forward ■■ explanation which was scarcely complimentary to their fellow officers. They suggested that the "fighters" in question were objects "suspended from balloons or some other kind of support invisible at night, and that the rapid movements reported in certain cases were to be ascribed to optical illusions."

Professor Donald H. Menzel, Professor of Astrophysics at the University of Harvard, writes in his book *Flying Saucers*: "The idea that balls of light suspended from balloons could account for the observations is completely at variance with the reports. I should rather accept the alternative that the objects were interplanetary saucers."

But the Professor does not believe in the interplanetary theory. In due course we will examine his own theory. It resembles all other explanations offered to date in ignoring certain features which still remain completely baffling.

Other Saucers

2

THE ARTICLE PUBLISHED in *The Washington Star* showed that Kenneth Arnold was by no means the first to have observed flying saucers. Similar objects had been travelling about in the sky for some time past, and now and then they had been noticed.

In 1926 ■■ team of American explorers led by Nicholas Roerich¹ was passing through Mongolia. His attention

¹ *Altai-Himalaya*, by Nicholas Roerich, p. 361.

having been drawn one morning by one of the porters to the odd behavior of a bird of prey, he saw in the sky an unknown object which was swiftly moving in a southerly direction. He focused his binoculars on the dark speck and was utterly amazed by what he saw. The object seemed to be oval in shape, unless it was circular seen sideways on. It certainly bore no resemblance to any familiar object. It was silver grey in color and of huge size. The sunlight sparkled on its polished metallic surface. Roerich followed the southerly course of the strange object for a moment or two but it suddenly changed course, veered southwest and vanished.

The description given by Roerich tallies in every respect with subsequent observations: shape, appearance and color, size, behavior were the same. There can be no doubt that the object he saw in the skies of Mongolia was what has since become known as a flying saucer.

A STRANGE SHADOW

But we can go back further. The American periodical *Monthly Weather Review* in 1913 reported a very curious occurrence. On April 8th in that year, the sky above Fort Worth, Texas, was covered with a thin, even layer of clouds. It was a windy day and the opaque curtain was moving fast but intact toward the horizon.

It was broad daylight. The sun could be glimpsed through the clouds. Presently, a number of the Fort Worth residents who were looking upward caught sight of a dark speck which grew bigger and bigger, then stopped in its tracks, throwing a circular shadow on the background of clouds. While the clouds continued to drift along with the wind, the shadow did not move with them. It was as if a circular object had descended from a high altitude and settled down above the bank of clouds. After a few moments the area of the dark shadow retracted until it was a speck again. Then it disappeared.

This account is very uninformative in many ways. It would have been interesting to know the altitude of the bank of clouds, the position of the sun (i.e., the time of the occurrence), the force of the wind at various altitudes, as well as the angles of the shadow thrown. But the high standing of the journal in question guarantees the

accuracy of the few facts reported and these facts seem to rule out the most obvious explanation—a drifting balloon. It might also be observed that:

1. Even if the angles could not be established, the very fact that the shadow was visible through the clouds presupposes that it was of very great size—as it must have been for its circular shape to have been observed.

2. Assuming it was a balloon, it must have been a real balloon, big enough to carry a basket attachment, and not the miniature balloon used for meteorological purposes.

3. Furthermore, the object was capable of self-impelled motion (it descended, halted and then rose again). It is possible to make a balloon descend by releasing gas and ascend by throwing out ballast. But if gas rises, ballast falls! There is no mention of ballast falling in the report of this occurrence in the *Monthly Weather Review*.

4. Even admitting that the ballast might have been fine sand and fell without being seen by the citizens of Fort Worth, the fact remains that the shadow did not move even though the wind was driving the clouds along quite fast. This fact alone makes the balloon theory very improbable, unless it could be said that the balloon was taking advantage of a motionless layer of air above the layer in movement. Of course that is not impossible, but layers of air moving at different rates do not glide over each other like a stream over a bed of pebbles. They are separated by an intermediate layer of air which is itself moving, though on no defined course. The thickness of this intermediate layer is determined by the relative speed of the other two layers: the higher the speed the thicker the layer. This would mean that the shadow observed at Fort Worth would never have presented the comparatively clear outline mentioned in the account. A broad fringe of penumbra, produced by the distance of the object, would have deprived it of that unusual appearance which puzzled the witnesses.

In short, nothing positive emerges from this record, which has all the features which Captain Clérouin deprecates in most of the evidence: everything is sudden, fleeting and vague. But that cannot be helped. Far from

disposing of the problem, these shortcomings only make it more provoking. For, although the evidence is vague, the various accounts have so much in common that their ultimate results is to make doubt seem unreasonable. After all, what the observers at Fort Worth saw on April 8th, 1913, was a round object, capable of remaining motionless and also of rising vertically.

The *Monthly Weather Review* reports even earlier observations, but unfortunately even vaguer. A kind of aerial spindle was supposed to have been seen in Vermont on July 2nd, 1907; a light travelling at high speed was observed over the Atlantic on February 24th, 1904, by Lieutenant Schofield and the crew of the "Supply," and so on. The spindle may well have been a dirigible, and the light a meteor or a fireball.

CAN THE ASTRONOMERS HELP US?

But there is another class of observations of greater interest. The sum total may not amount to much, but at least they are completely trustworthy. I refer to the observations of astronomers.

When someone once asked Professor Esclançon for his opinion about flying saucers, he replied:

"Everyone is seeing them. People who casually look up at the sky once a month are lucky enough to see them. But we astronomers, who spend the whole of our lives scouring the sky, have never seen a single one in our telescopes."

It can be readily understood that Professor Esclançon, one of the glories of astronomy, never found the time to ponder on a subject as frivolous as ours. But his answer nevertheless provokes a few comments:

1. How many airplanes or birds did Professor Esclançon see through his telescope in the course of his career? None, of course. Airplanes and birds fly much too close to the earth to be seen by instruments focused for infinity, and with a field of vision so limited that the slowest airplane takes only a few thousandths of a second to cross it.

2. The "flying saucer," as described by real or alleged

witnesses, is not an astronomical phenomenon. It appears not in the sky of the astronomers but in that familiar to meteorologists, airmen and the casual stroller. It would appear to be a creature of the earth's atmosphere, and so the casual observer is better equipped with his eyes for seeing it than are the astronomers with their instruments.

3. But ■ a scientific attitude must not *a priori* rule out any theory, however preposterous, let us assume for a moment that the phenomenon seen in the sky of the meteorologists is only a particular case of something of larger import. In other words, let us assume that the "flying saucers" observed with the naked eye at a low altitude are also capable of roving much farther afield into the sky of the astronomers. How would they look to the latter? Two alternatives can be considered. The first is that the flying saucer is a body emitting a light of its own, i.e., something with its own source of light. In that case photographs of the sky taken in observatories will reveal it as a trail of light. But how are we to distinguish this trail from those which meteorites and shooting stars leave on photographic plates? There would appear to be only one clue to the origin of such a trail, namely, the shape of the curve. Meteorites and similar bodies move in a straight line, but all the evidence about flying saucers indicates they are able to twist and turn and perform evolutions in every variety of trajectory.

Here, however, we are faced with the objection which we took when commenting on Professor Esclangon's statement about airplanes and birds. If the saucers are at a great distance from the earth they cannot make an impression upon a photographic plate unless the luminosity is enormous. The sightings, however, do not suggest a luminosity capable of affecting ■ photographic plate at a distance of several thousand miles. On the other hand, if the saucer is near enough to affect the plate, it crosses the angular field of the instrument in a fraction of a second and its passage is represented by a straight line identical with that left by ■ meteor.

So on the assumption that the saucers move in astronomical space and project a light of their own, we can only

conclude that astronomers will have the utmost difficulty in distinguishing a flying saucer from a meteor.

The second alternative, which seems to be a little more hopeful, is that the flying saucer is a dark, opaque body, capable of movement in the sky of the astronomers. What will happen? The slightest reflection will show that our only chance of seeing the object through astronomical instruments will be when it happens to pass in front of the sun or the illuminated disc of the moon.

Now when the most powerful astronomical apparatus in the world—the telescope at Yerkes, the St. Michel Observatory, or Mount Palomar, for example—is focused on the moon, it is estimated that an object a hundred yards in diameter, placed on the surface of our satellite, would appear in the eye-piece as a speck. If the object were a cavalry charge, for instance, the speck would be seen slowly moving.

Now let us assume that, instead of being placed on the surface of the moon, the object is moving in space between the earth and the moon, at a distance, say, of about 100,000 miles from the earth. A simple calculation will show that, in order to be visible the object need measure only 25 to 30 yards in diameter. We are getting into the realm of the dimensions attributed to flying saucers by those who claim to have seen them.

We are thus entitled to say that if flying saucers exist and if they can travel in an area 100,000 miles in depth, circumscribing the earth, astronomers ought to see them every time that the four or five most powerful instruments in the world are focused on the sun or moon at the moment when a saucer passes between the orb and the lens of the telescope. As the distances progressively diminish, down to a few thousand miles, the number of instruments capable of revealing a saucer will increase in inverse ratio to the square of the distance, always assuming, of course, that the saucer passes across the source of light.

LEVERRIER BAFFLED

Astronomers are indeed familiar with the fact that dark specks sometimes cross the moon and the sun. It cannot be said that such spectacles are frequent, but they do occur. The archives of all the observatories in the world possess-

ing apparatus devoted to the study of the moon or the sun contain records of such phenomena. The astronomer Lucien Rudaux, for example, in one of his later books, *La Lune et son Histoire*, published by the Nouvelles Editions Latines in 1947 (the year, it will be noticed, in which Kenneth Arnold encountered nine flying saucers), writes as follows:

“Observers of the solar disc have sometimes seen mysterious heavenly bodies, in the form of small dark specks, crossing it. Their behavior was exactly similar to that of the planets Mercury and Venus¹ when, in obedience to natural law, they appear on dates fixed and forecast, exactly between the sun and the earth. When I describe these heavenly bodies as mysterious, I mean that we do not know what they are and what their place is among the others. As their movements are unknown, they defy prediction and take astronomers by surprise. The haphazard recurrence of these movements does not exactly simplify the problem, although various theories have been advanced to solve it.”

Lucien Rudaux then proceeds to deal with these theories:

“The first postulated the existence of a planet which, having regard to various considerations,² must be quite close to the sun, certainly nearer than Mercury. This planet was prematurely given the name of Vulcan. Having studied some of the records of transits observed at intervals between 1802 and 1861, and decided that they referred to one and the same body, Leverrier undertook to establish its orbit. According to his calculations, this orbit would have to be at a much steeper angle than ours

¹ By this Lucien Rudaux means that these bodies appeared as dark shapes. Venus and Mercury, known as “inner” planets, have their orbits between the sun and the earth.

² In particular the displacement of the perihelion of Mercury, a phenomenon which has been fully explained, though on different lines, by Einstein.

(which would explain why such passages were rare) and Vulcan took only 35 days to complete it. If this was right, it should have crossed the sun on March 22nd, 1877. Astronomers all over the world eagerly awaited its appearance that day. They waited in vain, and soon lost interest in Vulcan.

“The phenomenon was subsequently observed on various occasions,” adds Rudaux, “and so far no really satisfactory explanation has been put forward. It has also been suggested that it is a question of huge meteors, but if this were so, the frequency of their passage across the sun would involve their appearance in the path of the earth also. Yet although the earth has occasionally encountered a few large meteors, the great majority of them are quite small.”

In connection with these dark spots on the sun the possibility of some exceptionally erratic trans-Martian asteroid has also been suggested. But in this case the asteroid, or asteroids, would return from time to time. Small moons have also been mentioned as a possible explanation, but the same objection would apply to them.

Lucien Rudaux refers only to specks which have been seen against the background of the sun. But the same puzzling phenomenon has been observed crossing the moon. One such case was reported by the American periodical *Popular Astronomy*. “Dr. F. B. Harris described an intensely black object that he saw crossing the moon on January 27th, 1912. As nearly as he could tell, it was gigantic in size—though again there was no way to be sure of its distance from him or the moon. With careful understatement, Dr. Harris said ‘I think a very interesting and curious phenomenon happened that night.’”

Another case of something moving across the moon was reported by the London *Times* of September 30th, 1870. “The object,” said the *Times*, “was elliptical in shape ‘with a kind of tail.’ It crossed the moon from one side to the other in half a minute, and then disappeared.” The very same object was also observed over Berlin by Lord Brabazon. On October 12th of the same year, the astronomer William F. Denning saw at Bristol a luminous ball travel-

ling faster than a balloon but slower than a meteor, and emitting sparks. The same object, or one quite similar, was seen at Wimbledon by a member of the Royal Astronomical Society.

The luminous ball was seen again in 1871, this time at Boulogne. It was indulging in spiral antics and twirled round for several minutes before moving on. Between 1881 and 1889 several luminous balls were seen at Epinal, in the Seine-Inférieure Department, Turkey, Canada and New Zealand. This information was communicated to me by Robert de la Croix, a writer on maritime subjects, who seems to feel that these dates indicate that the activities of flying saucers fall into a ten years' cycle: 1860-71, 1881-89, 1898-1910, and so on.

ACCURACY AND LIMITATIONS OF ASTRONOMERS

Such are some of the earlier astronomical observations relating to unknown objects moving in space "in a manner defying prediction," as Lucien Rudaux puts it. They are precise, and reliable, but the details are scanty. The more elaborate accounts do not emanate from observatories, and we have seen why. Their telescopes and other astronomical instruments can only cover very distant objectives, and such objectives are difficult to pick out unless they have the enormous size of astronomical bodies.

FLYING SAUCERS IN THE PAST

At Bonham, in Texas, a huge flying machine appeared in the sky in 1873. It flew twice round the town and then disappeared in an easterly direction. It was noiseless and silvery and constantly changing shape while performing its evolutions. All the inhabitants of Bonham and the surrounding district who happened to be out of doors at the right moment saw it, but some thought it was cigar-shaped, others again said it was a moderate ellipse. These apparently contradictory statements really corroborate each other in the most satisfactory fashion, for a disc bulging in the center will obviously look circular when seen from in front, elliptic from an angle, and cigar-shaped from the side.

On the following day, the same, or a similar machine passed above Fort Scott in Kansas; it caused ■ panic

among the personnel there, and in a few seconds disappeared towards the north.

Two years previously, on August 1st, 1871, ■ identical object had been seen at Marseilles. Discs were reported in the Bermudas and at Adrianople in Turkey in 1885, in New Zealand in 1888, and at Oakland, California, on November 22nd, 1896. Estimates of sizes ranging from 30 to 60 yards in diameter began to be reported. An English admiral observed at sea an object exactly like that which crossed the moon on September 26th, 1870. It was elliptic and had ■ "tail."

THE DARK AGES

Must we go even further back? Of course, it would be entertaining to study the numerous Almanacs, Intelligencers and Prognostications compiled during the Middle Ages "for the profit and instruction of such as be heedless and slothful by nature," as Rabelais says in his *Pantagréu-line Pronostication*. Under the disguise of serious meteorology, these works disseminate superstitions and the most tedious fables. But from time to time one can discover curious information. We learn, for instance, that in 1478 ■ kind of fireball was seen roaming through Swiss skies—thanks to which the dauntless mountaineers were inspired to defeat the Milanese forthwith and slay 1,400 of their troops!

As early ■ A.D. 583 Gregory of Tours, the first historian of France, had mentioned globes of fire moving about in the sky. And going back to an even earlier period, we find the Latin author Pliny, in his *Natural History*, referring to certain kinds of comet which he calls "disci"—discs. And it is highly probable that Pliny himself took these discs from the *Meteorologica* of Aristotle. We might, indeed, go back as far ■ the Bible and ponder over the famous wheel seen in the sky by the prophet Ezekiel. But such venturesome speculation is futile. All these stories are either too symbolical or too remote or both. Back to the twentieth century and its greater store of responsible evidence, ■ century which will certainly go on record—some say to its glory, others to its discomfiture—as the first to witness the attempt to make a scientific

study of such mysteries as flying discs, globes and spindles.

PROJECT "SAUCER"

As we saw at the beginning of this chapter, the whole business started with Kenneth Arnold's description of his adventure. His reputation for sound common sense, the wealth of sober detail in the precision of his story, the corroborative evidence of the prospector Fred Johnson and, above all, the fact that within a few days the Air Force, police and press had interrogated many witnesses whom fear of ridicule had restrained from coming forward before—all this convinced the public that "something had happened," if not in the sky, as the witnesses and their supporters maintained, at least in the minds of a large number of people.

So from Kenneth Arnold onward anyone who saw, or thought he saw, something in the sky could rely on having his statement recorded, studied, judged and classified. We can assume that since the Mount Rainier case no incident has been missed if there was anyone to report it. Unfortunately, a certain amount of evidence, the most interesting, there is every reason to believe, has been kept secret. I propose to consider the evidence immediately recorded by the American Army Air Force during the past two or three years, and by the British War Office since "Operation Mainbrace."

FIRST INVESTIGATIONS

The first Air Force investigation was conducted in absolute secrecy, though all the 1947 sightings before the establishment of Project Saucer by the American Government have been made public, as far as we know.

As we have already seen, not long after Kenneth Arnold's experience, C. J. Zohn, a rocket technician with the Navy, saw a silvery disc flying at a height of about 10,000 feet above the New Mexico desert. A few weeks later, the investigators appointed by the aviation authorities received a report which was particularly odd because it concerned an entirely novel occurrence, at Twin Falls, Idaho. A disc had been observed flying immediately above a forest, and

the witnesses stated that they had seen the trees swaying as it passed, just as if it had been wind at storm force.

Several other interesting reports came in at that time. Some of them date from the beginning of 1947, that is, six months before Kenneth Arnold's report. Perhaps the most interesting was in April and emanated from the Weather Bureau.

This bureau, it should be explained, sends up each day a number of balloons carrying radio transmitters which, as they rise toward the stratosphere, provide the laboratories with full particulars of temperature, humidity, barometric pressure, and so forth. While the balloon is rising, it can be followed by means of a theodolite which establishes the angular co-ordinates at any moment.

One day in April, 1947, a meteorologist at Richmond, Virginia, was following the ascent of his balloon with his theodolite, when his field of vision was crossed by an unfamiliar object. He was able to follow this object with his apparatus, and, by constantly checking its position with that of the balloon, could form a fairly accurate idea of its altitude, the speed at which it was travelling and its real size. Such, at least, was the information given out in due course by Project Saucer. That, and nothing more. Size, altitude and speed were never made public—for fear of ridicule, no doubt, the probability being that the figures outraged common sense.

DISCS AND BALLS

The reports, just as when airmen were bombing Germany and Japan, naturally covered both luminous discs and balls.

On the night of December 8th, 1947, a ball of light was observed above the center of Las Vegas. For a short while travelling at a moderate speed, it showed its reddish glow above the town, then it flashed a powerful green light and shot up at a tremendous speed which the pilots at Las Vegas estimated was certainly supersonic. We know that the brightness of an object moving away diminishes as the square of the distance.

The investigators enquired whether some unidentified jet plane had passed that way at this time. The result was negative. They also enquired whether the release of

weather balloons could account for the occurrence, but this possibility was also ruled out because:

1. No weather balloon had been released in any area not predetermined.
2. Even if it had, it would not account for the green light at the moment of acceleration, the acceleration itself or the speed with which the object had ascended.

THE AMERICAN GOVERNMENT INTERVENES

This happened on December 8th, 1947. For several months there had been a succession of reports, all of them equally strange and also equally inadequate to suggest a plausible explanation. Admittedly the Air Force investigators manfully stuck to their task, but who could say that the solution of the problem was their function, seeing that nobody knew exactly what was being investigated? Further, as no explanation could be excluded, were there no grounds for supposing that some foreign power, an enemy to America, had produced some novel contrivance which was a danger to national security?

Of course public opinion was passionately aroused. Some said that the Russians were behind this. Mr. Vyshinsky sarcastically corroborated that theory. "These saucers," he remarked, "prove that the Soviet champions have no rival in throwing the discus."

Another school of thought was satisfied that the military were hiding something. "We learned of the existence of the atomic bomb no earlier than the Japanese," it was said. Had not the American defense authorities shown themselves quite capable of keeping that secret to themselves? There was an element of probability in this speculation, but the American Government knew the situation and Vannevar Bush had said no more than the truth when he had stated that nothing of the kind had been produced in the United States.

The American Government was therefore facing a dilemma. Was it to invite the raillery of the skeptics by taking the matter seriously, or risk finding itself at some future time in the same plight as the Japanese immediate-

ly after Hiroshima? In this predicament the Government did its duty and faced its critics. On December 30th the decree was signed establishing the investigation which subsequently became known as Project "Saucer."

WHAT PROJECT SAUCER WAS

Placed under the aegis of the Air Materiel Command at Wright Field, Project Saucer contracted for the services of a group of scientists, including J. Allen Hynek, the astrophysicist. It was promised the collaboration of the Weather Bureau, the Electronics Laboratory of the Cambridge Field Station, the Aero-Medical Laboratory of Air Materiel Command, and the personnel and resources of the Army, the Navy, the F.B.I., the C.A.A., and Department of Commerce. It was given full authority to call upon the Defense authorities to make available their specialists in rockets, guided missiles, astronautical problems, and so forth.

THE PROJECT'S METHODS

How did the Project work? We have its own description in the preamble to one of its reports:

"A standard questionnaire is filled out under the guidance of interrogators. In each case, time, location, size and shape of object, approximate altitude, speed, maneuvers, color, length of time in sight, sound, etc., are carefully noted. This information is sent in its entirety, together with any fragments, soil specimens, photographs, drawings, etc., to Headquarters, A.M.C. Here highly trained evaluation teams take over . . .

"Duplicate copies on each incident are sent to other investigating agencies, including technical labs within the Air Materiel Command. These are studied in relation to many factors, such as guided missile research activity, weather, atmospheric sounding, balloon launchings, commercial and military aircraft flights, flights of migratory birds, and a myriad of other considerations which might furnish explanations . . .

"Currently a psychological analysis is being made by A.M.C.'s Aero-Medical laboratory to determine what percentage of incidents are probably based on errors of the human mind and senses . . ."

VIRTUES AND DEFECTS OF THE PROJECT

It will be seen that nothing had been overlooked, as far as good intentions were concerned. From experts on birds of passage to space-travel technicians, the scientific world had been called on. The Project had even been authorized to recruit the psychiatrists and psychoanalysts to help in the solution of the problem. In principle, then, an ideal body had been set up to conduct an exhaustive investigation and satisfy the curiosity of the public and of the government entrusted with the task of national defense.

But as early as December 30th, 1947, it was evident that the Project had the defects of its virtues. The choice of a team of specialists to deal with the problem had, automatically, limited the field of possible solutions to the range of knowledge covered by that team. Yet it is well known that all great scientific discoveries have been made as a result of a break with established tradition. Almost without exception, the great discoverers have had to establish the truth of their discoveries in the teeth of the opposition of the practitioners of techniques they have rendered obsolete. Fresnel, Pasteur, Newton and Carnot are cases in point.

By entrusting the investigation to highly specialized technicians, the American Government was almost inevitably rejecting in advance the possibility that the phenomenon of the flying saucers might be something totally new. Almost inevitably, it was setting the Project the task of somehow relating this particular phenomenon to phenomena already familiar, without regard to the consequences, and even if it involved bringing in the psychiatrists to cast a polite doubt upon the sanity of eyewitnesses if no other explanation seemed possible.

In view of the composition of the Project, it could therefore be assumed that whatever the real nature of the phenomenon, one possibility at least would be ruled out, or at any rate viewed with suspicion: the possibility that the witnesses would reiterate with wearisome monotony that they were giving evidence of what they had really seen.

WHAT THE PROJECT LACKED

Here perhaps someone will say: "If you rule out special-

ists, to whose authority would you appeal? Do you seriously think that journalists, watchmakers, magicians or crystal gazers would have been a better choice than engineers?"

Of course not. The specialists were essential. Their knowledge and integrity might hamper the exercise of their imagination (an improbable contingency in any event) but were a guarantee against fanciful speculation. In my opinion, what the Project lacked was one or two mathematicians. A mathematician ought to have been the chairman. His mathematics might not have proved very useful, but his appointment would have guaranteed a strictly scientific approach and the necessary detachment from preconceived notions. We shall see that the Project found its work hampered by excessive specialization. In most of the clear-cut cases each of the specialists declined to offer an opinion on the ground that the case did not fall within his particular sphere and he was not qualified to pronounce upon it.

THE MANTELL CASE

The decree setting up the Project was signed on December 30th, 1947. A week later, on January 7th, 1948, Captain Thomas F. Mantell met his death while pursuing a saucer.

The Mantell case is undoubtedly the best known of all, because of its tragic ending.

The scene was Godman Base of the U.S. Air Force at Fort Knox, Kentucky. By the clock of the control tower it was a little before three in the afternoon. In the tower a number of officers were looking at the sky, which was covered by a layer of clouds, with patches of blue here and there. They had been watching for about half an hour, because about 2:30 the military police at Fort Knox had notified them that a huge unidentified object was flying in the direction of Godman. The military police had had their attention called to it by the State police, who had seen the object in question at Madisonville, Kentucky, about 100 miles from Godman, together with several hundred other people.

Among the officers of Godman Base who were in the tower at the time were Colonel Guy Hix, C.O. of the

Base, and Major Woods, his second-in-command. Suddenly a gap in the clouds, on the southern horizon, disclosed a huge object, apparently metallic, which momentarily caught the light of the sun and then disappeared. The officers stared at each other in bewilderment. Then orders were rapped out, and it was a matter of seconds before three F-51 pursuit planes took off and soared southward.

The three pursuit planes were commanded by Captain Thomas F. Mantell. They had intercom with each other and the control tower. Colonel Hix, Major Woods and the other officers on the ground could hear Mantell's voice in the loudspeaker. While Mantell and his two companions were rising through the clouds, but unable to see anything, the officers in the tower were comparing notes. All had seen that:

1. The object was a sort of disc, with the top side shaped like an inverted cone.
2. It was of "gigantic" size.
3. At the top was a red spot which glowed intermittently.

Suddenly Mantell's voice was heard in the loudspeaker: "I am closing in now to take a good look. It is directly ahead of me and still moving at about half my speed. The thing looks metallic and of tremendous size."

Mantell stopped speaking, and in the control tower the officers waited silently, their faces showing the strain. At 3:08 p.m. one of Mantell's companions called in. He had seen the object, and so had the third pursuit plane. But the saucer, with Mantell behind it, had given them the slip. The two officers had lost sight of the Captain, who had vanished in the clouds.

The officers in the tower listened expectantly. After another five minutes they heard Mantell's voice again. He seemed to be greatly excited by what he was seeing: "It's going up now and forward as fast as I am. That's 360 miles per hour. I'm going up to 20,000 feet and if I'm no closer, I'll abandon chase."

This, according to the report of the U.S. Air Force, was Mantell's last message to the tower of Godman Base. A

few minutes later, a call from the tower received no answer. Colonel Hix immediately ordered two other pursuit planes to search for him. One of them went up nearly 35,000 feet, flew 100 miles in a southerly direction, but found nothing. Mantell had disappeared and so had the saucer.

Ground search, unfortunately, proved more successful. It was established that Mantell's plane had disintegrated in the air only a few minutes after he had announced his intention of getting closer to the object. The debris of the F-51 pursuit plane was found scattered over an area of several miles. Such was the end of the first pursuit of a saucer.

At sunset, about two hours after this disaster, an unidentified object passed at terrific speed above Lockbourne Air Force base at Columbus, Ohio. The observers at the base, says the report of the U.S. Air Force on the Mantell case, saw a round or oval object, much larger than a C-47, flying parallel to the ground at a speed of more than 500 miles an hour. They continued to watch the object from the Lockbourne control tower for more than twenty minutes. Its color changed from white to amber, and as it flew, it left in its track a tail more than five times its own length and also amber in color. It came down toward the horizon and seemed to touch the ground. It made no noise whatever.

INVESTIGATION AND REACTIONS

What exactly happened on January 7th, 1948, in the sky above Fort Knox? It is probable that if an answer to this question could be given, the solution of the flying saucer mystery would not be far off. As the evidence is abundant, varied, and circumstantial, it merits close examination.

In the first place, what is the value of the evidence? Donald H. Menzel, Professor of Astrophysics at Harvard University, in his book *Flying Saucers*, postulates five requirements for the validity of evidence on this subject.

1. The evidence must be first hand. Hearsay should be completely ruled out.
2. It must not be distorted by prejudice.

3. It has more weight when given by a trained observer.
4. It should be corroborated by other witnesses.
5. No attention should be paid to anonymous testimony.

Does the evidence on the Mantell case comply with these requirements? Unquestionably, and to an extent that should satisfy the most hardened skeptic. Let us see how it measures up to Professor Menzel's criteria.

1. The report drawn up by Project Saucer was based on investigation conducted on the spot by members of the Project. Evidence was given by all those who actually saw the object: the members of the state police force at Madisonville; several hundred citizens of that city; the military police at Fort Knox; Colonel Guy Hix, C.O. of Godman Base; Major Woods, his second-in-command; all the officers in the control tower, and the two pilots of the F-51's, commanded by Mantell. Mantell's words were heard by all the officers in the control tower, but his evidence was only hearsay for the very good reason that he was dead.

The evidence given by the officers and pilots at the Lockbourne base was valid, as the report was careful to point out, only on the assumption that the object seen at Columbus was identical with that seen at Fort Knox. I will deal with that point subsequently.

But that was not all. The investigations conducted by Professor Hynek during the period immediately after Mantell's death, showed that the same object had been seen simultaneously at Madisonville, Elizabethtown and Lexington, nearly 100 miles from Fort Knox, a few minutes after the F-51 had disintegrated. Professor Hynek embodied this information in his report.

2. As regards the possibility that evidence might have been garbled, I think I have guarded against it here by adding to the official records only such details ■ are essential for understanding the facts.

3. Can the observers be described as "trained"? That is easily answered. Surely nobody could wish for better wit-

nesses than pilots, officers and members of military and state police.

4. As regards the requirements of a second witness, corroboration came from hundreds, if not thousands of eye-witnesses. As witnesses were not anonymous, Professor Menzel's fifth requirement does not arise.

WHAT THE WITNESSES SAW

So much for the validity of the evidence. Now let us consider what it amounted to. What did the eye-witnesses actually see?

As far as the shape and appearance of the object are concerned, all the descriptions tally. It was a round body, metallic in appearance, the lower side comparatively flat, the upper conical, and it showed an intermittent red light at the top. Those who saw it from a distance describe it as cigar shaped, which can be readily understood. A few discrepancies may be noted. According to some witnesses its color was a silvery white, while others said it was tinged with amber. The observers at Lockbourne actually saw it change from white to amber. That also can be readily understood, because the color would depend upon the position of the object itself in relation to the sun and the spectator. Again, some witnesses saw a luminous tail, others none at all. It is worth noting that those who were emphatic about this tail were particularly impressed by the speed of the object. The observers at Lockbourne gave its speed as 500 miles an hour, and the length of the tail as five times that of the object itself.

THE SIZE OF THE MANTELL SAUCER

It will be noticed that one essential element is lacking in all these reports—the dimensions of the object. Observers from Columbus to Elizabethtown say that it was at least as large as a Dakota. Others nearer to it (the military police at Fort Knox, Colonel Hix, Major Woods, etc.) spoke of it as “gigantic,” “enormous,” “huge.” But there were three witnesses—Mantell and his two companions—who saw it at fairly close quarters, and they described its size as “tremendous.” All this is pretty vague, but at any

rate we have been warned; its proportions must have been formidable.

Even though the witnesses were unable to form even an approximate idea of the actual dimensions, by comparing their reports one is able to visualize a standard of size.

As I have said, the object was seen simultaneously from Madisonville, Elizabethtown and Lexington, that is to say, from points up to 175 miles apart. On the other hand, the observers in the Lockbourne control tower who estimated its speed at more than 500 miles per hour reported that they were watching it for no less than twenty minutes. In twenty minutes an object travelling at 500 miles an hour covers a distance of about 175 miles, a figure which tallies with the previous one.

In this connection we must consider the observations of the officers that the object seemed to touch the ground before it vanished from sight, which indicated that it disappeared behind the curvature of the earth. It would therefore appear that the dimensions of the Fort Knox saucer could be established by answering the following question: What is the minimum size of an object visible at a distance of approximately ninety miles?

The fact that the object vanished from sight at a distance of ninety miles also gives a factor for calculating its probable altitude when last seen.

The reader, curious as to the answers to these two little problems in geometry and physics, may like to know that, having regard to the optical, meteorological and other factors involved, the object must have been at an altitude of at least twenty-five miles, and possibly over fifty, when it was seen from the three different towns, and also from Lockbourne, disappearing over the horizon. Now, as we have mentioned, Professor Hynek's investigation showed that it had been visible from the three towns only a few minutes after Mantell's death and his message: "It is directly ahead of me. I am going to climb and get nearer."

So between that moment and its appearance within the visual range of the three towns, i.e., in a few minutes, the altitude of the object had risen from twenty-five thousand feet to over twenty-five miles.

As for its dimensions, we must accept a figure of 300

feet and possibly even 450 as its diameter. I repeat that, having regard to the mathematics involved, these figures must be minima. As a matter of fact, if the object was able to attract the attention of a large number of people at a distance of nearly ninety miles, it is evident that:

1. Its appearance must clearly have been more striking and unusual than a mere speck in the sky; all the more so because the statements made during the investigation were sufficiently explicit to convince the Project that the witnesses had, in fact, seen the very object pursued by Mantell.

2. The object was considerably above the horizon.

Mantell was thus fully justified in describing what he had seen as something "tremendous." It was travelling at a speed greater than that of his Mustang, and he was boldly pursuing a monster vaster than the battleship "Richelieu."

WHAT HAPPENED AT FORT KNOX?

With the Mantell file as a starting point, let us now proceed to what the courts term "the reconstruction of the crime." The evidence must, of course, at the outset be interpreted literally. In other words, the scene can only be visualized if we begin by assuming that the witnesses did in fact see what they thought they saw.

Madisonville (Kentucky): 2:10 p.m. or a little later. A rather cold day in January. People in the streets looking at the sky see a curious, round, metallic object traveling eastward fairly fast. There is astonishment not unmingled with apprehension. The crowd includes a number of policemen, who at once report what they have seen to their superior officers. The latter immediately notify the military police at Fort Knox, Kentucky. The Godman Base near Fort Knox is the nearest aviation base on the presumed course of the object.

Fort Knox (Kentucky): 2:25 p.m. The military police office. The object is passing over the town, still traveling eastward.

2:30 p.m. The military police telephone to Godman

Base. The control tower and headquarters staff are notified.

2:48-3 p.m. Three F-51 Mustangs, commanded by Captain Mantell, take off in pursuit of the object. It is a disc of metallic appearance, as big as a battleship, the upper part conical in shape, with an intermittent red light at the top. It is climbing, followed by the pursuit planes.

3:08 p.m. The object has put on speed and disappeared in the clouds, with Mantell close behind it. The two other Mustangs have been left behind.

3:15 p.m. Mantell's last message.

3:30 p.m. The object has risen to an altitude of 25-30 miles. It is travelling northeast. Mantell's plane disintegrates in a shower of debris.

Lockbourne (Columbus, Ohio): 5-5:20 p.m. Last appearance of the object. It is travelling at 500 miles per hour and has changed in color from silvery grey to amber, leaving in its track a tail five times its own length (or 600 to 800 yards if we accept the argument I have previously put forward). It disappears over the horizon, not to be seen again.

THE RIDDLE

Such is the Mantell case. When these events occurred Project Saucer had been officially in existence for a week. It certainly had something to work on.

It undoubtedly made a first rate job of the case. It got together all the information set out above. But assembling, filing and analyzing reports was one thing; offering an explanation quite another.

On April 27th, 1949, after two years of investigation and reflection, the Project released the following report:

"Subsequent investigation revealed that Mantell had probably blacked out at 20,000 feet from lack of oxygen and had died of suffocation before his crash.

"The mysterious object which the flyer chased to his death was first identified as the planet Venus. However, further probing showed the elevation and azimuth readings of Venus and the object at specified time intervals did not coincide.

“It is still considered ‘unidentified.’”

Incidentally, in the preamble to that report, the Project practically admitted that it had failed to find an explanation:

“The mere existence of some yet unidentified flying objects necessitates a constant vigilance on the part of Project ‘Saucer’ personnel, and on the part of the civilian population. Answers have been—and will be—drawn from such factors as guided missile research activity, balloons, astronomical phenomena. But there are still question marks.”

The preamble then went on to deal with the possibility of Russian responsibility:

“Observations based on nuclear power plant research in this country label as ‘highly improbable’ the existence on earth of engines small enough to have powered the saucers.”

On December 30th of the same year, 1949, the Project supplied the press with extracts from its final secret report, in which Mantell’s case was again discussed, this time in greater detail.

“When Venus is at its greatest brilliance, it is possible to see it during daytime when one knows exactly where to look. But on January 7, 1948, Venus was less than half as bright as its peak brilliance. However, under exceptionally good atmospheric conditions, and with the eye shielded from direct rays of the sun, Venus might be seen as an exceedingly tiny bright spot of light. . . . However, the chances of looking at just the right spot are very few.”

The Project next considered the suggestion of some of its members that a balloon had been released by the Navy for the study of cosmic rays. The comments on this possibility were as follows:

“If one accepts the assumption that reports from various

other localities refer to the same object,¹ any such device must have been a good many miles high—25 to 30—in order to have been seen clearly, almost simultaneously, from places 175 miles apart.

“If all reports were of a single object, in the knowledge of this investigator² no man-made object could have been large enough and far enough away for the approximately simultaneous sightings. It is most unlikely, however, that so many separated persons should at that time have chanced on Venus in the daylight sky. It seems therefore much more probable that more than one object was involved. The sighting might have included two or more balloons (or aircraft) or they might have included Venus and balloons.”

Here we can see the effect of what I have called the defects of the Project. The explanation which was rejected on April 27th was accepted on December 30th. Why? Had any new facts come to light? No. But an explanation was required and it was given on lines favored by specialists even though the explanation might explain nothing. Some inevitable queries call for an answer:

1. As regards Venus, were the angular co-ordinates (elevation and azimuth) on January 7th at 3 p.m. miraculously revised between April 27th and December 30th? And did the writer of the report, rivaling Joshua's feat of stopping the sun in its course, cause the planet to change its trajectory?

2. If balloons were involved, we ought to be told: (a) How they were able to accelerate so fast as to leave Mantell behind and cause the two other Mustangs to lose them and Mantell as well; (b) what could have happened to these balloons after 3:15 p.m., since the Mustang sent up 35,000 feet to look for Mantell saw no sign of them within a range of 100 miles, though this was the very time

¹ Those who believe it was not the same object must explain the coincidences of time and direction. The likelihood of their doing so satisfactorily is “highly improbable.”

² This, no doubt, is Dr. Hynek, Professor of Astrophysics and consultant to the Project.

when, if they were fact and not fiction, they were seen from Lexington, Elizabethtown and Madisonville; (c) how did the balloon, pin-pointed by theodolite at Lockbourne, manage to travel at 500 miles an hour, leaving a long tail of flame in its track, and what was the purpose of this odd appendage?

In short, even if it is assumed that balloons¹ were involved, nothing that could be called an explanation has been offered. We can admit their existence as a concession to the writer of the report, but we are still back where we started.

Does Professor Menzel provide us with a more satisfactory explanation? In his book, which appeared in 1953, he writes:

“Captain Mantell was chasing a bona fide saucer, if my interpretation of what he saw is correct. The clue lies in the shape and color of the object: a luminous ice-cream cone ‘topped with red.’ Color in the sky is significant, especially as early as 3 p.m. in the afternoon. Sunset may tint clouds with many shades of red, but red in the middle of the afternoon, especially on a mid-winter day, suggests only one thing to the scientist familiar with meteorological optics. The patch of light, with little question, was what we ordinarily term a ‘mock sun’ caused by ice crystals in cirrus clouds that lay even higher than Mantell’s plane was able to reach. This mock sun and attached halos could have produced an effect similar to the one described. And it would also fully account for the fact that Mantell was never able to close in on it. Chasing one of these mock suns or ‘sundogs,’ as they are sometimes called, is just like chasing a rainbow. It races on ahead at the same speed that you are moving yourself. Sometimes it displays colors; at other times it appears silvery.”

Professor Menzel’s explanation is clearly more attractive than the previous one. It conjures up phenomena more

¹ The only two agencies which could possibly have released balloons were the Weather Bureau and the Navy Research Project, near Minneapolis, for the study of Cosmic Rays. No such balloons were responsible for this sighting.

exotic and much less familiar than the movements of a balloon. The mock sun is a concentration of light caused by the meteorological phenomenon which the scientists call a "parhelion." The parhelion itself is a circular, horizontal band of light, half a degree in width, like the moon or sun. In certain places the band displays a spot, or sometimes several spots, brighter than the rest and reddish in color. These spots are the mock suns.

Can the parhelion and its mock sun explain what was seen on January 7th, 1947? If this question is to be answered in the affirmative we must:

1. Assume that Mantell and his two companions had never heard of such a thing as a parhelion. This phenomenon is mentioned in all meteorology courses taken by airmen in France, and I imagine that the same applies to America as well. On geometrical grounds Menzel favored the theory that Mantell mistook a false sun for the real sun and set off in pursuit of the latter thinking it was a flying saucer;

2. Systematically disregard large portions of evidence inconsistent with such an explanation, e.g., the metallic gleam reported by all the eye-witnesses, whereas meteorological phenomena are vaporous and transparent; the intermittent action of the red light and the course of the saucer, not only in relation to the pursuit planes but also to observers at ground level. This course, it will be remembered, was checked by theodolite—it's sudden spurts, changes of direction, and periods of immobility;

3. Worst of all, ignore the fact that the parhelion is a phenomenon produced by the sun. Now at three o'clock on a winter afternoon, the sun is in the southwest, and the first eye-witness, the Madisonville group, had seen the saucer disappear in the east. They saw it again in the east a short while after Mantell crashed. Seen from Fort Knox, it disappeared towards the south, climbed eastward and disappeared in that quarter before the eyes of the witnesses at Lockbourne.

We are thus compelled to make the same mental reservations in accepting Menzel's parhelion theory as were forced upon us in the case of the Project's balloons. If the

Professor sets great store by his parhelion, we can let him have it, but we have still to find out what Mantell's saucer really was.

In all fairness, however, it must be admitted that Professor Menzel does not simply ignore many statements made by witnesses which are inconsistent with his explanation. But he casually dismisses them as improbable. To take one example, this is what he has to say about the evidence of the observers in the Lockbourne control tower:

"A body in level flight at 500 miles per hour would traverse 167 miles in twenty minutes. How, then, could it have remained in view so long?"

How? Perhaps simply because Mantell was right when he said, just before his death, that it was "tremendous." The trouble is that Professor Menzel starts out with a preconceived notion that "certain things are impossible." So if anyone claims to have seen one of these impossible things, his evidence cannot be taken seriously. On page 51 of his book he writes: "Let us be guided by that most famous of detectives, Sherlock Holmes himself, who declared: 'How often have I said to you that when you have eliminated the impossible, whatever remains, however improbable, must be the truth.'"

Let us leave it at that.

NO SOLUTION TO THE MYSTERY

But if none of these explanations is satisfactory, what is the truth? Can any interpretation of the facts reconcile the scientific principles involved and the evidence of the eye-witnesses? I believe that this question must be answered in the affirmative. There is such an interpretation, for no physical phenomenon is outside the range of science and no doubt the Air Force authorities, if they wanted to, could supply us with information calculated to put the enquiries on the right track. Unfortunately:

1. The photographs of the remains of Mantell's aircraft are still secret. All the approaches to the Pentagon for permission to see these photographs have hitherto met with polite but firm refusal. In his book, *Flying Saucers*

Are Real, Major Donald Keyhoe has given an account of his fruitless efforts to get a sight of them.

2. The medical report on the examination of Mantell's remains has also been kept secret.

3. The same course has been followed in the case of two other essential documents—the official evidence of Mantell's two companions and the verbatim report of Mantell's own conversations with the Godman control tower. Nothing has been disclosed beyond a few sentences which are incorporated in the meager communiqué of Project Saucer dated April 27th, 1949, which was discussed previously. The Mantell dossier is still filed away at the Pentagon among the documents marked "secret."

4. There was a press rumour that the debris of the airplane had been tested with a Geiger counter by the Project. Journalists claim that they got this information from airmen friends of the Godman staff. As far as I am aware this rumor has neither been confirmed nor denied, but the story is a probability and there can be no doubt that it was the duty of the Project to submit the remains to a test by the Counter. If the Project has done so, it would be interesting to learn the result and know why it has been hushed up.

Such is the Mantell case. I can only conclude my analysis of it with a question mark, for since the death of the ill-fated captain nothing has been disclosed which throws any light upon his last moments. Was his death accidental? Was he killed? What sort of object was it which was watched by hundreds of people from Madisonville to Lockbourne?

I have said that there are thousands of items of evidence about flying saucers. The reader would be bored if I referred to them all, for they are monotonously consistent in emphasizing that the object always displays one of three aspects, and a novel feature is a rarity. I will confine myself to some specimen cases, omitting details except where the story is particularly vivid, circumstantial or unusual.

FLYING CIGARS. THE EASTERN AIR LINES INCIDENT

The Eastern Airlines incident, which occurred seven

months after the death of Mantell, combines all these qualities to perfection.

At 8:30 p.m. on the evening of July 23rd, 1948, one of Eastern's aircraft took off from Houston, Texas, for Boston. It was a DC-3. Clarence S. Chiles, who was in command, was a cool and level-headed officer who had been a lieutenant-colonel in the Air Transport Command during the war and had 8,500 flying hours to his credit. His co-pilot, John B. Whitted, had been a bomber pilot during the war, and both of them had, and still have, the reputation of being thoroughly reliable pilots and sensible men who would not let their imaginations run away with them.

Night had fallen and the passengers were sleeping to the music of the great aircraft's steady drone. The moon was bright, visibility good, the sky cloudless, and the time passed uneventfully.

At 2:45 a.m. the DC-3 was about twenty miles west of Montgomery, Alabama, when Chiles, and then his co-pilot, saw directly ahead a huge object like a projectile coming straight toward them at high speed. Their first thought was that it must be a jet plane.

"It was heading southwest," Chiles said later, "exactly opposite to our course. It flashed down toward us at terrific speed. We veered to the left and it passed us about 700 feet to the right."

Whitted happened to be on that side of the aircraft and had an ample opportunity of viewing the object. It was cigar-shaped, about thirty yards long and double the width of a Dakota. It had no wings, and its sides glowed with an intense dark blue light which ran along the fuselage as though it were moving in a neon tube.

Nor was this all. The object had two rows of windows, "emitting an uncanny light" similar to a magnesium flash. At the nose Chiles noticed something that looked like a radar aerial. The tail was belching a flame ten to fifteen yards long, orange-colored in the center and lighter at the sides.

Just when the object was closest to the plane, barely a few dozen yards away, it pulled up with a violent jerk as if its pilot had suddenly seen the DC-3. There was a tremendous burst of flame at the rear and it shot up at

right angles and disappeared within a few seconds. Its instantaneous change of direction caused the DC-3 to sway in an alarming fashion. Major Keyhoe tells us that the two pilots estimated the speed of the airship at 500-700 miles per hour up to the moment of its vertical ascent. Afterwards it vanished so fast that no estimate of its speed was possible.

The whole thing was over in a few seconds, and the two dumbfounded pilots lost no time in questioning the passengers about what they had seen, and anxious were they to be assured that they had not been dreaming. Chiles went to the passenger cabin and glanced inside. It was nearly 3 a.m. and everyone was asleep except Clarence McKelvie, assistant managing editor of the American Education Press at Columbus, Ohio.

"What happened?" he exclaimed when he saw Chiles.

The two pilots realized that they had not been dreaming. When interviewed by the Associated Press, McKelvie said: "I saw no shape or form. It was on the right side of the plane, and suddenly I saw this strange, eerie streak out of my window. It was very intense, not like lightning or anything I had ever seen."

According to the Associated Press, McKelvie further stated that his astonishment had been too great and the object had moved too rapidly to enable him to observe it closely.

THE INVESTIGATION

Of course the Project immediately took up the matter. Chiles, Whitted and McKelvie repeated the statements which they had originally made. But the investigators soon obtained some interesting information from other quarters. Their first discovery was that others besides the three men in the DC-3 had seen the mysterious object. An hour before its meeting with the aircraft twenty miles west of Montgomery, Alabama, observers at the Robbins aviation base near Macon, Georgia, had spent several minutes watching an object exactly like that described by Chiles and Whitted, which was travelling in a southerly direction (Montgomery is situated to the southwest of Macon). The reports sent to the Project by the Robbins base describe a sort of wingless super-Dakota having a luminous tail but

travelling like any conventional aircraft moving at high speed.

The Project next made careful enquiries to ascertain whether any plane answering the description given had been in the area in question about 3 o'clock that morning. Nine months were spent in tracing the flight records of 225 civil and military aircraft. Of course the possibility of tracing a wingless airplane was precluded from the outset, but apart from that, it appeared that no aircraft had been on the course reported by Robbins and the three Eastern Airlines men.

A ROCKET?

Other members of the Project were making simultaneous enquiries to ascertain if some teleguided machine from a secret testing base provided the answer to the problem.

About this time, on July 28th, *The Washington Star* published a statement "from a government authority" to the effect that rockets capable of reaching a speed of 3,000 miles per hour had been tested in the New Mexico desert. Had one of these rockets got out of control? Could this be the key to the mystery? The luminous tail suggested that the object might be a rocket and so did the absence of wings. Unfortunately, this hypothesis was not in accordance with the facts and the Project had to reject it for the following reasons:

1. It did not account for the portholes which figured so prominently in the descriptions; the apparent, or the deliberate reaction of the object when it dashed off at a sharp angle on the approach of the DC-3; the disproportionate width as compared to the length (a violation of aerodynamics); or the fact that a machine which could fly at 3,000 miles per hour could not be ninety feet long and twice as wide as a Dakota.

2. If so huge an object launched from a secret base had gone astray in the sky in America, it would obviously have come to earth somewhere. Nothing of the kind occurred.

3. A wingless machine, flying horizontally at the comparatively moderate speed of 500-700 miles per hour,

which was estimated both from the airplane and the ground, would, *a fortiori*, have struck the ground after travelling a few miles. It would not have been able to ascend vertically in the manner described.

A SECRET MACHINE?

But perhaps it was another type of secret teleguided machine, different from the one referred to by *The Washington Star* and so secret that the Project could say nothing about it. In this case, having regard to the particulars given in the evidence (vast size, staggering power of acceleration, the vertical ascent), the law of mass-ratio would require an enormous gas ejection velocity. The Robbins observers would necessarily have heard a frightful din in the sky. And as such initial velocity is consistent only with atomic energy, the implications are obvious. Even now, after five years of strenuous effort, men have only just managed to produce nuclear engines for submarines.

PROFESSOR MENZEL

Then what explanation are we to accept?

In his book *Flying Saucers* (p. 14), Professor Menzel sets forth all the facts, but in order to avoid having to commit himself he prefaces his account with the following somewhat mystifying comment:

"The Air Force¹ has, with good reason, generally regarded the airline pilots as the most reliable observers of all. These men are highly skilled and possess both judgment and integrity. They are not likely to make a report merely for the sensation it will cause. They will relate their impressions honestly and to the best of their ability. Any mistakes they may make are at least honest ones." More than two hundred pages later (p. 216), he briefly specifies the "honest mistake" supposedly made by Chiles, Whitted, and McKelvie:

"Temperature inversion accounts for observations of this

¹ By this Professor Menzel means Project Saucer.

kind. The atmospheric lens that causes the mirage consists of a layer of cold air between two layers of hot air. A plane flying through the dividing surface will encounter sharp up and down drafts. These 'pockets' are what the pilot feels—not a blast from the jet engines of the vanishing saucer."

This explanation is physically impossible. Quite apart from the extreme rarity of the *Fata Morgana* mirage postulated by Menzel (see Part Three, Chapter 1), a mirage does not spontaneously generate light "as brilliant as a magnesium flare." There was, of course, *no light source* to produce such an image.

The Project certainly made no attempt to shirk the issues by veiled hints. After investigating the incident for months it suggested that the object might be a meteor and added:

"It will have to be left to the psychologists to tell us whether the immediate trail of a bright meteor could produce the subjective impression of a ship with lighted windows. Considering only the Chiles-Whitted sighting, the hypothesis seems very improbable."

I should add that in a previous paragraph of the report the writer had given this warning:

"There is no astronomical explanation, if we accept the report at face value. But the sheer improbability of the facts as stated . . . makes it necessary to see whether any other explanation, even though far-fetched, can be considered."

THE PLOT THICKENS

Such is the conclusion of the investigation by the Project. To arrive at its true value we must, in my opinion, take into account a series of facts which, even if they prove nothing, multiply the significance of the problem by five. I must remind my readers that Chiles and Whitted saw the object on July 24th, 1948. However:

1. On July 20th, four days previously, a double-decked

wingless machine had been seen on the Hague-Arnhem route in Holland on four separate occasions by a large number of witnesses. It was travelling at a very high altitude and great speed. The witnesses reckoned it was moving as fast as a V2. (Case 168.)

2. A few days later, at the beginning of August, a similar machine was observed above Clark Field in the Philippines.

Here are the comments of the Project on this case:

"If the facts are correct, there is no astronomical explanation. A few points favor the daytime meteor hypothesis—snow-white color, speed faster than a jet, the roar, similarity to sky writing and the time of day.

"But the tactics, if really performed, oppose it strenuously: the maneuvers in and out of cloud banks, turns of 180 degrees or more. Possibly these were illusions, caused by seeing the object intermittently through clouds. The impression of a fuselage with windows could even more easily have been a figment of imagination."

3. During that same early part of August 1948 my friend Samy Simon, the producer well known to Radiodiffusion Française, happened to be in the Far East on professional business. Having spent several weeks traveling in China, he had never heard of Chiles and Whitted. One morning he boarded the regular Air France plane at Hong Kong and started off for Saigon.

"After flying for about two hours," he says, "we were over the sea a few miles from the coast of Annam and, glancing casually through the porthole, I saw an object of altogether unfamiliar shape in the sky. It was coming from the north at an apparent altitude of 15,000-18,000 feet,¹ and a speed quite definitely greater than ours.

"It had the appearance of a long, metallic, silvery-grey spindle, glittering in the sun, with two slight horizontal bulges in the center. Below the spindle and apparently

¹ Estimated in relation to the layer of clouds which S. Simon mentions farther on.

separated from it I could clearly distinguish a rigid oblong mass, of the same length but narrower. There was no flame and no smoke.

"When the object had come close enough I could see that its size must be far greater than the largest aircraft known, and at least double that of a Flying Fortress.

"My immediate neighbor, a Chinese, noticed this object at the same time as I did, and expressed his astonishment to me in a few words of broken English.

"After having watched its flight for perhaps thirty seconds, I saw it suddenly turn 90 degrees without reducing speed and disappear in the clouds hiding the Annamite mountain chain.

"On reaching Saigon I told some of my friends what I had seen, and learned that since the previous day the whole town had been talking about mysterious objects which had been flying over that area. But the description of them (saucer) did not tally with mine (spindle).

"I was anxious to compare my impressions with those of the pilot of my airplane. I tried to get into touch with him. He had already left Saigon, but Air France told me that he also had seen the object."

I questioned Simon closely about what he had seen. He is very emphatic about the two-fold aspect of the object—a huge spindle above, another much narrower beneath. Until he reached Saigon he thought he had encountered a new secret American or Russian two-decker machine, though this still left the apparent separation unexplained.

A novel phenomenon, undoubtedly, but let us suppose that the two decks had portholes and that Simon had seen them at night. Would not his story in that case have been much the same as that of Chiles and Whitted? In other words, if Simon was not the victim of a mirage,¹ does

¹ Simon has travelled all over the world by every kind of transport and is familiar with mirages. He rules out the possibility of a mirage altogether, stressing the metallic glitter of the object in the sun, the steady movement, the appearance of complete rigidity, and above all, the way in which it disappeared into the clouds, just like the machine sighted from the Philippines.

not his account reinforce the particulars supplied by the two American pilots? Of course, this is only a suggestion, and obviously there is no proof that the object observed from The Hague, Montgomery, the Philippines and the China Sea was one and the same.

4. In the early part of August, 1947, two pilots of an Alabama airline flying over Bethel had already had an experience very similar to that of Chiles and Whitted. The description in their account is summarized in the final report of the Commission as follows: a machine without wings, larger than a C-54, black in appearance against the red flush of the sunset. Its speed was moderate. It was making straight for the airplane. The two pilots managed to dodge it and then attempted a pursuit, but without success, because their machine could fly at only 175 miles per hour.

EXPLANATIONS?

Even though there is nothing to prove that these four objects were one and the same, the various descriptions given by the witnesses clearly invite comparison. On *a priori* grounds it is natural to seek a common explanation for all, but it is equally permissible to look for four individual solutions, and the latter alternative was adopted by the Saucer Project. Having admitted its failure in the Eastern Airlines, Bethel, and The Hague cases (which are classified "unexplained"), the Project suggested that the Philippines incident could be accounted for by illusion plus disordered imagination.

PROFESSOR MENZEL'S VIEW

What has Professor Menzel to say? We have seen that he settled the Chiles and Whitted case, to his own satisfaction, as a "mirage." The Bethel sighting is likewise interpreted by him as a thoroughly characteristic example of mirage, a mirage which rushed at the two airmen, who dodged it by a sudden swerve and then wheeled round to chase it.

His explanation gave me an uneasy feeling that I had hitherto overlooked an optical phenomenon which, al-

though termed "mirage" in America, must have no connection with the mirage described in our textbooks, so I also read the theory of this phenomenon which Professor Menzel has added as an appendix to his book. But I was wrong. The mirage he mentions is just the same as ours. Hence the difficulty of understanding how the two pilots avoided this optical phenomenon only by getting out of its way and how the phenomenon, displaying diabolical cunning, made itself look like a wingless aircraft whether seen from in front as the two pilots approached it, sideways when they were passing, or from behind when they were chasing it.

If it is odd that they were able to catch up and overtake a mirage by pursuing it in one direction, it is even odder that this mirage could have put on sufficient speed to get away from them when they changed course.

AN ASTRONOMER'S EVIDENCE

A year after these various appearances of "aerial spindles" an extremely distinguished astronomer witnessed a "vision" which takes a great deal of explaining. The astronomer in question was Clyde W. Tombaugh, who, in 1930, discovered Pluto, the last planet of the solar system.

At 10:45 on the evening of August 20th, 1949, Professor Tombaugh was outside his house at Las Cruces, New Mexico, with his wife and mother-in-law. Looking up at the sky he suddenly noticed immediately overhead six or eight rectangular greenish lights travelling fast toward a point on the horizon 25-30 degrees south. They were moving at a uniform speed and seemed to be the windows of some object not itself lit up, but vaguely silhouetted against the darkness of the sky. These rectangles were undoubtedly flat objects for, as they receded into the distance, they gradually diminished in size, showing that the three spectators were seeing them more and more in profile.

The set of six or eight rectangles, set in pairs, formed in the sky a rigid pattern about one degree in length, which is equivalent to about twice the breadth of the full moon.

"In all of my several thousand hours of night sky-watching," the astronomer reports, "I have never seen anything so strange as this. I was so astonished that my impression of it was somewhat confused. How I wished I could have had some binoculars in hand. No sound whatever."

REFLECTIONS OF LIGHTS?

The only attempt to explain Professor Tombaugh's experience was made by Professor Menzel. He says:

"I assume that the cause is reflection in a rippling layer of fine haze, probably just over the heads of the observers. The source of light may be a distant or even nearby group of houses, a row of street lamps, or automobile headlights."

Before discussing this hypothesis, I should like to point out that the first account of what Professor Tombaugh had seen was published by *Life* magazine. He later supplied Professor Menzel with a fresh account, to enable him to include the incident in the book which he was writing. There are slight discrepancies between the two accounts. In the first, Professor Tombaugh specifically mentioned a cigar-shaped object with two rows of portholes, while in the second the cigar shape had been toned down to a vague silhouette. In the first, the sighting lasted about twenty seconds, while in the second it is described as being much shorter.

In a word, the account given by Professor Menzel is somewhat less spectacular. It is the second account with which I am concerned, for several reasons:

1. Professor Menzel is an expert occupying an official position, whereas the editor of *Life*, whatever his qualifications, might be suspected in some quarters of having touched up the story for journalistic purposes.

2. Professor Menzel does not believe in the physical existence of the saucers, so if his account records some facts which seem inexplicable, they are much more convincing. Yet the book itself provides excellent reasons for mistrusting the manner in which he reports Professor

Tombaugh's evidence. For, since it was for Professor Menzel that the astronomer wrote his account of what he had seen, why did not Professor Menzel simply reproduce it verbatim, without changing a syllable, as he insists on others doing?

An even more serious point is that he received from Professor Tombaugh some drawings of the object observed. Such drawings, made by an astronomer of Professor Tombaugh's reputation, would have been a precious addition to the dossier on the flying saucers. I have already quoted some of the comments of Professor Esclançon, who is also an astronomer and had never seen a flying saucer. If Menzel had reproduced any of these drawings in his book, it is fair to assume that Professor Esclançon would have eagerly availed himself of the chance to satisfy his curiosity. But he has had to swallow his disappointment, Professor Menzel having thought fit to keep the sketches in his drawer. In this book, which contains no fewer than 96 illustrations, including quite a number portraying medieval monsters, imaginary Martians or the visions of the prophet Ezekiel, no room has been found for a picture of a flying saucer, drawn by perhaps the most qualified witness who ever saw one.

Nor is that all. To illustrate what Professor Tombaugh saw, Professor Menzel gives us a photograph of a faked flying saucer, produced in his laboratory by the reflection of a patch of light. This sham saucer would be far more convincing if it could be compared with the other one, sketches of which Professor Menzel has kept in his drawer. Why did he deprive us of so illuminating a comparison?

It is time to turn to his explanation, which is that what Professor Tombaugh saw in the sky was the reflection of ground lights on a thin curtain of haze.

The first question that springs to mind is whether Professor Tombaugh, who is an astronomer, can detect the presence of a layer of fine haze in the sky. Indeed, Menzel remarks: "The haze must have been inconspicuous to the eye, because Tombaugh comments on the unusual clarity of the sky." (*Flying Saucers*, p. 38.)

But even assuming that there was a layer of haze, could Professor Tombaugh see what he claims to have seen?

In order that the image of the windows of a house, for example, can be reflected on a screen in the sky, there must be a lens of some kind at a particular point between the house and the screen. These atmospheric lenses are, in fact, sometimes formed when there exists what is known as a vertical inversion of temperature. This is a comparatively simple phenomenon, resulting from a property of light causing it to travel faster in air which is becoming warmer and less dense.

But, of course, the effects of the inversion must be consistent with what Professor Tombaugh observed. The latter's description is very circumstantial. First of all he saw rectangles shining brightly and well defined, two characteristics which the atmospheric lens has little chance of producing. For this to occur, it would have to be geometrically perfect, the curtain of haze would have to be smooth, flat, comparatively dense but not thick; also the lens would have to be of exactly the right focal length (otherwise it would produce a blurred image) and have the luck to be in the very spot postulated by the requirements of optics governing the behavior of lenses. This is making great demands on the laws of chance, most of them very unlikely to be satisfied.

Another obstacle in the path of Professor Menzel's lens theory is that the object which Professor Tombaugh saw was travelling fast without losing its sharpness of outline, and was obeying the laws of perspective. To reconcile this with Professor Menzel's explanation would involve either a geometrical impossibility or a series of coincidences so extraordinary that it would be more logical to treat the whole thing as a miracle pure and simple, and organize pilgrimages to Professor Tombaugh's house.

My last word on this subject must be that whatever we may think of Professor Menzel's theory, it is surely odd that Professor Tombaugh, a distinguished astronomer, accustomed by long experience to observe meteorological and astronomical phenomena, did not suggest such an explanation himself. It is not an abstruse explanation, based as it is upon physical laws and phenomena which are familiar, especially to astronomers of the calibre of

Professor Tombaugh. The phenomena of atmospheric refraction and reflection are obviously just as well known to him as to Professor Menzel, while inversion of temperature is hardly to be regarded as one of the rare phenomena. It can be said to occur almost regularly in fine weather, though it varies in degree. We may well ask why Professor Tombaugh himself did not guess that what he had seen in the sky was the image of some windows or headlights of cars, focused upon the screen of the haze by an atmospheric lens.

I might add that Professor Menzel published his book in 1953, at a time when his theory that flying saucers are due to temperature inversions was already widely known and had been discussed in the press for several years. Yet Professor Tombaugh, when writing on the subject, still persisted in his opinion that what he had seen on August 20th, 1949, was completely baffling.

MORE "CIGARS"

An object similar to that seen by Chiles and Whitted was noticed in May 1950, by Willis Sperry, an airline pilot, but not in such detail, though he had had it in view for several seconds and had clearly distinguished a sort of "luminous submarine travelling at a fantastic speed." It was at night and the weather was fine.

At Las Vegas on the evening of June 26th, 1950, a similar object was observed for several minutes travelling at a speed nothing short of supersonic, at an altitude of about 20,000 feet. At least five airmen in three different aircraft, and a large number of eye-witnesses on the ground, gave descriptions of it: a spindle, metallic in appearance, similar to a dirigible, giving out a bluish light and with an orange patch in the center. Though it was still daylight (the time was 8 p.m.) it lit up the sky.

On January 20th, 1951, the crew of a plane belonging to the Mid-Continent Airlines also saw a mysterious object. It came so close to them that it was finally within a few yards of their machine. The witnesses had the distinct impression that the movements of the object were controlled by some rational being.

No explanation of this incident has ever been suggested and, with regard to the fact that American experiments

with teleguided machines are secret, it has been assumed that the witnesses had contacted one of these machines about which the public knows nothing. But this supposition was always rejected by the authorities, even though their denials were unnecessary. As I have said in connection with similar cases, the sudden acceleration, the turn at acute angles, etc., absolutely rule out the possibility of a jet machine. The mass-ratio law also negates such ideas. Cigar-shaped objects have, moreover, been seen all over the world.

As for ■■ explanation based on optics (mirages, inversions of temperature, etc.), no one even thought of them. Professor Menzel, who devoted a whole chapter of his book to the wheel of Ezekiel, does not discuss these incidents.

From Mantell to the "Project Saucer" Report

3

ENOUGH OF CIGARS for the moment. We shall soon meet them above the Old World, in Europe and Africa. Although frequently sighted, the cigars are actually less numerous than the saucers.

SOME UNEXPLAINED CASES

In America there is ■ regular glut of reports on the sighting of saucers. Here are a few which Donald Keyhoe has extracted from the final report of the Saucer Project:

Case 188. Goose Bay, Labrador, October 29th, 1948:

A non-astronomical phenomenon. Traced by radar. The experts should investigate the evidence. (This has no doubt been done, though the results have not been published.)

Case 189. Goose Bay again, October 31st, 1948: An identical phenomenon, followed by radar.

Case 196. Object travelling against the wind. Observed and changing direction continuously.

Case 198. A spot on the radar screen moving rapidly.

WHITE SANDS

In June, 1949, reports Commander R. B. McLaughlin of the U.S. Navy, five technicians at White Sands followed with theodolites two circular objects about 20 inches in diameter accompanying a Navy upper-atmosphere missile on its ascent.

It may here be remarked that White Sands seems to be one of the favorite haunts of mysterious machines. McLaughlin's team has seen them several times engaged in remarkable maneuvers. On one such occasion, April 24, 1949, a group of five balloon technicians of the Office of Naval Research, under the supervision of Charles B. Moore, Jr., were tracking a weather balloon at Arrey, New Mexico, when they discovered an unknown object in the sky; tracked by a theodolite, the speed was estimated at 17,000 miles per hour and its altitude at nearly 60 miles.

Captain Clérrouin, who reported this case in *Forces Aériennes Françaises*, the official periodical of the French Committee of Military Aeronautical Studies, has stated that an artificial satellite rotating at such an altitude would have a speed much below 17,000 miles per hour, which means that an object travelling at such a speed and height would largely escape the influence of gravity and embark upon an endless voyage through space. Captain Clérrouin does not actually give this result as his conclusion, but his idea may be read between the lines: if the objects sighted by the theodolite at White Sands are material things, they are capable of interplanetary navigation and must be space ships.

ANALYSIS

These White Sands cases are of the highest interest for several reasons:

1. The exceptional qualifications of the observers. From one point of view—their knowledge of secret devices—they have great advantages even over Professor Tombaugh.

2. The considerable number of these observers who have the further advantage of being equipped with all the necessary instruments for tracing accurately the rapid movement of their rockets and all other objects in the upper atmosphere.

3. The large number of sightings. It was inevitable that under such favorable circumstances, the Project Saucer should take a special interest in the White Sands sightings. It is therefore worth noting that, in its final report, the section devoted to them concludes with the statement that there is no rational explanation. Are they right? Captain Clérouin suggests that the shock waves produced by the fantastic speed of the rockets materialize, which is ■■ much as saying that the sightings are an optical illusion.

This theory cannot be lightly dismissed, though attendant saucers have also been seen at very high altitudes moving round balloons released by laboratories engaged in the study of cosmic rays, at Minneapolis, for example. There can be no question of shock waves here, though I must add that, strictly speaking, this does not invalidate the possibility in the case of the rockets. It merely proves that, if the material existence of the saucers is not admitted, there must be an individual explanation which differs in each case. In that event we are left with no explanation of the similarities.

Professor Menzel's interpretation of the sightings near the balloons is ■■ follows:

"The mysterious interloper proves to be not material at all, but ■■ distorted image of the original balloon—an image formed by a lens of air and focused far above the ground. Since the lens is imperfect and shifts with the breeze, the image flies erratically about—and finally disappears."

It might be noted that Professor Menzel's atmospheric lens is sometimes almost perfectly accurate (when the nature of the sightings requires it) and sometimes defective (when the image is capricious). None the less we can believe—for it is possible—that these lenses can take all forms, even if a geometrically perfect lens is most improbable. How are we to explain the rapid movement of the image round the rocket or the balloon? May it be that the rocket, rising at an enormous speed, passes through irregular atmospheric layers, the variable refractive index of which places the lenticular effect sometimes on one side of the machine, sometimes on the other, thus producing the illusion of gyration? But in that event the sightings would necessarily reveal rapid gyrations round the rocket and slow ones round the balloon, because the latter rises more slowly. And when the balloon stops rising there ought to be no gyrations at all. Have these points been considered? I have not seen any mention of them.

ARE ■■■ SAUCERS WATCHING THE SECRET BASES?

We cannot help wondering why the sightings are so numerous at White Sands, Los Alamos, and other places where work on secret machines is being carried on in connection with national defense. This is ■ subject on which people will have different ideas, according to their mentality. It is an extremely controversial topic. The lovers of sensation will regard the fact as proof that the machines are of "Martian" origin and their purpose to probe the secrets of the Pentagon. The psychologists—Professor Menzel agrees with them—maintain that the workers in these ultra-secret centers live in such an atmosphere of suspicion (enemy ears are listening!) that they always end up by finding—in the sky if need be—what they fear.

There may be some force in all these theories. May I add one more, based on the principles of probability? If it is admitted that the saucer phenomenon occurs with the same regularity all over the globe, there must necessarily be places where it is seen more often than at others, because the equipment for observing the upper air is concentrated there, namely, the military bases, especially the most secret ones. So if we wonder why people see so many saucers at White Sands or Goose Bay, we must also

wonder why they are never seen in the subway. The reasoning is the same, but the converse.

E. G. HALL'S SIGHTING¹

At 1:15 on the afternoon of February 20, 1948, E. G. Hall, one of a group of surveyors working on the Emmett, Idaho, substation project of the Idaho Power Company, saw a heart-shaped object, moving with the point forward, travelling at a moderate speed in the sky. He followed it with his surveyor's transit to measure its size and apparent changes of position. It passed beneath a bank of clouds that was estimated to be 2,000 to 4,000 feet high and its size appeared to be about the same as a Piper Cub plane. As a surveyor, Mr. Hall knows that all such estimates may well be wrong and so these figures are approximate. On the other hand, his description of the object is precise to a degree. He saw it flying point first, "fuzzy across the back edge, as though it had been dipped in whipped cream, but this fuzzy edge went right along with it, as though it were part of the object."²

Here is obviously a sighting of the highest interest. Consider the observer's qualifications. In this case we can be quite sure that Hall has not been deceived by some familiar object which he has failed to identify. Next, there is the lucidity of the description, confirmed by several other witnesses in the group of surveyors, even though the figures may not be exact. Lastly, the oddity of a turbulent cloud accompanying an object across a windless, clear blue sky is a most uncommon sight.

THE GORMAN CASE

Of all the saucer incidents, the Gorman case is certainly

¹ In the French text, the author mistakenly identifies Hall as a professor at Lowell Observatory; and he gives the date of the sighting as May 20, 1950. An account of this interesting observation is quoted in *Fate* magazine, Summer 1948, pp. 13-15.

—AMER. EDS.

² This frothy whipped-cream appearance has been observed in France on several occasions. The Plantier theory provides a satisfactory explanation for this phenomenon.

the greatest shock to common sense. It involved a duel which a pilot fought with a luminous and apparently non-material globe on the evening of October 1st, 1948, and fully justifies Captain Clérouin's remarks about the spectral character of saucers.

On that evening Lieutenant George F. Gorman, of the Air National Guard, was returning in a Mustang from a patrol. Other members of the patrol had already landed at the airport at Fargo, North Dakota, when the control tower notified him that it was his turn, and he could land.

It was nine o'clock in the evening. Gorman, who was at an altitude of about 4,500 feet, glanced down before preparing to land and noticed a rather strong white light travelling fast about 3,500 feet below his aircraft. Comparing the speed of this light with his own, he estimated it at about 250 miles per hour.

"What do you mean?" he at once asked the control tower. "You've said I can land but I can see the tail light of a plane between a thousand and twelve hundred feet above the runway. What am I to do?"

"A plane?" answered the control tower. "What are you talking about? There's nothing about except the little Piper Cub due to land after you."

Gorman turned without descending and had another look. He had a good view of the runway, the windows of the control tower, and the football field alongside the airport all lit up for a match that night. There was the Piper Cub and the light, closer now, was making straight for the football field.

"Anyway, I'll see its silhouette when it passes over the football field," thought Gorman.

The light duly arrived over the football ground, and Gorman thought he had gone mad. It was a light and nothing else. There was no silhouette standing out against the well-lit football field. Yet he could see the silhouette of the little Piper Cub descending in a different direction, quite plainly.

SIGHTINGS FROM THE GROUND

At that moment the traffic controller of the airport also saw the light. His name was L. D. Jensen, and he had a

friend, Manuel E. Johnson, with him in the control tower.

"Look out," he said to Gorman. "You were right. There is something. Don't come down. I'll see what it is."

He carefully inspected the object through his binoculars. Like Gorman, he saw that there was a light and nothing else. He passed the binoculars to Johnson, who agreed with him. The three of them, utterly amazed, watched the mysterious light for several seconds. They did not know what to do.

"It was from six to eight inches in diameter," Gorman told the Project Saucer teams, "clear white and completely round, with a sort of fuzz at the edges. It was blinking on and off. As I approached, however, the light suddenly became steady and pulled into a sharp left bank."

After a few seconds Gorman recovered from his amazement and swooped down toward the object at nearly 400 miles per hour. Everything that happened from that moment onward was seen, not only by Gorman himself, but also by the two men in the control tower and the two passengers in the Piper Cub. After Gorman had approached the ball, as he has described, the light suddenly stopped blinking, made a ultra-tight turn and swiftly ascended. Gorman made a corresponding turn to intercept it.

"When I attempted to turn with the light," he stated, "I blacked out temporarily, owing to excessive speed. I am in fairly good physical condition, and I don't believe there are many, if any, pilots who could withstand the turn and speed effected by the light and remain conscious."

The duel had already lasted for several minutes, and the globe, evading Gorman, was rising higher and higher. Presently, when both of them were at an altitude of about 7,000 feet, a series of skilful maneuvers brought Gorman right into the path of the ball. His account continues:

"We headed straight at each other. Just when we were about to collide I guess I lost my nerve. I went into a dive and the light passed over my canopy at about five hundred feet. Then it made a left circle about one thousand feet above and I gave chase again."

This time Gorman saw the strange globe of blinking light at close quarters and satisfied himself that it was nothing but a light. He therefore decided to continue the same tactics, get into the path of the globe and plunge ahead until a collision occurred. He did so and each time it was blinking as he approached, ceased to do so when he was quite close, made a slight turn sideways or upward out of his way, and then began to blink again.

After Gorman's second attempt to crash the object, the two passengers in the Piper Cub (Dr. A. D. Cannon and a friend, Einar Nelson) also watched the duel.

It lasted for precisely twenty-seven minutes, during which the five men—three in the two different planes and two on the ground—saw the same phenomenon: the globe steadily stabbing the darkness with its winking light until the moment for the right turns and change of direction, when the blinking was exchanged for a bright continuous glow.

As the duel approached its climax, both opponents were gradually gaining height, and after rising to 14,000 feet, the Mustang showed signs of giving out. The Piper Cub landed and Cannon and Nelson compared notes with the men in the control tower. Together they watched Gorman's final efforts and ultimate failure.

He had made up his mind to crash the mysterious object. Its small size and apparent lack of substance seemed to guarantee that impact could not be fatal to him and if anything happened he would bail out. But the ball simply played with him, like a toreador enticing the bull to charge him and then slipping neatly aside at the very last moment. It varied its tactics, swerving right, or even vertically, and sometimes allowing its adversary to get within a few feet.

In the end, apparently tired of so one-sided a contest, the luminous globe shot up vertically for the last time, headed north-northwest and in a few seconds disappeared at a tremendous speed. It was 9:27 p.m.

What was Gorman fighting?

In the statement which Gorman made he stressed the skill, imagination and accuracy—in a word, the intelligence—manifested in the behavior of the object. During the twenty-seven minutes of the duel he had carefully

noted the reactions of his opponent, and his main impression was that it was "always one move ahead of me."

In short, Gorman landed at Fargo, thoroughly convinced that he had been engaged in a duel with something directed by a brain, not merely the "brain" of a robot automatically responding to the movements of its opponent, but something more unpredictable, something capable of changing its mind, planning its moves and ultimately getting tired and sheering off.

"I am also convinced," he said, "that the object was governed by the laws of inertia, because its acceleration was rapid but not immediate and, although it was able to turn fairly tightly at considerable speed, it still followed a natural curve."

THE INVESTIGATION

The Project's first concern was with Gorman himself, in hopes that the whole thing could be put down to a disordered imagination. But it soon abandoned that line. Gorman was a very reliable man. He had been an instructor of French student pilots during the war, and all the information available about him at Fargo indicated that he was level-headed, intelligent and a realist.

The fact that the other witnesses, men of the same standing, corroborated his evidence, also ruled out the possibility of hallucination or a hoax. "The Project investigators asked me no end of questions. I suppose that at the outset they thought the whole thing was a hoax," he subsequently told Donald Keyhoe.

THEORIES

When the investigators saw that they had to look for an objective explanation, they first suggested a weather balloon that had been released at Fargo.

They soon dropped that theory, because the meteorologist there still had his diagrams and records. The times, altitudes and direction of the wind negated the idea. Fortunately, he had carefully followed the balloon with the theodolite, and could supply all the information required. Professor Menzel (who places Gorman's luminous globe in the same category as the "foo fighters" at the end of the war) considers the balloon explanation so prepos-

terous that he would even prefer the interplanetary theory.

We must not forget that Professor Menzel is not an advocate of that theory.

OPERATION SKYHOOK?

In the *Saturday Evening Post* of May 7th, 1949, Sidney Shalett put forward an improved version of the "balloon" theory: if it was not a weather balloon, why should it not be a different type of balloon, the type occasionally used by the Navy at Minneapolis to study cosmic rays in its "Operation Skyhook"?

Our first comment must be that this suggestion deliberately ignores facts reported by all five witnesses and does not take into consideration the shape of the object described by Gorman. Balloons used for the study of cosmic rays are spherical only at high altitudes; at low altitudes they look like a long shrivelled pear with the narrow end down. When Gorman saw the light for the first time it was at an altitude of only about 1,000 feet. The suggestion also ignores the matter of size. These balloons are huge. If one of them had passed, as the light had, between Gorman and the football field, he would have seen an enormous dark shadow and the witnesses at ground level would have reported something very different from a small light.

The third factor ignored is the behavior of this light, with its steady blinking observed by all the witnesses, and its indulgence in all the complicated and dangerous maneuvers incidental to an aerial duel lasting twenty-seven minutes.

In a word, Sidney Shalett's explanation of Gorman's adventure is simply that the latter saw something luminous in the sky. He disposes of the circumstantial details by the assertion that Gorman had a fit of dizziness and was thus misled by a balloon. Incidentally, if Shalett is right, the same misfortune must also have overtaken the ground observers. One wonders why he is prepared to admit that Gorman saw something, when he needed only to go one step further and say: Gorman had an attack of dizziness; he thought he saw something but did not. This explanation would account for everything admirably.

So the Project ruled out both a hoax and the balloon. They also ruled out hallucination because the evidence was corroborated by several witnesses.

Then they enquired whether some airplane which had not been reported had been in the area at the time when the phenomenon occurred. None had. Finally Professor Hynek considered whether a meteor, star, or comet could provide a clue to the mystery. He satisfied himself that there was no astronomical explanation.

The investigators, having made the round of all possible solutions, included the incident in the unexplained cases and concluded their enquiries.

THE SILENCE OF LIEUTENANT GORMAN

Some time afterwards Donald Keyhoe went to see Gorman. He took the report with him and checked the course of the enquiry and the statements made by Gorman, sentence by sentence. Gorman specifically confirmed everything except the passage in the report that "during his duel with the light he had not noticed any effect on his navigating instruments." He refused either to confirm or deny it. On this point Keyhoe could get nothing definite from him. Ought we to attach any importance to this fact? In any case, the reader should bear it in mind when he comes to Lieutenant Plantier's theory.

PROFESSOR MENZEL

The last explanation of the Gorman case to be put forward is that of Professor Menzel.

"I think," he says, "that Gorman was right when he stated that the foo fighter seemed to be controlled by thought. However, the thought that controlled it was his own. But the object was only light reflected from a distant source by a whirlpool of air over one wing of the plane. The fact that the foo ball sightings increased towards the end of World War II signified that more of our planes had by then been damaged in combat or by anti-aircraft fire. The patches on the wings are not always perfect and the flow of air over them can be quite turbulent. The reflectivity of the air whirl may be increased by the formation of fog or even ice crystals within it. Ice crystals floating in the

air can reflect a distinct source of light as in a mirror and thus a bright image can seem to accompany a plane in its flight."

As a matter of fact, there is a phenomenon of the kind mentioned by Professor Menzel, and it has even been successfully photographed—at any rate, the whirlpool with ice crystals has. For a simple whirl of air with neither ice nor mist is only a rather special kind of air current, just ■ invisible as any other air current.

Thus Professor Menzel's explanation corresponds with real facts. It is quite possible that whirlpools of the kind he mentions may have formed on one of the wings of Gorman's plane, and that they reflected the lights of Fargo Airport. But it is certain that if Gorman had seen anything of the kind he would have reported it, yet it figures nowhere in his story. All he saw was a luminous sphere, at first about half a mile below his machine, then successively ahead, behind, right and left of him. In fact, everywhere except on one of his wings. And this sphere was a blinking light which became steady under certain circumstances—always the same ones. To crown everything, while the baffled Gorman was coming down toward Fargo, the witnesses on the ground watched the "light" make off at ■ tremendous speed. Clearly all this has no connection with Professor Menzel's whirlpool.

MORE "GORMAN" CASES

Lieutenant Gorman's disconcerting experience is not unique.

But just ■ the flying saucer is associated with the Mantell case, and Chiles and Whitted may be said to have christened the flying cigars, so the Gorman case heralds the exploits of the luminous ball. We shall come across it again over France, but a few more American cases should first be noted.

On November 18th, 1948, six weeks after the Gorman case, Lieutenant H. G. Combs also encountered a luminous globe, above Andrews Field, not far from Washington. The time was 9:45 p.m. and, like Gorman, Combs began to chase the object in the dark. Like Gorman, he was "tagged" for more than ten minutes and had a num-

ber of extremely tight turns forced upon him. He could see that the maximum speed of the object was far greater than his own, and estimated it at about 600 miles per hour. The ball should thus have soon disappeared. But it "changed its mind," waited for Combs, and the duel was resumed, still without any result. Presently, Combs managed to get into the path of the object and did something which had not occurred to Gorman. He turned his two landing lights upon it. The ball quickly swerved away and brought the duel to an end by making off eastward at high speed.

Combs was accompanied by Lieutenant Jackson, and both of them were closely cross-examined by Project Saucer. The enquiry followed the same lines as in the Gorman case and eventually reached the conclusion: "Incident unexplained."

In another case, a green fireball was seen by 17 people. This sighting also is described as "unexplained" though officially listed as "explained." We shall presently see what lies behind this contradiction in terms.

On December 8th, 1948, three weeks after the Combs case, a green fireball, similar to that in the preceding case, was seen very distinctly and carefully noted at Las Vegas, New Mexico. It was travelling at very high speed. An official report was made by two F.B.I. men. As in the preceding case, this was officially classified as "explained," yet described ■ "unexplained."

So much for the luminous spheres and fireballs. Project Saucer investigated a large number of them which were neither meteors, mirages, nor any other known phenomenon.

What must our final judgment be? There is practically no choice. If they were not anything known, they must have been *something else*. Otherwise the witnesses—consciously or not—invented their stories.

END OF PROJECT SAUCER

All this evidence was included in the final report of Project Saucer. On December 27th, 1949, exactly two years after being set up, Project Saucer was dissolved. The announcement was made in an Air Force press release to the effect that the existence of flying saucers had not been

proved, and that the Project had investigated 375 reports of sightings and had concluded that their origin was either:

1. Misinterpretation of various conventional objects.
2. A mild form of mass hysteria due to "war nerves."
3. Individuals who fabricate such reports to perpetrate a hoax or to seek publicity.

This statement was obviously addressed to those members of the public who had been intrigued by such curious happenings in the preceding two or three years. Unfortunately these people immediately recollected another statement issued by the Air Force, on April 27th, 1949, which had contained the following passages:

"The mere existence of some yet unidentified flying objects necessitates a constant vigilance on the part of Project 'Saucer' personnel, and on the part of the civilian population. . . .

"Answers have been—and will be—drawn from such factors as guided missile research activity, balloons, astronomical phenomena. But there are still question marks. . . .

"Possibilities that the saucers are foreign aircraft have also been considered. But observations based on nuclear power plant research in this country label as 'highly improbable' the existence on Earth of engines small enough to have powered the saucers. . . .

"Intelligent life on Mars is not impossible but is completely unproven. The possibility of intelligent life on the planet Venus is not considered completely unreasonable by astronomers. . . .

"The saucers are not jokes. Neither are they cause for alarm."

So it was clear that between April 27th and December 27th the official view about the saucers had fundamentally changed. Whereas the first statement did not rule out the extra-terrestrial hypothesis, the second one asserted that there are no such things as flying saucers.

In any event this December statement was considerably weakened by the wording of the final report of Project Saucer itself, which contained the following passage:

"It will never be possible to say with certainty that any individual did not see a space ship, an enemy missile, or some other object."

The Air Force emphasized its positive attitude by casting doubt upon the existence of flying saucers, not on metaphysical grounds but because what had been seen could be accounted for by known phenomena.

The final report went on to say that if there existed somewhere a celestial body with a civilization superior to ours, its inhabitants might have good reason for keeping it under observation: "Such a civilization might observe that on earth we now have atomic bombs and are fast developing rockets. In view of the past history of mankind, they should be alarmed. We should therefore expect at this time above all to behold such visitations."

It will be noted that the hard and fast negative has been modified to the extent that the report admits there are sound arguments in favor of possible extra-terrestrial visits.

CONFUSION

All this is not very clear and invites comment.

1. The press release of April 27th, 1949, issued by the Air Force, cautiously admits that the saucers may actually exist, and that their extra-terrestrial origin is possible.

2. The second statement is twofold. The first part is Air Force Press Release 629-49. It is short and precise and makes three points: all the cases of sightings have been explained by the project set up to investigate them; its conclusion is that the saucers do not exist; the project has accordingly been dissolved.

But three days later they supplemented it by revealing certain portions of the final report of Project Saucer.¹

¹ The report of December 30, 1949, to which the author refers, was officially titled "Unidentified Flying Objects—Project Grudge," Technical Report No. 102-AC-49/15-100. It was widely referred to as the "Grudge Report." See *The Report on Unidentified Flying Objects*, by Edward J. Ruppelt (Doubleday, New York, 1956), pp. 93-94.—AMER. EDS.

The existence of the saucers is cautiously denied but it is admitted that there are reasons in favor of the extra-terrestrial hypothesis. There were 375 cases mentioned; 34 cases were "unexplained." But when each individual case is examined, it is found that the reports on many more of them (and, in particular, those which I have cited) end with the words "no explanation." To cap all this, the Air Force announced that everything had been accounted for. What is the meaning of this vacillation?

"I believe," writes Donald Keyhoe, "that the Air Force statements, contradictory as they appear, are part of an intricate program to prepare America—and the world—for the secret of the discs."

Personally, I regard such Machiavellian practices ■ absolutely improbable and childish. I do not believe that these contradictory statements (and those I have mentioned are by no means the only ones) have any set purpose. A simpler and more plausible explanation is that they were the result of a change in ideas, or rather feelings, at the Pentagon as events developed.

WHAT ARE WE TO MAKE OF THESE CONTRADICTIONS?

Let us look back to the origin of Project Saucer. When it was set up, the mysterious sky objects had been the subject of public discussion for exactly six months. The date of Kenneth Arnold's sighting was June 24th, 1947, and the order establishing the project was signed on December 30th following.

During those six months the most preposterous stories had been in circulation. As there is never any dearth of lunatics and visionaries, reports which were genuinely puzzling had been mixed up with the inventions of weak minds which were ready-made victims of the "saucer psychosis." The result was wholesale chaos, and the impossibility of mentioning saucers without being considered insane.

Meanwhile the authorities were harassed by enquiring journalists. As they had nothing to reply, they might be accused of refusing information to which the public of a democratic country was legitimately entitled, or of not doing the work for which they were paid.

Hence the establishment of a body commissioned to find

the answer. But unlike Keyhoe, I believe that in setting up Project Saucer the Air Force was animated by one consideration only: "Since the saucers are a hoax, we know beforehand that a project comprising all the necessary technicians will quickly manage to account for all the alleged sightings, whether as natural phenomena, the products of disordered minds or downright inventions. It will cost a few thousand dollars and some months' work, but it will be a cheap price if we are left in peace."

In one sense they were right. The project found a perfect explanation for all the cases which were capable of explanation. Unfortunately, contrary to expectations, they also found many cases which could not be explained at all, and men who had been expected to convince the public that there were no such things as saucers now began to believe in them!

Such was the situation when, on April 27th, 1949, the statement appeared which admitted the existence of the saucers, and also the possibility that they were of extra-terrestrial origin. But, in my opinion, it has not been sufficiently appreciated that between April and December, 1949, no new explanation was put forth warranting the conclusion that what was unexplained in April was explainable in December. Indeed, the statement in April had already mentioned all the hypotheses suggested in December, including "guided missile research activity, balloons, astronomical phenomena," and had added "there remain, however, numerous unexplained cases."

So it seems fairly easy to understand why Project Saucer dissolved in December, 1949. It had done its job and was needed no longer. Of course, that job was not the same as the one originally assigned—to produce a complete explanation.

We still do not know why the Air Force issued one statement announcing that the mystery had been elucidated, and, only a short time later, another, which explicitly negated that pronouncement. I can see only two possible answers to the riddle. The first is that in December, 1949, the Air Force no doubt hoped, with the help of the huge resources at its disposal, to achieve success at an early date in the cases which remained unexplained. By

announcing that everything had been accounted for, they thought they were only anticipating a little.

But the alternative answer, that the Pentagon's designs are inscrutable, seems more likely. I know of military roads in the Alps which lead nowhere.

The American Investigation Continues

4

AS I HAVE said, Project Saucer was reported at an end.

Here I should mention how surprised I was, when conducting my own enquiries in responsible French military circles, to discover that they were wholly ignorant of the investigations now being carried on by the American authorities. I was not only surprised but shocked, because the utter skepticism prevailing in these circles about flying saucers is due entirely to the supposed dissolution of the Project in December, 1949. Apparently, no one in France took the trouble to examine the report issued on December 30th (three days after the Project ostensibly ceased its labors), which would have started another train of thought. "The informed" thought the Project was dissolved because it had completed its assignment, whereas the real reason was just the opposite.

For their edification, I give here some information which, I hope, will make it clear in French circles that America is not really content to explain the saucer phenomenon by simply shrugging its shoulders.

To begin with, there is the last chapter of Professor Menzel's book, published in 1953. It suggests: "If you see

a flying saucer, fill out a report sheet like the one shown and send it to the Air Technical Intelligence Center at Wright Field, Dayton, Ohio. They will be glad to get such information."

So at Wright Field, in the United States, there is still a special group engaged in studying the saucers. This section is by no means idle. During 1952 alone, it examined about 2,000 reports, found plausible explanations for some 1,200 cases and classified the rest as impossible to explain. That means about 800 cases of flying saucers in one year, in America only.

IN CANADA

While the Americans are very laconic about their enquiries, the Canadians are less so.

On November 12th, 1953, the following telegram from Ottawa was circulated by the Agence France-Presse:

"In a few weeks an observatory which, it is hoped, will elucidate the mystery of the flying saucers, will begin its work at Shirley's Bay, about twelve miles from Ottawa. The laboratory has been equipped with all the instruments now available for that purpose. It will be directed by Mr. Wilbert Smith, Chief Engineer of the Electronic Division of the Canadian Ministry of Transport. Mr. Smith has made the following statement: "There is a good chance that the flying saucers are real objects. The odds are sixty to a hundred that they are extra-terrestrial vehicles.'"

Sightings after 1949

5

THESE ACCOUNTS ARE very numerous. I will mention only some of the most remarkable.

ANOTHER ASTRONOMER WITNESS

Professor Menzel does not mention the sighting made on May 20th, 1950, by Seymour L. Hess of the Lowell Observatory at Flagstaff, Arizona.

Dr. Hess was studying weather conditions when he noticed a shining disc passing in somewhat leisurely fashion between the clouds and the sun. It was quite visible to the naked eye, but the astronomer examined it through a telescope.

It was a flying saucer of the classic kind, i.e., a disc of metallic appearance. As the clouds were not dense Hess was able to see the object outlined both against the background of very white clouds—where it looked dark because it was in shadow—and against the blue sky, where it was caught by the sun's rays and shone like a mirror.

Dr. Hess had an excellent opportunity to gauge the maximum altitude of the object, as it was below the clouds, and knowing the altitude and apparent diameter, he could calculate its actual dimensions. He found that it was barely two yards long. It was a small saucer. Small, but difficult to ignore.

Some time afterwards Hess's story began to be talked about in scientific circles, and the French astronomer Gérard de Vaucouleurs wrote to his American colleague

for assurances that it was neither a complete fabrication nor a literary embellishment of some more commonplace incident. Hess repeated his story with all the desired detail.

SIGHTINGS BY RADAR

There are many legends about radar sightings. One of them, related by Colonel Gallois in the course of a debate on flying saucers at the Aéro Club de France, is the generalization of a particular case:

"It is quite true," he said, "that radar screens have sometimes picked up unidentified objects moving in the sky. But every time an airplane set off in pursuit of one and the radar center told the pilot, 'You've reached it, it is just in front of you. What can you see?' the invariable reply was, 'Nothing. I can't see anything. There is nothing to see.'

"These vagaries of the radar screen are well known," added the Colonel. "English pilots have given them a slang name—angels."

It is true enough that these "angels" exist and are fairly familiar to radar operators. But it is obvious that:

1. The cases in which pilots sent in pursuit of an "angel" have replied, "I can see nothing" do not invalidate the many cases in which they have replied, "I can see a light, a disc, etc."

2. Although radar can behave erratically and invent objects moving in the sky, it is very difficult to see how it can cause another radar screen miles away to behave in the same way and record the very same object moving in the same area, at the same speed and in the same direction.

As a matter of fact there have been cases of sightings, not merely by two, but by three or more radar screens. What about those?

THE TRICKS PLAYED BY WARM AIR

The other legend is the one about temperature inver-

sion. It is quite true that certain temperature inversions appear as radar vagaries. But:

1. The most remarkable radar sightings were made when there was no temperature inversion at all.

2. The effect of temperature inversions on the radar screen can be recognized quite easily: they produce large blurred patches which are totally unlike the sharply focused "blips." The "blips" of saucers do not differ in the least from those of any airplane, except for the bewildering evolutions of the saucers. How can Professor Menzel (who has put forward this explanation) identify radar images attributed to saucers as the effects of inversion, when these radar images are absolutely the same as those of airplanes, and an inversion has never been mistaken for an airplane?

IN THE CONTROL CENTER AT WASHINGTON, D.C.

In order to understand the events which occurred above Washington during the night of July 20th, 1952, one must have a clear picture of the way in which a control center of air traffic operates. The control center is quite different from a control tower, whose function is to supervise landings and take-offs of aircraft. The control center is a section of the airport organization which "collects" airplanes while still far away, and follows them for a considerable distance (about 100 miles in the case of Washington). The room containing the scopes is darkened, so that their faint lavender glow remains visible, and there the operators watch the sky without having to move from their places. All they have to do is keep their eyes on the scopes. When a plane is approaching, the big revolving antenna outside sweeps the sky with its beam, and in return receives the echo thrown back by the plane. Every time the revolving beam strikes a plane, a violet-colored spot of light (called a "blip") appears on the scope. The position of this "blip" indicates the position of the plane in the sky at the instant when the beam hits it. As the spot fades rather slowly (it takes about a minute) and the beam makes a complete sweep of the sky in ten seconds, a series of "blips" on the scope indicates the successive positions of the plane. The distance between the "blips"

provides the data for computing the speed of the aircraft.

There are three radarscopes in the radar control center at Washington: a large one about thirty inches in diameter, which picks up everything within a radius of 35 miles, and two smaller ones which follow aircraft up to a distance of more than 100 miles.

EVENING VISITORS

It was 12:40 a.m. Eight controllers were working in the radar room, with Harry G. Barnes in charge. It was a clear night and air traffic was light. Suddenly seven round spots, just like the "blips" from aircraft, appeared on the scope. Barnes noted that the objects were travelling at a moderate speed of 100-130 miles an hour. He was rather worried because no planes were scheduled to arrive, so he had the apparatus checked to make sure that it was in proper working order and, to be on the safe side, called the other radar center in Washington controlling local traffic, and the Air Force radar center at Andrews Field. Both had already noted the seven mysterious visitors.

Watching the evolutions of the strange objects on the screens, the three centers realized that the performance was taking surprising liberties with the laws of mechanics. At one moment one of the objects changed direction at an angle of 90 degrees without decelerating or describing any perceptible curve. A little later, another of the objects, also without noticeable deceleration, made a turn of 180 degrees—which meant that, at a speed of nearly 125 miles per hour, it suddenly reversed its course.

Meanwhile, a commercial plane piloted by Captain Pierman had taken off. Following radar directions, he found himself facing a shining circular light, very similar to the one which Gorman had chased two years previously above Fargo. But when he was on the point of reporting what he saw to the Center, the object suddenly accelerated at tremendous speed and disappeared in a few seconds. It not only vanished from his sight, but faded out on the radarscopes.

"There are only two explanations," said Barnes, the official in charge of the Control Center, in a statement which he made later. "Either the object ascended vertical-

ly at a terrific speed and thus got out of radar range; or it travelled such a distance horizontally in ten seconds as to get out of range of ground radar—which would entail speeds of 5,000 to 7,000 miles per hour.”

Pierman, who saw six vanishing lights in all, later confirmed their speeds. One of the radars, an A.S.R. turning at twenty-eight revolutions per minute instead of ten and therefore able to pick up objects moving at nearly three times the maximum speed that the ordinary radar can deal with, showed an object disappearing almost vertically but with a slight inclination north-northeast, toward Riverdale. The speed indicated by the radar was a little more than two miles per second, roughly the same figure computed by Barnes.

About 3 o'clock in the morning two jet planes arrived over Washington, and all the objects vanished as before. When the two planes left, the mysterious visitors returned. But this time there were as many as ten of them. The observers at three radar screens counted them, watched them, and followed their evolutions.

This performance lasted till daybreak. During the course of it a transport plane arrived over Washington, and while it was getting ready to land, one of the luminous objects left the others and came quite close. It followed the aircraft to within four miles of the airport, to the amazement of the pilot, who saw it, and of the observers on the radarscopes of the three centers, who had also followed its progress.

“I am absolutely sure,” said Barnes to the investigators, “that these objects were guided by intelligence. When no aircraft were about, they showed a preference for the most interesting points: Andrews Field, the Riverdale aircraft factory, the Capitol. One or two of them circled for a short while above the radio beacons, but as soon as a plane came along, they would follow it, as if they wanted to examine it closely.”

These observations by the head of the airport radar center are, of course, a personal opinion and must be treated as such. But they certainly should be compared with the comments of Gorman, Combs and many others who gained first-hand knowledge of the same luminous globes.

THE VISITANTS RETURN

Six days later, on July 26th, 1952, the same antics started again at the same place and under the same conditions.

The Center was the first to observe the preliminary "blips," then the control tower at Andrews Field. As before, the radar sightings were confirmed by visual observation from the ground and air. Lights could be seen flitting to and fro, stopping, jerking into motion again, making off at the approach of aircraft or, contrariwise, following them until they were about to land.

One of these witnesses was Lieutenant William L. Patterson, who was passing over Washington in a jet plane. He had noticed four suspicious looking lights in the sky and made straight for one of them, swooping down on it at more than 600 miles per hour. But it got away and Patterson could not follow it.

EXPLANATIONS?

Once again the Air Force was flooded with demands for an explanation. They responded with Professor Menzel's explanation: The luminous patches on the radarscope and in the sky might have been produced by temperature inversion. As radar waves are propagated in space like light, they have the same possibilities of producing illusions. An optical illusion is analogous to the radar illusion displayed as a "ghost blip" on the radarscope. Moreover, inversion accounts for the high speeds and sudden turns, either because the ground object picked up by the atmospheric lens itself moves, or, more probably, because there is considerable disturbance in the atmospheric layers in which inversion is produced.

The technicians and engineers at Washington airport who witnessed the phenomena do not accept this explanation, according to Keyhoe, who questioned them about the matter.

"Everyone here," said Barnes, "is familiar with the effects of inversion. When it is strong enough it picks up all kinds of things on the ground: water tanks, buildings, bridges, and so on. But nobody is deceived, because it causes huge irregular patches, nothing like the 'blips' which were observed on the 20th and 26th of July.

During the six years I have spent looking at these scopes no jet plane, however fast, no storm or inversion, in fact nothing at all, has produced radar echoes behaving like that. And yet we have several times had identical atmospheric conditions."

"There's something else," observed chief engineer J. L. MacGivern. "There was never any ground clutter either on July 20th or 26th, apart from the patch that we always have in the center of the scope, where the beam picks up the airport buildings."

MAJOR KEYHOE'S INQUIRY

In his report on the investigation which he conducted for the magazine *True* (December, 1952), Donald Keyhoe said that, in order to leave nothing to chance, he made a point of interviewing persons best qualified to judge the amount of inversion necessary to produce a concentration of luminous objects comparable to the phenomena observed at Washington. At the Weather Bureau Vaughan D. Rockne, a radar expert, replied that he had never heard that inversion could produce images of that kind on radarscopes, while Dr. John Hagin, leading radio astronomer at the Naval Research Laboratory, said:

"Even with an extreme inversion, conditions would have to be very, very unusual to cause such effects. In my opinion, the pin-pointing of blips by three radar stations, and simultaneous sighting of lights at the same points, would make it impossible."

The same scientist, in reply to further questions by Keyhoe, suggested that even if the thing were possible there would have to be an inversion of at least ten degrees Fahrenheit (approximately six degrees Centigrade). To check this opinion and the figure specified, Keyhoe asked the Air Force to select a radar specialist to give the official view. They suggested Major Lewis S. Norman, Jr., of the Aircraft Control and Warning Branch, who had made a special study of temperature inversion.

Major Norman pronounced that high speed and sudden turns implied intensive atmospheric disturbance, accom-

panied by an inversion of at least nine and possibly eighteen degrees Fahrenheit.

Armed with these figures, Keyhoe asked the Weather Bureau for the graphs showing the temperature above Washington on the date when these phenomena occurred.

Inversion had never exceeded one degree Fahrenheit on the night of July 20th and two degrees on July 26th.

This annoyed Keyhoe considerably. It must be remembered that he probably knows more than anybody about the saucers except the Air Force, that he firmly believes in the extra-terrestrial origin of these objects, and that he never misses an opportunity of exposing the inconsistencies of those who disagree with him. Now here was a case in which the contradiction was blatant. The official specialist had stated that the very lowest figure for the inversion capable of producing the phenomena was nine degrees and though the official records showed that no such inversion had existed, the official explanation was based upon the assumption that it did.

INVERSION DISCARDED AS AN EXPLANATION

Keyhoe then submitted the two following questions to the Air Force:

1. Had the Air Force ever asked Dr. Menzel to explain specific saucer cases by the theory of inversions?
2. If so, what were the results?

Here are the replies of the Air Force:

1. Dr. Menzel had been invited to apply his theory to cases on record.
2. He had not attempted to explain any specific occurrences.

I myself have asked several eminent French meteorological technicians if they thought that temperature inversion could produce the effects described by the various witnesses. They proved to be highly skeptical about the possibility of such an explanation. We shall speak of this again

when dealing with the luminous spheres sighted in France.

OTHER SIGHTINGS IN AMERICA

I have already spoken of the sightings at Goose Bay Air Force Base in Labrador, in 1948 (Project Saucer cases 188 and 189). This seems to be a favorite haunt of the saucers. On June 19th, 1952, shortly after midnight, a red glow appeared in the sky, going southwest. The control tower radar picked it up. The object hovered motionless for a moment, then suddenly changed to a dazzling white and took off at a tremendous speed.

At the exact moment the changes of color took place, the "blip" on the radarscope became very vivid. Radar operators know what this change means; it occurs when an airplane banks and exposes more of its surface to the radar beam.

The object had apparently dipped before making a sudden turn; a second later, it had vanished.

WHITE SANDS AGAIN

The experimental base of White Sands is another favorite haunt of saucers. The reader will remember that in April, 1949, experienced observers saw a saucer moving at speeds in excess of escape velocity. If the observations are accurate (nobody has questioned them) this means that these objects had the attributes of spaceships.

On July 14, 1951, the technicians at White Sands had just launched a guided missile, and they were following it through a telescope, when they noticed an oval object in the air near a B-29.

As we have already seen, there had been similar occurrences at White Sands in 1949, but this time it was difficult to believe that the object was merely the materialization of shock waves, whatever that mysterious expression may mean, for its actual existence was established by the radar sets of two jet planes. It was even recorded on a 35 mm. film. The Air Force, however, has not released the film, confining itself to a statement that it showed an oval object which was so far away that no structural details were visible.

SAUCER AT KIRKSVILLE

On the evening of July 12th, 1952, an object very similar to the one reported at White Sands was seen at Kirksville, Missouri.

It was 9:00 p.m. when there appeared on the radar-scope a "blip" indicating a solid body about the size of a B-36. The radar recorded a speed of over 1,700 miles per hour. The Air Technical Intelligence Center classified this sighting as "unknown."

SAUCER AT WRIGHT-PATTERSON AFB

On August 1, 1952, just before 11:00 a.m., radar at Wright-Patterson picked up an unidentified object traveling at high altitude. Seen from the ground, the object presented the appearance of a luminous sphere emitting an intense light. Two F-86 jet planes took off at once on an intercept mission and climbed to a height of 30,000 feet. Both pilots could see the object above them, a brightly glowing object hovering at a higher altitude. To avoid the possibility of being deceived by a reflection from the ground, they separated so as to view the object from different angles. This made no difference; the object was still there, appearing just the same. When the pilots tried to close in to take photographs, the saucer suddenly put on speed in the familiar fashion and vanished into the distance.

The two pilots, Major James B. Smith and Lt. Donald J. Hemer, had little chance to get into position for photographing the object properly, but when the film in the gun cameras was developed, both revealed a round shape, without visible structural details, just as in White Sands.

INVESTIGATION AND THEORIES

At first Air Technical Intelligence Center assumed that this was a balloon. However:

1. The speeds observed by the two pilots and recorded by the ground radar ruled out that explanation.
2. A radiosonde balloon had been released by the Weather Bureau about half an hour before the sighting. But such balloons are small and incapable of affecting radar in the manner observed.

THE NOEL SCOTT SAUCERS

The Wright-Patterson case marks a date in the history of flying saucers, because it was in this context that an American Army technician, a physicist named Noel Scott, first put forward his theory that lenses of ionized gas provided the explanation. In his laboratory at Fort Belvoir, Noel Scott had succeeded in producing small luminous saucers in an airtight glass vessel. Scott's experiment did, in fact, result in small lenticular bodies with a certain degree of luminosity, and if such phenomena could move about in space, no doubt the newspapers would report far more flying saucers than they actually do. But the conditions under which Scott carried out his experiments exist nowhere in the atmosphere or the stratosphere. Distinguished scientists have given their opinion on the subject in no uncertain terms. Prominent among them is George Ray Wait, physicist of the Carnegie Institute, who was questioned by Keyhoe.

The French *Météorologie Nationale* also deny the possibility of atmospheric conditions capable of producing Noel Scott's lenticular ionization. In any case, a glance at the photographs published by Scott makes it quite clear that these conditions cannot exist in the atmosphere. Actually, Scott's saucers are produced in a cylindrical glass vessel in a vertical position. The "saucer" lies motionless, flat on the bottom of the vessel, its edges exactly concentric with the glass side. Would it still be round if the vessel, instead of being a cylinder, were a parallelepiped? It is highly unlikely. Even assuming that it would keep its lenticular shape in any receptacle, the fact remains that it retains its central position and therefore the presence of the surrounding wall must play an essential part in the formation and behavior of the so-called saucer.

And in the atmosphere, where is anything comparable to the glass sides of the vessel to be found?

Even Professor Menzel, taking the improbable in his stride unless it is downright preposterous, ignores Noel Scott's theory. So we must therefore put it aside, ingenious though it may be.

FASTER AND FASTER

The radar observations are now extremely numerous. As

I have said, the Air Technical Intelligence Center collects and studies them methodically, and so does the Canadian observatory at Shirley's Bay and some others. I cannot refer to all those records here. A large number of them are kept secret, either because the enquiry is still in progress, or for more mysterious reasons. But I must not omit two spectacular sightings distinguished by particularly careful observation and the tremendous speed of the objects.

THE CONGAREE OBJECT

On the morning of August 20th, 1952, the radar observers at Congaree Air Base near Columbia, South Carolina, were watching the sky when suddenly the screen picked up an object in the southeast about 60 miles away. In a few seconds the successive "blips" on the screen traced a trajectory which implied a speed of more than 4,000 miles per hour—many times as fast as the fastest jet. If it had happened in France this object could have crossed the country from one side to the other in ten minutes.

The Air Technical Intelligence Center has put this case in the unexplained category.

NIGHTTIME ENCOUNTER OVER THE GULF OF MEXICO

It may have been noticed that witnesses of flying saucer sightings frequently came away with the impression that someone nimbler or more cunning than themselves had been making game of them. It could be said that the saucers had a private and particular sense of humor, something between that of a cat playing with a mouse and the caprices of a coquette. But do they share the cat's cruel instincts? Certainly not. Our authority is an officer who had every reason to believe on one occasion that he was being attacked by a formation of saucers.

He is Lieutenant Coleman, radar officer on a B-29. About 5:25 a.m. on December 6th, 1952, his aircraft was flying at 18,000 feet above the Gulf of Mexico. The moon was shining brightly and the great plane was about 100 miles off the Louisiana coast, when he suddenly saw on his scope the characteristic "blip" of an object moving in the sky. For a fraction of a second he thought it was an airplane, but the second "blip" was so far away from the

first that he was staggered. Where would the third "blip" be? A second later it made its appearance. There was no doubt about it. There was nothing wrong with his eyesight. In a few seconds the object had crossed the screen, and the speed registered was more than 5,000 miles per hour.

Was the radar out of order? Hurriedly Coleman recalibrated; as he finished, four more objects were crossing his screen, and the screens of the other two sets in the plane ■ well. From the waist blister Sergeant Bailey incredulously watched one of them streak from front to rear, a strange bluish object hurtling along under the wing. It was gone so quickly that he did not have time to form an exact idea of its shape, and as it approached from the front, the moment when he had the best view of it was also the moment when it disappeared.

The crew barely had time to recover their breath when more objects appeared on the radar screens, coming from almost dead ahead and making the same speed as the others. They passed, off to one side; the crew drew a long breath. Six minutes had passed since the first sighting. The nightmare seemed to be over.

Suddenly there was a third group. Two streaked past under the wing again. Five more were coming from behind, heading straight for the B-29! In three seconds at that speed, they would strike it!

What happened then proves that the saucers, if not above scaring human beings out of their wits occasionally, wish them no harm. Abruptly the onrushing machines slowed to the bomber's pace, and for ten seconds followed it behind.

Then they picked up speed again and sped off to one side; and on the screens the astonished crew watched the most amazing spectacle of all. A huge half-inch blip appeared. The five smaller objects, still moving at 5,000 miles per hour, rushed upon the sixth one and *merged with it*. All that remained was one large patch. It accelerated, flashed across the scope at incredible speed, and vanished.

Grimly the men compared their figures. There was no mistake. All the calculations showed that the huge object had been travelling at more than 9,000 miles per hour!

The rest of the B-29's trip was uneventful. Nothing else appeared on the screen or in the sky. But the men were haunted by what they had seen. What could it all mean? Air Technical Intelligence Center seemed particularly interested in the story, but could offer no explanation. At the end of the account given by the crew, Keyhoe found A.T.I.C.'s verdict: "All the possible natural phenomena have been considered. Conclusion: origin unknown."

Keyhoe himself thinks that the meaning of the evidence of concerted action noticed by the B-29 crew is clear. The small bluish objects hurtling towards the B-29 were auxiliary machines guided from a central one of huge size. They approached the B-29 for observation purposes and then, having fulfilled their mission, rejoined the central machine. Of course all this is theoretical, and here we come to the strong point of theories.

When Professor Menzel or the A.T.I.C. or any other expert or technician suggests a "natural" explanation of the saucer phenomenon, he is caught in a vise. On the one hand, his explanation must fit the actual evidence and "save appearances," as Plato said. On the other, he must be able to reconcile it with natural phenomena or established scientific theories.

Explanations of this type are often like a blanket that is too short—if you pull it up toward your shoulders it leaves your feet uncovered. If you think of some well-known phenomenon associated with the sky you find that it does not square with what the witnesses saw. If it does square with the witnesses' story it is easily pulled apart by the scientists.

That is why it is easy to criticize and generally to demolish, I fear, those explanations of the saucer phenomenon which associate it with familiar natural phenomena. In my opinion it will never be possible to find a satisfactory conventional explanation of the Mantell case, for instance, except by pulling up the blanket and rejecting ninety percent of the evidence.

Keyhoe does not worry about having to make the blanket cover both the facts and conventional science. He makes no attempt to save the latter. And, indeed, it must be recognized that all scientific progress in history has

been achieved by this sort of defiance. The day comes when there is no alternative but to choose between truths hitherto regarded as firmly established and some fact which cannot be explained away. In these cases there can be no hesitation.

The trouble with the saucers is that not everyone is yet convinced that they cannot be explained away. It is certainly not Keyhoe's fault. Conversely it would be just as wrong to criticize Professor Menzel for leaving no stone unturned to explain away everything.

In a criminal trial it is essential that the prosecution and the defense should both have their say. That is how the truth emerges. But there is one important difference between Keyhoe and Professor Menzel: Keyhoe does not choose only the facts which suit his case.¹

¹ So far I have dealt only with evidence whose authenticity is guaranteed by the honesty and standing of the witnesses. But there is evidence of another kind.

There is the silly yarn told by George Adamski, an American of Polish origin, in his book *Flying Saucers Have Landed*. He tells how a saucer landed before his very eyes. From it alighted an inhabitant of Venus, tall and fair, with blue eyes. He and Adamski carried on a conversation by telepathy. The people on Venus, it seems, are greatly worried about the follies of the earth dwellers and they are even keeping us under observation. This meeting took place on November 20th, 1952, and twenty-three days later, the Venusian having arranged a rendezvous, they met again near Adamski's home. He entrusted a message to Adamski which the latter has not yet managed to decipher. (There is a reproduction of this message in Adamski's book, and it is, indeed, undecipherable, as one would expect.) Adamski took his footprints (also pictured in the book), and so forth.

The book contains some very clear photographs of the saucer from Venus. It is a kind of glass dish-cover, with a dumpy turret at the top and a row of apertures.

Nor is that all. In October 1953, two amateur English astronomers, Mr. and Mrs. F. W. Potter, of Norwich (Mr. Potter is a member of the British Astronomical Association) followed an object in the sky with their telescope for three and a half minutes. They then made a drawing of it, which is an exact reproduction, upside down, of Adamski's saucer. A remarkable coincidence. Mr. and Mrs. Potter's telescope, like all astronom-

Let us add one more word about the numerous cases reported in the newspapers during the summer and fall of 1954, especially those in which "little men" emerged from saucers on the ground. All the implausibility records were broken during those months. The scientific probability that the incidents really took place is infinitesimal. Nevertheless we must not forget that if the saucers exist, they have been constructed by living beings, and that life itself is simply the result of a long perseverance in the improbable (see Part Three, Chapter V). Therefore it would be only after a long and difficult investigation that we could decide about these cases—unless, of course, there are sensational new developments.¹

ical instruments, turns the field of view upside down. Does not this evidence corroborate Adamski's startling narrative? It would be more convincing if the two amateur astronomers had not told us that they had previously read Adamski's book and knew it well.

But it should be added that the British Astronomical Association expresses a favorable opinion of Mr. Potter.

What are we to think of this story? Is it a *reductio ad absurdum*, demolishing all the other evidence? That line of reasoning would demonstrate that all the Napoleons confined in asylums prove that the real Napoleon never existed.

Good representatives of the more lurid saucer stories are the reports of alleged saucer debris found on Spitzbergen, the crashed saucer found in New Mexico, in which a good half-dozen corpses thirty-six inches high were found, and the saucer man run over by a motorist, who took his victim to a doctor. The latter, examining the little corpse with the whitest of white skins, finally realized that it was a rhesus monkey which the motorist, a practical joker, had carefully shaved, after cutting off its tail.

¹ [The sensational new developments postulated by Michel began in November, 1954 in Venezuela, where there were at least six well-authenticated reports of hairy humanoid dwarfs landing in saucers and encountering human beings. Although South American newspapers gave many details, none of the accounts were carried in the North American press. Therefore it is particularly interesting to note that in the latter part of August, 1955, similiar events involving almost identical creatures were reported from Kentucky and Ohio.—AMER. EDS.]

PART TWO

SAUCERS OVER THE OLD WORLD

Saucers over North Africa

1

IT IS NOW time to cross the Atlantic, for although the United States was the scene of the first recorded sightings, it must not be supposed that America enjoyed a preference. On the contrary, some of the European evidence comes nearest to furnishing scientific proof that the saucers actually exist. But hitherto no official enquiry has been made, except by the English, who keep their findings secret. So the second part of this book will perhaps be somewhat drier than the first, my object being to review the arguments and the results of my own analysis. But if this calls for a little more effort on the part of the reader, he will at least have an opportunity of bringing his own critical faculties to bear, because when he has read through the cases I am giving he will know almost as much about them as I do.

A very large number of sightings have been reported on this side of the Atlantic, and I have necessarily had to make a choice. If the method adopted in dealing with some of these cases had been applied to all, several volumes would have been required. I have been guided in my selection by two dominant considerations:

1. The qualifications of the observers: scientists, meteorologists, airmen, army, etc. In these cases there is some guarantee that the evidence is trustworthy. They form the majority.

2. The large number of witnesses. I must admit that the

cases included for this reason do not prove very much. But if the former are true, the latter are possible; and so we can learn a great deal from them. The evidence of the customs officer at Marignane falls into this category.

MUSSOLINI'S SURPRISE ALLY

In October, 1935, the Italians began to invade Ethiopia. Addis Ababa, the capital of the country, was expecting air raids. One day in October, Pierre Ichac, the African traveller, was strolling through the streets, his camera slung as usual over his shoulders. At a crossroads his attention was attracted by the behavior of the crowd, staring upward and pointing to something in the sky, "The Italians!" they shouted.

Ichac looked up. He expected to see an airplane, but there was no aircraft. A silvery disc was poised motionless in the clear blue sky. Ichac at once got his camera ready, but the view-finder showed him that the object was too small. A photograph would merely show a blurred, over-exposed patch. So he turned his camera on the crowd and photographed the first witness of the phenomenon which, twelve years later, was to cause so much ink to flow.

The disc was absolutely motionless, and remained so for a very considerable time. Ichac soon lost interest in it, and so did the Ethiopians when they saw that no bombs fell. The result was that no one saw it go. One moment it was there and the next it was not.

Pierre Ichac is an engineer. He thinks that the absence of movement negated the idea that it could be a balloon; furthermore, it seemed a disc, not a sphere.

This happened in 1935. Had a saucer already been seen? The sighting was too uncertain to warrant a definite answer. But a few years later the same phenomenon was to be observed in the Sahara, and there was to be no uncertainty this time.

DESERT MYSTERY

Ouallen is situated in the Adrar-En-Abnet, in the heart of the desert, 170 miles south of Aoulef and only 100 miles from the Tropic of Cancer. It is an isolated fort, near a well on the site of an ancient Kasbah used as a relay-

station for Sudan caravans.¹ A rocky bluff separates it from the eastern edge of the Tanezrouft.

In 1942 a small detachment of ten camel-riders, two radio operators and a meteorologist named Martin comprised the garrison. On April 4th, a group commanded by Captain Louis Le Prieur arrived from the south with the intention of staying three weeks.

"We had been there a few days," says Captain Le Prieur, "when one morning the meteorologist N.C.O. came in and drew my attention to a kind of 'planet' which had appeared in the cloudless sky immediately above the fort. The object was visible to the naked eye and looked like a small aluminum speck. There were about forty of us and we saw it quite plainly, as the atmosphere was perfectly clear.

"When we examined it more closely through our field glasses and the telescope of a theodolite, the 'planet' looked like a small moon or a five-franc piece. It had a pale metallic glint and seemed to be suspended at an altitude of 15,000-18,000 feet.²

"It appeared to be motionless, but prolonged examination with the theodolite revealed that it was slowly rotating. We counted three complete revolutions in eight hours.

"The next morning it was still there immediately overhead, and we began to take it for granted, assuming that it must be a stray star or a new satellite attracted by the gravitational pull of the earth, for at that time flying saucers had not been heard of.

"At dawn on the third day, there was no sign of it."

EXPERTS AND SAUCERS IN 1942

Captain Le Prieur then sent a telegram to the national meteorological authorities at Algiers reporting what had been seen and asking for an explanation.

¹ See *Bulletin des Liaisons Sahariennes*, December 1953.

² Of course, this is entirely a subjective impression, as there was no opportunity to take measurements.

"Algiers University was consulted," he relates, "for some time later it informed us that the object we had seen was nothing but the star Vega.

"This explanation struck us as unexpected and improbable, ■ a star does not remain for two whole days in the same spot, immediately overhead and ■ close as to be examined at leisure with an ordinary telescope! I have often wondered what could have been the nature and origin of the strange disc with its metallic gleam, and what could have caused it to remain in the sky above that semi-lunar Sahara landscape where nothing of interest is to be seen apart from the small fort. Was it the proximity of its shortwave transmitter, or of the iron deposits at In Ziza, 15 miles to the south (which could well be the center of great magnetic activity), or was it merely due to the unaccountable workings of chance?"

EXPERTS AND SAUCERS IN 1953

Captain LePrieur is too polite when he says that the statement that the object was Vega is "unexpected and improbable." The really improbable feature is that any scientist could have offered such a suggestion. It is difficult to believe that any sane individual, familiar with the facts of astronomy, told that an object had been seen shining for 48 hours immediately overhead, could say: "It was a star." Ever since the world began there is only one occasion on which a star was halted in its daily course. The event was the greatest miracle. The star in question was the sun. The miracle worker was Joshua. This happened several thousand years ago and is still being discussed. How could the name of the second Joshua who halted Vega for 48 hours in the sky above the Sahara be forgotten so soon? History does not record it, alas, so I cannot transmit it for future generations to venerate. Another explanation is offered by M. Dubief, of the Algerian Institut de Météorologie et de Physique du Globe:¹

"We well remember receiving ■ telegram some years ago about this sighting. On being consulted, we replied that it must have been the planet Venus. Someone else

¹ *Journal d'Alger*, December 10, 1953.

must have said it was Vega. If our theory is correct, it must have been seen slowly travelling west during the day. We thought, and we still think, that this is the only reasonable explanation, a similar misunderstanding having arisen at the observatory of Tamanrasset in 1933, in the course of a balloon sounding at high altitude. On that occasion we confused the white balloon that we were tracking with the planet in question. As the observer was not convinced of his error, we watched the planet until nightfall.

“Venus is quite visible to the naked eye in broad daylight when the sky is very clear, but only if its approximate position is known. Without being too positive, we think that this is the only valid explanation at the moment.”

We may be grateful that Professor Dubief is moderately cautious and introduces his statements with such expressions as “If our theory is correct. . . .” “Without being too positive. . . .” It is just as well, because his explanation explains nothing, unless we begin by completely disregarding the essence of the statements of Captain Le Prieur and his forty men.

The core of their evidence was this: a round, shining object, large enough to be clearly observed with field glasses, hung for two days immediately above Ouallen, its only motion being a rotation on its own axis perceptible only by theodolite. In the course of eight hours the round object described three small circles in the sky.

What does M. Dubief say? That if his theory is correct, the object must have been seen slowly travelling west during the day. Did the object travel westward? It did not. Can Venus describe three small circles round the zenith in the course of eight hours? It cannot. And can this planet stay in the same place for 48 hours? Of course it can, but only on Joshua’s order. And it is by no means certain that God empowered him to issue it a second time.

But we must be serious. Is the Venus theory any sounder than the Vegan? Not at all in the particular case we are considering. We can only respect M. Dubief for his caution. He fully realized that his theory was futile unless

Captain Le Prieur and his men either had not used their eyes properly, or had not given an accurate description of what they saw.

As to the value of their evidence, we should note the number of witnesses, the high qualifications of several of them, the fact that field glasses and theodolite were available and used, and that the object was under observation for an exceptionally long time. Captain Le Prieur tells us that at one time the theodolite was in use for *eight consecutive hours*.

As to the accuracy of the report, the doubts cast upon it merely show that, in the best-demonstrated cases of flying saucers, the skeptic on principle is, in the long run, always driven to call all the witnesses liars. It is an easy way out, which simplifies matters considerably.

We may wonder why M. Dubief settled on Venus. He admits that as far back as 1933, he mistook a balloon for Venus. An odd explanation! One would think that his previous error would have made him more careful.¹

Such is the Ouallen affair. What a disappointment to anyone anxious to fathom the mystery of the saucers! If the mysterious object had chosen to make an observatory, and not a lonely fort, the witness of its demonstration, saucer archives would now include detailed photographs, spectrograph analyses, and in fact, more or less everything that we still lack. Was the choice of the deserted village due to pure chance? Shall we ever know?

Be that as it may, there is at least one element of capital importance in the Ouallen sighting—the date. As with the Addis Ababa sighting, the date makes it highly improbable that the saucers are of terrestrial origin. If these objects were haunting the sky not only in 1942, but

¹ I have discussed this case at length with the personnel of the Astrophysical Institute. Their preference is for the Venus explanation. Venus was shining on that date with unusual brilliance (magnitude -4). The testimony of Captain Le Prieur, according to which the object remained for two days in the zenith, was received with skepticism. In my opinion, however, it is difficult to throw doubt on an observation confirmed by so many witnesses.

as far back as 1936, it is long odds that they come—or at any rate some of them come—from *elsewhere*.

SIGHTINGS BY THE METEOROLOGICAL
DEPARTMENT IN NORTH AFRICA

The very nature of their work makes meteorologists and airmen the most favored observers, the most likely to receive visits from saucers. The fact that they are specialists comes out in the quality of their evidence and the restraint of their comments. M. Ducasse, chief engineer of *Météorologie Nationale* of North Africa, drew my attention to the remarkable moderation of the statements in some documents he sent me, from which I will quote:

“It should be noted that meteorologists, although their work necessarily involves the observation and investigation of phenomena in the earth’s atmosphere, are not *a priori* more qualified than other observers—particularly astronomers—to identify and account for the saucers. Incidentally, it is a striking fact that, ever since saucers were first seen, none of the great international bodies which co-ordinate national activities in the field of meteorology (*Organisation Météorologique Mondiale*) or aeronautics (*Organisation de l’Aviation Civile Internationale*) has felt called on to make any recommendation or indicate its wishes with regard to saucer observations.

“May I conclude by remarking that the gross errors which can distort the descriptions of even the most honest witnesses prove the necessity of extreme caution in preparing even the simplest saucer statistics, and *a fortiori* in drawing inferences from them. With that point in mind the accompanying data should not be regarded as scientific truths, but merely as the subjective impressions or interpretations of observers not specially qualified by their training and duties to identify the saucers.”

I have thought it desirable to reproduce M. Ducasse’s warning, as it gives some idea of the downright panic in the learned world with which genuinely objective experts, such as M. Ducasse himself, have had to cope when they ventured to take an interest in this question—not a word from the international groups about the qualifications of

witnesses. (Are astronomers better qualified than meteorologists? Incidentally, what *are* the desirable qualifications in this saucer business, a phenomenon unknown to the text books?) But the restraint of the language in the reports should not be regarded as diminishing their value as evidence. Quite the contrary.

Here, then, are some cases of flying saucers sighted by meteorologists in North Africa (Algeria).

July 26, 1952, at Palat, department of Oran. At 10:45 p.m. a luminous object made its appearance in the southeastern quarter of the sky. Its shape became clearer as it drew closer. Like the object seen in America by the astronomer Tombaugh, it was cigar-shaped. It traversed the sky and vanished in a northwesterly direction. There were four trustworthy witnesses, adds the report. *Object not identified.*

October 10th, 1952, the Sully Meteorological Center near Sidi-Bel-Abbès. Another flying cigar. It passed straight overhead. *Not identified.*

October 14th, 1952, at Ain El Arab, near Constantine. At 7:30 p.m. a luminous disc crossed the sky from west to east. Classic description of the flying saucer. *Not identified.*

May 5th, 1953, at Tabarourt, in the Grande Kabylie department of Constantine. This sighting is somewhat odd. It was 4:45 p.m. when a white trail began to appear from the east at a high altitude. The object which produced it was invisible. It crossed the sky from east to west, without a sound, at moderate speed. The trail did not swell out and change shape like condensation trails. It merely faded out after five minutes. *Object not identified.*

It should be noted that the meteorologist who made this sighting did not identify the white trail as an ordinary condensation trail. (Meteorologists are always interested in such trails because their appearance is instructive.) His report speaks of "smoke."

"Could it have been a rocket fired from one of the Sahara centers of the Section des Engins Spéciaux?" asked someone who was supposed to be in the know. "You're something of an optimist to think that anything fired from

any of those testing centers could get as far as that," he replied.

The next report is undoubtedly the most interesting of the whole series. It covers two sightings, and the remarkable "cumulus agité" recurs in a very original form, inevitably recalling Lieutenant Plantier's theory.

November 5th, 1953, at Tixter, near Bordj-Bou-Arreridj, Constantine department: The essence of the report is as follows:

"At 1:30 p.m. we noticed a long, even trail in the eastern sky. It was luminous and almost vertical. It was at an angle of 45 degrees to the horizon when first seen, but when it disappeared in the clouds the angle was about 25 degrees. The whole trail remained visible for about five minutes. Its origin seemed to be a hemisphere which was slowly descending, leaving behind it a similar trail like that of fireworks. Approximate distance and height, 50 kilometres and 10,000 metres respectively. This phenomenon was also seen by a large number of the inhabitants of Tixter and Bordj-Bou-Arreridj."

The report adds: "It is remarkable that on the same day and practically at the same hour a similar phenomenon was sighted at Saint Eugène, near Algiers, by the family of M. Bochet, an engineer employed by Météorologie Nationale. At one point in the track there was a backward twist which may have been no more than a trick of perspective."

How are these sightings of November 5th, 1953, to be interpreted? To get some idea we must first analyze more closely the figures given in the report. At a distance of 30 miles an object descended from 45 to 25 degrees, i.e., travelled a vertical angular distance of 20 degrees. The observers also give an altitude whose significance is not made clear. Was 10,000 metres (33,000 feet) the height at which the object disappeared in the clouds? It is impossible; its angle in relation to the horizon at that moment was 25 degrees. Now an angular altitude of 25 degrees at a distance of 30 miles means a real altitude of about 18 miles.

The figures for distance and altitude are thus not mere-

ly approximate, but manifestly wrong. The three figures—25 degrees, 30 miles, 33,000 feet—are plainly contradictory. At least one of them is wrong.

Our first task is to try to decide which is the improbable figure and eliminate it. Here we are helped by the important piece of information that the object disappeared *in the clouds*. It gives us a maximum altitude, since the highest clouds, the cirrus, never rise higher than about 39,000 feet, and their average height is 26,000 feet.¹ So it is not impossible that the object disappeared in a cloud formation at an altitude of about 33,000 feet, but if so we have to choose between the two other figures: 25 degrees and 30 miles. If the figure of 30 miles is correct, we must reject not merely 25 degrees, but anything over half that figure.

If the angle is correct, the distance will have to be halved, as even the roughest calculation of distances cannot be made without triangulation; and as the actual distance is quite incompatible with the angle given, it is clear that the distance was not calculated, but resulted purely and simply, as M. Ducasse warned us, from a "subjective interpretation."

Can we even accept the following figures: distance, about 12 miles; angular altitude, 25 degrees; real altitude, 33,000 feet? No, because we started with the assumption that the clouds mentioned were cirrus. In fact, we have no information on this point. Our analysis shows us that if the figure of 25 degrees is correct, the distance and maximum altitude are about 12 miles and 33,000 feet respectively.

Hence we are forced to question the accuracy of the figure of 25 degrees. Here the "subjective interpretation" is reliable. Meteorologists are so accustomed to estimating angles that we can safely accept this figure, as well as the figure of 45 degrees when the phenomenon first appeared, though it is a pity that the report says nothing about the use of the theodolite, which would have confirmed our confidence.

Let us take these figures and work out a little calculation, realizing that it can only be approximate. We have

¹ *La Météorologie*, by André Viaut, director of the Météorologie Nationale, page 38. (Presses Universitaires de France.)

seen that if the object disappeared in the clouds at a height of about 33,000 feet, it must have been about 18 miles away. If these figures are maxima, what can the minima be? To ask this question is simply to enquire what can be the altitude of the upper edge of a *low cloud formation*. That altitude may be a minimum, but we must not forget that the observers thought the distance very great (about 30 miles). These two factors indicate a figure of a mile and a quarter for the altitude in question; hence a figure of 3 miles for the distance. Thus our first conclusion is that the object was, in fact, more than 3 and less than 12 miles away, and that it disappeared at an altitude of more than 6,500 and less than 33,000 feet.

Now we have the most interesting figure of all: its altitude when it first appeared. Unfortunately this figure will be even more approximate than the others, because the report does not say that the object descended vertically, but *almost* vertically. We can accept 17,000 feet as a minimum and 65,000 as a maximum. If we take the mean figure (which is fair enough, since it is difficult to believe that meteorologists could have judged the distance of clouds to be 30 miles when it was only about 3 miles, the minimum figure at which we arrived in the preceding paragraph) we must conclude that the phenomenon sighted at Tixter made its appearance at a high altitude, something approaching 10 miles.

May there not be a fallacy in these calculations? Might not the alleged vertical descent be a trick of perspective, and the real trajectory be quite different, even horizontal? It is a geometrical possibility. But the report includes three facts which make it practically certain that the descent was vertical:

1. The object was visible, and therefore a trajectory which was horizontal, or clearly out of the vertical, would have been shown by variations in the apparent diameter.

2. The whole trail remained visible for five minutes.

3. Above all, the supposed optical illusion could not, for geometrical reasons, have been visible simultaneously from Tixter and Bordj-Bou-Arreridj. Incidentally the Saint

Eugène sighting seems to confirm the object's partiality to vertical descents, at any rate on that particular day.

There remains the "luminous" trail. From the report itself no conclusion can be drawn on this point, but if we study it in the light of Lieutenant Plantier's theory, we cannot fail to comment that an object impelled by a field of force with a slow vertical thrust must necessarily ascend, and in certain atmospheric conditions must produce the famous "cumulus agité" phenomenon. Also, that, as the object descends, the cumulus spreads out, as if it were pleated.

In the Saint Eugène sighting there was the famous "right-about turn" in the trajectory of the object. Was it or was it not due to a trick of perspective? Here it is even more difficult to arrive at a positive conclusion. We can only say that if there actually was a vertical descent, no trick of perspective could account for such an apparent movement in reverse. That movement would have been a fact and its significance is plain: the object was not an inert body falling under the effect of gravity. But was there a vertical descent? It was less likely at Saint Eugène than at Tixter.

Bearing these considerations in mind, and examining the two sightings of November 5th, 1953, in the light of Lieutenant Plantier's theory, we can assume that the witnesses at Tixter, Bordj-Bou-Arreridj and Saint Eugène saw two saucers descending slowly and producing an ascending cumulus. These two sightings were due to the circumstances that two saucers encountered certain meteorological conditions. The similarity of the two phenomena suggests that these conditions were much the same at Bordj-Bou-Arreridj and Saint Eugène.

MORE SAHARA SAUCERS

Speaking generally, deserts fertile in mirages are not to be trusted. But mirages do not account for everything.¹ As they are the product of great differences of temperature between horizontal atmosphere layers, they cannot account for optical illusions at the zenith (the Ouallen

¹ See the chapter devoted to Professor Menzel.

case), or induce people to imagine that they are seeing a rigid object in rapid motion and obeying the laws of perspective. Nor can a mirage account for the appearance of a source of light. All it does is to make an existing source of light look as if it were somewhere else. But here the desert introduces a cold fact. The observer knows all the possible sources of light for miles around and if there are none he cannot be deceived.

TESSALIT, OCTOBER 4TH, 1951

Tessalit is an oasis at the southeastern end of the Erg Azour, northwest of Adrar des Iforas, about 250 miles to the south of the Tropic of Cancer, and just inside French West Africa. It has an air base and a weather station.

On the night of October 3-4th, two Air Force officers and a number of airmen were sleeping in the open under the clear silent vault of the desert sky.

"I woke at 2 a.m.," says one of the officers, "and could not get to sleep again. It was a dark night, the stars were very bright and the air was quite still. Suddenly I saw a light coming from the east and travelling fast due west, or approximately due west. It was descending. I thought it might be the landing light of some aircraft coming in. I roused the men. But not a sound could be heard. It was not a plane. A few seconds later the shape of the object could be made out quite clearly. It was almost circular, with an apparent diameter of about 10 centimetres.¹ In color it was dark yellow, almost orange. It continued to draw nearer, coming down slowly, at about the night landing speed of a DC-3. When it was immediately over the village of Tessalit, about 6 kilometres southeast of where we were, it made a more than 90 degree turn to the left, which meant nearly 170-180 degrees at the nose. Then it accelerated in breathtaking fashion, climbed at an amazing speed, and its apparent diameter diminished in size until it disappeared."

¹ Another "subjective statement." A circle 10 centimeters (4 inches) in diameter seen at what distance?

The officer added that the weather station was not using radiosonde balloons at that period, so that any idea that the object could have been a balloon seems impossible, apart from the fact that its rate of travel entirely rules out such a conjecture.

The Tessalit evidence, though lacking the detail one might have expected, is none the less as trustworthy and significant as anything ever put forward, for these reasons:

1. The observers (two flying officers and several air-men) were specially qualified by experience.
2. The circular shape of the object was distinctly seen.
3. The object was in view for about a minute, a comparatively long time. Chiles and Whitted's famous encounter with a flying cigar lasted only a few seconds.
4. The behavior and movements were followed most carefully.

In *Forces Aériennes Françaises*, the journal of the French Air Force, Captain Clérouin discusses the Tessalit sighting and puts it in the "unexplained" category. Unfortunately, as I have said, the officer's report is unsatisfactory by reason of its "subjective" character. If, instead of speaking of "apparent diameter 10 centimetres" (an expression which is meaningless in a mathematical sense), he had given us the approximate angular diameter at the moment when the object made its turn above the village of Tessalit, some idea of its real dimensions could have been formed. If "10 centimetres diameter" is taken in relation to something seen at arm's length, it would mean that the real diameter of the saucer must be at least 650 yards. Perhaps it is better to leave this unwarranted speculation alone.

AOULEF, AUGUST 7TH, 1952

The oasis of Aoulef is about 250 miles north of the Tropic of Cancer, and northwest of the Hoggar. There, in the depths of the Sahara, the Société Africaine de Transports Tropicaux, the S.A.T.T., well known to all African travellers, has established a post.

On the night of August 6-7th, M. Jean Doray, the official in charge of this post, was lying awake though it was after midnight.

"I was watching the sky, which was misty up to 30-35 degrees above the horizon, when, at about a quarter to one in the morning, I suddenly saw a light-colored object emerge from the curtain of mist in what was the northeast to me. It soon assumed a definite shape which appeared to me more or less elliptical, though I presume that allowing for the angle of vision it can only have been circular. It was travelling along soundlessly in a dead straight line towards a point somewhere northwest in the curtain of mist, and there it faded away and disappeared. Its course must therefore have been substantially east-west.

"Its color was light grey, and it stood out quite clearly against the background of the sky, which was darker, even with the moon almost at the full. I could see no trail or any sign of the object being luminous. The shape was clear enough, but I could not distinguish any structural details. The time of this occurrence was 12:45 a.m. on the 7th August, 1952, about fifteen minutes before the V.H.F. (very short-wave) radio station at Aoulef began to function, as a DC-4 passed.

"It seems to me that the object could not possibly have been a weather balloon or radiosonde balloon from the Aoulef meteorological station. Besides, no such balloon was sent up on August 7th."

THE AOULEF SAUCER

M. Doray was not content to report a mere fleeting vision, and subsequently particularized his impressions. "I acquired the habit of noting the speed, distance and altitudes of aircraft passing or landing at Aoulef Aerodrome in the course of my official duties," he explains.

The only sound foundation for an estimate available to him was the mist surrounding the object, its density giving some idea of its distance. He considered that the object was about 5 miles from Aoulef when it passed. By comparing the approximate angles he arrived at the following conclusions:

Altitude: 10,000-13,000 feet.

Speed: Two or three times that of a DC-4, i.e., between 450 and 700 miles per hour.

Diameter: Four to five times the length of a DC-4, i.e., between 350 and 450 feet.

Of course M. Doray realizes that these figures are highly speculative, as he had nothing but a fleeting impression to go upon. And indeed there is nothing in his account which provides a basis for any calculation. We have to take his figures—which have their value—while bearing in mind their subjective character. His report, like so many others, is an illustration of the fact that the majority of observers do not know what is significant in their evidence and what is not. M. Doray could, in fact, have furnished us with a more or less sound foundation for some calculations if he had thought of it at the time. It would have sufficed if he had:

1. Indicated the angle through which the object travelled from its first appearance to its disappearance in the mist.

2. Noted, at the time the expected DC-4 arrived, the distance at which the curtain of mist became opaque.

These two factors would have enabled us to determine the distance of the object when it passed. If in addition he had given some idea of its angular diameter—in relation to the moon, for instance—we should have known its actual size.

The Aoulef case, perhaps better than any other, illustrates the necessity of compiling a questionnaire to be completed by observers, if we want to make real progress in clearing up the mystery of the saucers. M. Doray deserves credit for his attempt to give figures, but a questionnaire would have guided him and his report would have been much more informative.

Saucers in Equatorial Africa

2

ONE NIGHT IN March 1951, just before 4 a.m., three officers of the French Air Force were near the base of Bangui, French Equatorial Africa. There was a bright moon in a very clear sky.

“At a distance impossible to estimate, but at a comparatively low altitude,” runs their report, “a luminous object (about twice the size of Venus at maximum brilliance) suddenly came in sight. It approached at a tremendous speed and without a sound. At first we thought it was a shooting star. It passed over Bangui and on reaching a point due west of the base unmistakably slowed up, executed a turn at an angle of about 90 degrees, then perceptibly accelerated and disappeared in the distance, three or four minutes after the turn. Its passage took about five minutes and its altitude apparently did not vary. It was impossible to make out its exact conformation, but it looked very large. Its luminosity was slight.”

In this case also no facts are given upon which any calculations can be based. The only value of the evidence of the three officers is the descriptive element—luminous object, long trajectory, right-angle turn, deceleration, acceleration, enormous speed, total silence. The chief interest of this case also lies in the technical qualifications of the witnesses.

Captain Clérouin contributed to the *Revue de l'Armée*

de l'Air an article on the Bangui case, which he classifies ■ unexplained.

It is certainly difficult to imagine any natural phenomenon at all like this "shooting star" which could accelerate and change direction, while maintaining a constant altitude.

BOCARANGA, NOVEMBER 22, 1952

Of all the saucer sightings reported today, the following is perhaps the most startling because of its duration, which enabled eight men to spend half an hour observing four saucers, their evolutions, variations of color and luminosity, and the whole range of their antics. If Father Carlos Maria or M. Lasimone had been a movie crew, undoubtedly we should now possess the most sensational of all documentaries. The story which follows is taken from the records of the local Service Météorologique of the Oubangui Chari.

FATHER CARLOS MARIA'S STORY¹

At the end of November, 1952, Father Carlos Maria was on his way to Bouar to see a dentist. M. Lasimone, a Bouar businessman, was returning home and offered Father Carlos Maria a lift in his truck. They had six of M. Lasimone's colored employees with them, making a party of eight. The report says:

"We left Bozoum in the afternoon of Saturday, November 22nd. We stopped after 50 or 60 kilometres to call on two army geographical specialists who were stationed in a village. We stayed with them from 7 to 8 p.m. and then continued toward Bocaranga. It was just short of this place that we had our first surprise.

"Here the left side of the road is tree-lined. Looking through the trees in the direction we were travelling, we suddenly saw a large disc which seemed to be about to cross the sky ahead and was rather low down. M. Lasimone switched off our lights and we waited, but in vain. It had already vanished.

¹ Father Carlos Maria de Beata Assumptione is an Argentinian missionary. His story is translated from the Spanish original.

"We started off again, exchanging ideas. Some time passed in discussion and we were between Bocaranga and a village known as De Gaulle, when the truck stopped on a slight slope.

"The wedge," he ordered.

"What's up?" I asked.

"He told me we had run out of gas. When he had told the boy to fill up, he walked a short way up the road.

"I stayed behind to keep an eye on the boy, and soon heard Lasimone shouting to me again. I ran to join him and found him pointing at the sky. 'Look!' he said.

"I then saw four discs hanging in the sky to the left of the road. We could see them quite clearly though it was impossible to judge their distance. There were two above and two below, and they were not in contact. When they came to a standstill they were pale silver in color, like the moon.

"I had several opportunities of seeing them in motion and had a strong impression that only the lower pair were revolving. Just before moving, they blazed up as bright as the sun. Then they seemed to arrange themselves in a group, which proceeded to describe circles, before returning to their starting point. When they stopped, the bright blaze died down to the original dull silver.

"When they were on the move they looked slightly oval, but I could not say for certain whether that was because they actually changed shape or because they were viewed from a different angle. Whatever the reason, the same conformation and the same blazing up marked every change of position. We watched them from 10 to 10:20 p.m. After their final circling movement they remained motionless for several minutes. Then they departed and disappeared in the opposite direction to ours, still keeping left of the road. Such, at least, was my impression, but I do not rule out the possibility that they never moved at all and that I might have been deceived by a gradual diminution of luminosity until they were lost in the darkness of the night.

"There is nothing I can add. What I saw was neither a fireball nor a shooting star, nor anything of that kind. It could only be some machine, the product of human brains."

M. LASIMONE'S STORY

There are some highly interesting particulars in the report of Father Carlos Maria's companion:

"Just before 10 p.m. we were driving along the Chutes de Lancrenon road from Bozoum in the direction of the village of Ibrahim-Foulbe. When we were about 14 kilometres from where our road crossed the Bouar-Bocaranga road we saw in the sky four silvery discs arranged in a square pattern above some thin fleecy clouds. It was a fairly bright night. These four discs were motionless and did not present any appearance of being solid geometrical bodies from which light could emanate. I switched off my headlights several times to make sure that I was not merely seeing their reflection in the sky. I was not. When we stopped to refuel, the four luminous discs were in line with the horizon, in the direction of Bozoum.

"Suddenly one of the discs turned bright crimson, and it then became possible to distinguish the shape quite easily—a cigar swelling out in front, and in the center, about one-third of the total length, an opaque section, showing its symmetrical lines quite clearly against the light. This object made straight for us, travelling pretty fast below the clouds. It must have been moving at the pace of a jet plane. When about five or six kilometres away it stopped dead without dimming its light, and remained motionless half way between the cloud ceiling and the ground. It stayed thus for about half a minute, and then climbed vertically to the same spot where we had first seen it. It stopped as suddenly as before, its red glow faded away to a silvery gleam and its outline disappeared.

"One after another the objects which had remained behind on the horizon began to execute the same maneuver, omitting the momentary suspension, and the performance ended with the four discs taking up stations in their original square. We did not see them disappear and they had not moved when we left. All my six African employees on the truck saw what we saw and confirmed the description we gave to Father Edouard, of the Berberati Mission."

"CLASSIC" EXPLANATIONS?

The first explanation which comes to mind when "luminous discs" and "thin fleecy clouds" are mentioned is that which immediately occurred to M. Lasimone himself, viz., that the eight witnesses saw the headlights of the truck reflected on the clouds. But as it only had two headlights, how could they see four discs? Admittedly, the clouds were thin. They might have been in two layers, the first allowing the passage of sufficient light to permit the appearance of two other discs on the second layer behind and above it. Would not this account for the four discs "arranged in a square"?

This theory has the merit of making it unnecessary to have recourse to the vagaries of Professor Menzel. If the light from the headlights (which are only supposed to light up the road) reached the clouds, it was simply because the truck had stopped on rising ground, a grade steep enough to involve using a wedge.

No doubt this theory will entirely satisfy anyone who believes that Mantell and his two companions chased the planet Venus. It accounts admirably for the description given by Father Carlos Maria and M. Lasimone of what they saw—provided that we discard 95 per cent of it and deny its substance.

1. Let us consider that Father Carlos Maria said: "Here the left hand side of the road is tree-lined. Looking through the trees . . ." Through the trees; then the trees themselves must have been lit up by the headlights. But the light that was seen was *behind the trees*. So the lights can be ignored.

2. "There were two above and two below, and they were not in contact." Consider what a car's headlight is. It is not an instrument of precision capable of projecting a band of parallel rays which will never merge with the rays projected by the other headlight. Such a feat is beyond the power of any commercial headlight, and it is equally beyond the power of a pair of them to produce separate discs in the sky; not at any rate the definitely circular objects which the witnesses described in this case.

3. The objects were silvery in color. The light from headlights is not.

4. The two witnesses observed "four discs of silvery light, arranged in a square above some thin, fleecy clouds." If they were maneuvering behind the layer of clouds, the clouds could not have been a screen on which movements were projected.

5. If M. Lasimone places the discs beyond the clouds, it can only mean that the layer is not continuous, since he thinks he sees behind it. But is it possible that nobody would have observed the disappearance of the objects every time the cloud screen moved out of the beam of the truck's lights, or the movements of the truck caused the beam to leave the screen?

6. Even when the truck was at a standstill, the discs were seen in motion several times. How could that be explained by cloud movements? And at one moment one of the discs went off on its own. M. Lasimone also records that it approached through the layer of clouds and travelled towards the observers "at the speed of a jet plane." This headlight which deserted its twin to caper about at various angles must have given M. Lasimone's truck a very odd form of squint.

7. And what about the wealth of detail in the report? When the disc races away it blazes up, changes color, reveals its shape quite clearly, exposes an opaque patch in its elliptical middle section, and so forth. What a lot of things to see in the dispersed rays of a car's headlights!

8. In short, the band of parallel rays which this theory presupposes did not exist; if it had existed, the screen was inadequate. If the screen had been adequate, 95 per cent of the report would have been left unexplained, and even if we discard this 95 per cent, we are left with the fact that M. Lasimone switched off his lights several times without interrupting the performance of the phenomenon.¹

WHAT THE BOCARANGA WITNESSES SAW

The mystery of the Bocaranga sighting lies in the detailed and explicit evidence. Once more, we must either

¹ It might be suggested that the four discs were produced by another vehicle. The same eight objections apply, particularly the eighth—that the explanation ignores 95 percent of the evidence.

assume that the witnesses invented the whole story, with the complicity of M. Lasimone's six Africans, or else try to understand what they tell us. But it is hardly likely that a missionary would have lent himself to a lie, and the evidence itself is of nothing known on earth; nothing in the way of human invention or natural phenomenon bears any resemblance to the four Bocaranga discs. Accordingly, here is the problem in a nutshell, and we are necessarily driven to seek for unorthodox explanations and enquire whether the solutions they offer are more satisfactory, of course on the understanding that this enquiry may be no more than an intellectual exercise.

MOVEMENTS AND POSITIONS

M. Lasimone mentions three successive positions: above, below (in the case of one of the objects), then again above a thin layer of fleecy clouds. These thin fleecy clouds give us a clue to the altitude at which the performance took place. They are stratocumulus, which hardly ever descend below 1,500 feet or rise above 8,500 feet, 5,000 being the average. The performance in question must therefore have been staged at somewhere about that height.

1. But the only part of the evidence which is absolutely trustworthy is the statement that one of the objects was below the clouds. There, the eye cannot be deceived; if the outlines of the object are sharp it can be seen distinctly. But if it is either *in* or *above* clouds its outlines are blurred. The fact that the observation is made at night would increase the difficulty of distinguishing.

2. M. Lasimone says that at a particular moment the four objects were on the far horizon and that they were approaching *below* the clouds at that moment. Can the proximity of the horizon to an object at a probable altitude of less than 3,500 feet give us a clue to its maximum distance? In theory it can, but it is a very uncertain clue owing to the trees and bush. It seems certain that M. Lasimone's estimate of three or four miles for the distance of the object when it stopped dead must be on the high side. At such a distance, and with trees intervening, the objects would have been invisible, or at any rate barely

visible through the branches. There is no point in working out an exact calculation based upon such uncertain data, but even a sketchy one shows that the witnesses must have been wrong in their estimates. In all probability the four objects were quite close—not more than two miles away—when they performed their maneuvers. Incidentally, this sort of miscalculation seems to be quite common in the evidence about flying saucers, and normally involves two others: the exaggerated estimates of speeds and actual dimensions, in cases where such estimates are only subjective.

But we have still to deal with the descriptions of the movements and angular positions. What do we find?

1. Long periods when the objects remained stationary, rapid acceleration, high speeds, remarkable “maneuverability.”

2. All these features accompanied by luminous—or perhaps I should say optical—phenomena, operating with automatic regularity, the same phenomenon always accompanying the same maneuver.

When the objects were not in motion all that could be seen was a luminous disc or aureole. M. Lasimone says that they “did not present any appearance of being solid geometrical bodies from which light could emanate.” What is the significance of this aureole? Another statement which he makes gives us an idea: when the object descends below the clouds and stays in one position, *the aureole is not seen*. It rather looks as though it might be due to the presence of the cloud. Of course this is only an idea, but one fact about which there can be no dispute emerges from the evidence, that when the objects were not in motion they gave out a feeble silvery light.

TAKE-OFF AND MOTION

“Suddenly,” says M. Lasimone, “one of these discs turned bright crimson . . . and made straight for us, traveling pretty fast.” And Father Carlos Maria says: “Just before moving they blazed up as bright as the sun.” Here again one witness corroborates the other and their evi-

dence is definite: the take-off and movements were always accompanied by a sudden burst of light. The reverse process marked a halt. The regularity of this procedure is strongly emphasized by Father Carlos Maria: "The same conformation and the same blazing up marked every change of position."

THE SHAPES OF THE OBJECTS

A point to be noted is that the two witnesses also refer to changes of shape, certainly one of the most puzzling aspects of the saucer phenomenon.

M. Lasimone, describing the manner in which one of the objects began to move, says: "It then became possible to distinguish the shape very easily—a cigar swelling out in front, and in the center, about one-third of the total length, an opaque section showing its symmetrical lines quite clearly against the light." Father Carlos Maria says: "When they were on the move they looked slightly oval." As we know, the missionary admits that he was unable to judge whether this was the result of an actual change of shape, or a change of position causing the object to be viewed from a different angle.

LIGHTS AND SHADOWS OF THE BOCARANGA STORY

There is nothing more to be got out of the evidence, I think, and it leaves us very much where we were. What did Father Carlos Maria and M. Lasimone really see? If we confine ourselves to certainties, the only certainty is our own ignorance. We can only venture on a cautious approach to certain suppositions.

This Bocaranga sighting, like all others where the evidence is explicit, brings us up sharp against one solid fact: that what the witnesses saw is the object imagined by Lieutenant Plantier.

If the reader will turn to the chapter on Plantier's theory, he will find there a detailed description of the Bocaranga phenomenon. The circular shape, the rocking movement on take-off and during acceleration, with the concomitant blaze-up and the eccentric dark patch, are all there. Perhaps the most remarkable feature in M. Lasimone's narrative is the dark patch observed in the center section of the object (about one-third of its total length)

and his comparison of it to a cigar with a slight bulge in front. What is the meaning of that? Simply that the patch is not in the exact center, but divides the object into two not quite equal parts. It is remarkable that Lieutenant Plantier's machine, conceived without thinking of flying saucers, was endowed with just such an off-center dark spot.

We should no doubt require to be in a position to formulate the exact relationship between the shape of the object described by the two witnesses, and its appearance from the angle at which they viewed it; in other words, between the object and its projection in relation to those witnesses. We should then see what part of the object corresponds to what M. Lasimone calls the "front." If we have properly understood the description of the movements of the four objects in the sky, it would appear that they maneuvered "in depth" in relation to the witnesses. If that was so the witnesses could not have known which was the front and which the rear.

If the object was a disc tilted in the direction in which it was moving, the two witnesses must have seen it approaching with the forward side down. The Plantier theory presupposes that position, but if this is correct M. Lasimone must have mistaken the front for the rear—a very natural mistake, under the circumstances.

Of course, the Plantier theory gives us no clue to the origin of the objects. He confined himself to conjecturing what would happen if it were possible to create fields of force whose intensity and direction could be varied at will. He had never heard of M. Lasimone or Father Carlos Maria, or the many strange phenomena which his admirable theory explains so well. Such is the power of imagination when it is prompted by a passion for understanding. His theory may not be confirmed by existing knowledge on our planet; nevertheless it makes one think.

THE VISITOR AT THE CAPE

Before leaving Africa, the scene of so many saucer appearances, we will refer to one other report, which I have selected from a considerable number. It is laconic, but notable for the fact that it comes from a particularly trustworthy source.

On November 27th, 1953, press agencies circulated the following telegram from the Cape:

“Headquarters of the South African Air Force announce that on May 23rd, 1953, radar operators picked up an unknown object which passed over the Cape six times at a speed definitely exceeding 1,250 miles an hour. Each time it passed it was within radar range for sixteen seconds at distances varying from 35,000 to 50,000 feet, and altitudes between 5,000 and 17,000 feet.”

It should be noted that this statement was issued more than six months after the sighting. The intervening period was taken up by the investigation. It should also be noted that no natural explanation was offered by the authorities. There is no suggestion that what was seen above the Cape was some creation of playful radar, or a refracted or reflected image, or a sound balloon, or Venus, or anything of the kind. It was simply “an unknown object,” which passed overhead six times in succession.

The communiqué gives no further information. Nothing is said about the atmospheric conditions, or the dimensions, or the angular speeds of the object. We have to be content with the result of the calculations based upon these data. In the preceding cases the reader has been able to make for himself such deductions as are warranted by the evidence, and thus gain insight into the methods usually adopted in such investigations.

THE BEIRUT PARADE

The expression is Captain Clérouin's, and it refers to one of the best and most intelligent sightings reported in the flying saucer records. The chief witness, it should be noted, is a professional engineer, versed in every aspect of aeronautics, while the four other witnesses are university professors.

In February 1953 M. Philippe Daurces of Sadir-Carpentier, an engineer, was employed at Beirut in supervising the installation of electric and radio equipment at the Beirut-Khalde International Airport. Beginning at 6:40 p.m. on February 28th, he found himself witnessing a remarkable phenomenon. He waited for a fortnight before

giving the competent authorities a detailed account of what he had seen. As a scientist he was somewhat chary of making himself responsible for an improbable story, with only four persons to vouch for it. He deserves great credit for his courage in doing so.

M. DAURCES' STORY

"On February 28th at 6:40 (Beirut time)," he states, "I was just leaving my room with a box of Kodachrome films which I intended to show to my neighbors. The room looks out on a terrace with an uninterrupted view, about 130 feet above sea level. I had a range of vision of about 70 degrees. It was a rather dark night, and the stars were somewhat obscured by a very slight mist.

"My attention was attracted by a luminous object right in front of me and some 20 degrees above the horizon. I see aircraft passing there almost every day and it seemed to me about the spot where they turn before coming in to land at Beirut airfield.

"What struck me most about this object was its vivid crimson light, much bigger than the ordinary lights of aircraft. I looked intently for some time and noticed that what I saw was not the usual blinking lights, green and white, which aircraft display in the vicinity of aerodromes. The light travelled calmly towards the horizon, like an airplane at an altitude of about 2,000 feet. I thought for a moment that it might be some aircraft in difficulties (engine on fire, perhaps), except that it was moving away so steadily. My curiosity thoroughly aroused, I walked downhill to my neighbor's house.

"I found the Mlles. Aubry and M. and Mme. Le Boydre, all of them professors, at home. Their house is below the terrace I mentioned, looks out on a garden, and has an equally good view.

"Would you like to see a flying saucer?" I said jokingly.

"My neighbors smilingly assented, and we went out on to the steps. To our surprise we then saw that two more of the mysterious objects had appeared on the scene. The original visitor, now farthest away, resembled a reddish star and it was being followed by two others, one at the zenith and the other in the middle distance.

"The one overhead was much easier to distinguish. Its color was the same as the others, a vivid orange-red disc of fairly sharply defined outline. The objects passed immediately overhead, travelling on a straight course about 10 degrees northeast. Their distance apart, apparently uniform, enabled us to see three or four in line at the same time, the nearest being overhead and the farthest about to disappear some 10 degrees above the horizon. It took each object about three minutes to travel from straight overhead to the horizon. I would say that the apparent diameter of each object, when it passed overhead, was between one-fifth and one-tenth of the apparent diameter of the full moon.

"I hurried up to my room to fetch my 10 X 45 prismatic binoculars. I was able to observe several objects for a considerable time. All appeared alike. Magnified in my glasses, each object looked like a reddish-orange disc giving out a very bright light. The contour was quite distinct. Travelling ahead of it in the same direction, at a distance which I would put at a quarter of its diameter, I could distinguish a bluish and faintly luminous semi-circle, which struck me as being a reflection of the edge of the object rather than an additional source of light. At the rear I thought I could discern a trail of smoke or vapour.

"When I imparted a slight movement to the field glasses, the sinuous lines so obtained appeared slightly discontinuous or regularly dotted, indicating a pulsation of the lights. The frequency of this pulsation seemed more rapid than that of the local AC current (50 cycles per second); I would estimate it at 100 to 150 cycles per second. However, I do not attach much importance to this observation, since a similar pulsation could be observed when distant lights were observed in the same manner.¹

"We saw ten objects passing on such a trajectory, and two on a trajectory which seemed to be parallel, to our right and about 10 degrees above the horizon. None of us heard any engine noise at any time, or the whistling sound of something passing at high speed through the atmos-

¹ Perhaps these lights were actually powered by AC current.

phere. Yet we could have heard a pin drop. The last of the objects was seen at 7 p.m., after which we did not continue our observation."

Such is the evidence of M. Daurces and the four Beirut professors. He goes on to give some further particulars:

"I have said that the objects travelled in a straight line. It would be more accurate to say that they kept to a roughly rectilinear route. When they appeared immediately above the house, they were spaced out about 10 degrees.

"No meteorological balloon was sent up at Beirut on February 28th. A local paper reported that two readers had telephoned to say that a flying saucer had passed over Beirut at 7 p.m. At 9 a.m. on February 28th the wind was blowing in a north-northwest direction at seven kilometres an hour."

WHO WERE THE BEIRUT VISITORS?

In one sense M. Daurces and his friends were unlucky. Their sighting is admirably reported, and they got everything possible out of it. But though the "everything possible" puts us in their debt, unfortunately it does not amount to much. If one of the objects had stopped or turned, or had found an easily distinguishable cloud in its path, Beirut could have proved a useful test for Bocaranga and many other sightings. But such as it is, the evidence as to rectilinear movements and the curtain of mist ought to rejoice the heart of Professor Menzel (he does not know about this case). Yet over and above the general objections to his theories, there are in this case some special features which are very difficult to interpret.

1. When seen through binoculars, the contours of the object were quite distinct. It could properly be called an "object." It was preceded by an arc of bluish light and followed by a kind of trail. This bluish light and the reddish-orange color are certainly characteristic. We shall come across them again in the Villacoublay case.

2. Let us agree with the professor for a moment that the objects seen by the five witnesses were lights projected

on a curtain of mist by several sources of light on the ground. How does that explain why these lights travelled from immediately overhead to the horizon like any ordinary airplane, i.e., their speed apparently diminished as the distance increased? A geometrical impossibility is involved. If any reader with an elementary knowledge of geometry will take the trouble to draw a diagram, he will find that an image projected on a horizontal screen in the sky by a light on the ground which is revolving so as to sweep all the angles of a plane passing through the zenith cannot give the impression that its rate of movement diminishes as it recedes into the distance. On the contrary, the angular speed of a beam of light being constant, the image will travel with ever-increasing speed. In this case, either the observer will notice this tremendous acceleration or, more probably, he will realize that the apparent object is not an object, but an optical illusion.

This is, of course, an argument of general application and an additional obstacle in the way of Menzel's thesis. It applies with equal force to what he calls his explanation of the evidence of astronomer Tombaugh and of the Lubbock Lights.

Can we offer any other conventional explanation? Neither a radiosonde balloon (none had been sent up that day, and in any event the wind was not blowing in the direction of the trajectories observed) nor the theoretical presence of jet planes seems to offer any solution of the Beirut puzzle. There is nothing to fall back on, unless we line up with the readers of the local paper quoted by M. Daurces, and decide for "flying saucers."

Yet the Plantier theory once again explains everything: the silence, speed, luminosity and colors. If six objects like those imagined by Lieutenant Plantier had crossed the sky at Beirut on February 28th, M. Daurces' report would not have differed in any way from his actual description of what he saw. Another strange coincidence.

Flying Saucers in Europe

3

THE EUROPEAN SIGHTINGS are extremely numerous. We have seen that the Air Technical Intelligence Center (A.T.I.C.) had investigated several thousand American cases by the end of 1953. If Europe had established an investigating body on the same scale there is no doubt that its records would be just as abundant.

But the only enquiry conducted in Europe was opened by Great Britain after certain incidents in "Operation Mainbrace." The reticence of the British security services is, of course, legendary. They have issued no statement on their findings. At the beginning of February, 1954, a Government spokesman merely announced that 95 per cent of the cases submitted for investigation could be explained (in particular as observations of meteorological sound balloons), and that five per cent would not be explained. The spokesman implied that this would not always be true.

The percentages mentioned by the representative of the British Government are reasonable, but his statement would have been more convincing if, instead of giving percentages, he had given the actual figures. He might have said, for instance:

"We have investigated some 1,500 cases which were brought to our notice. Of these we have accounted for 1,425. That leaves 75 for which no explanation can be found. And here are the records of both categories."

I do not know how many "unexplained" cases there are in the British (secret) dossier. But I have been able to examine the files of a certain number of French authorities, and to ascertain that the number of such cases is a good deal higher than five per cent. Why? The answer is that they get the reports from their own staff, men with the technical knowledge and qualifications to throw out most of the cases that may have a possible explanation. Of the figures given above they would retain the 75 inexplicable cases, but the 1,425 others would be screened and reduced to a quarter, or even a fifth, of that number before being transmitted.

But though the French dossiers are scantier, their content is much more substantial, for the very reason—paradoxical though it may seem—that there has been no official investigation in France. The *Météorologie Nationale*, for example, has issued no special directive with regard to saucers. All that happens is that if a station observes something unusual in the sky it adds a supplement to its daily report. This supplement is sent to Paris for examination and filing. The same system is followed in essentials by the civil aviation authorities, the police, the various security services and right up to the *Centre National de la Recherche Scientifique*. All these bodies show themselves receptive, but no more than receptive, to information about every kind of unusual phenomenon sent in by a local representative. What these wary officials are waiting for is solid, substantial proof of the existence of the saucers. When they get it the investigation will start.

The private investigator trying to get at the truth is under no such compulsion. Having undertaken to face the music, in order to supply enquiring minds with the material for controversy, he is rather like those skirmishers who risk their lives to prepare for an offensive which may never be launched.

The cases I am about to relate have been chosen after a careful study of many hundreds. My choice was dictated either by the special qualifications of the witnesses or by unusual features in the evidence. It will be seen that some of the European evidence, particularly the French, is as

detailed and solidly based as any in the history of flying saucers.

AN INDISCREET VISITOR: THE "OPERATION MAINBRACE" SAUCER

On September 19th, 1952, naval units from all the countries of the North Atlantic Treaty Organization were engaged somewhere in the North Sea in one of the most extensive naval exercises which had been organized since the war. The code name was "Operation Mainbrace," and the exercise lasted several days. The United States of America was represented by the great aircraft carrier "Franklin Roosevelt," on which the press correspondents were accommodated.

At an unrecorded moment on September 19th, a silvery disc, of metallic appearance, was observed in the sky and seen to pass swiftly over the Allied fleet. An American press photographer, Wallace Litwin, who was on board the "Franklin Roosevelt," had time to take three color photographs of the object before it disappeared. As far as I know, these photographs have never been published. None of the numerous witnesses has told us anything more. News of the incident was made public the following morning in a few laconic lines circulated by the press agencies, and then nothing more was heard of it.

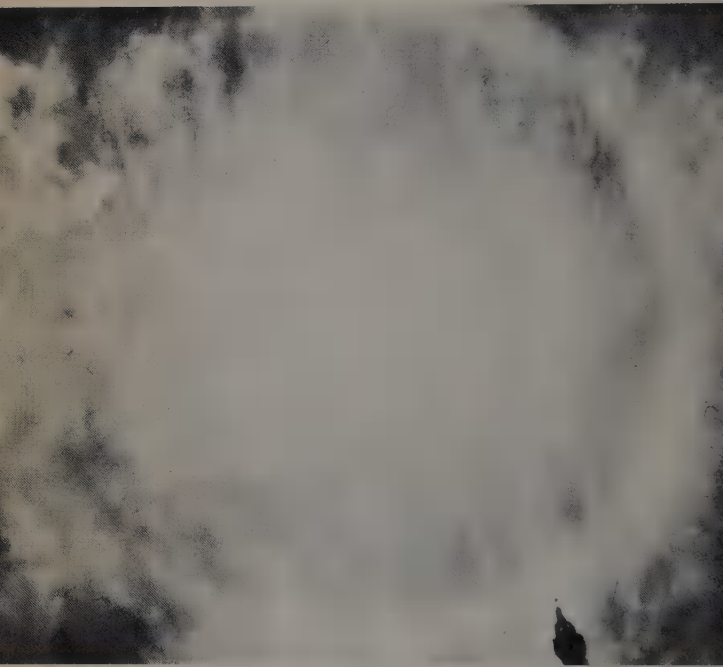
But a statement issued by the R.A.F. whipped up public curiosity. Coastal Command, which is responsible for the air security of British coasts and waters, had sent the Air Ministry a report that an aircraft which had taken part in Mainbrace had been followed back to England by a disc-shaped object.

The essence of the report was that shortly before 11 a.m. on the 19th of September, two officers and three airmen of Coastal Command were following the approach of a Meteor which had participated in the Mainbrace exercises; it was returning to England and was about to land at the Dishforth Aerodrome in Yorkshire, alongside the naval base of Topcliffe, where the five witnesses were stationed.

"It was 10:53," says Lieutenant John W. Kilburn. "The Meteor was coming down from about 5,000 feet. The sky



1. Taormina, Sicily: Four Sicilians gaze skyward at two Unidentified Flying Objects.



2. Unusual atmospheric phenomena: ■ halo around the sun, seen over Paris. (The black spot in the foreground is the top of the Eiffel Tower.)

3. Meteors ■■ sometimes mistaken for flying saucers. (The track has here been interrupted by ■ shutter for the purpose of speed calculation.)



- 4 and 5. Two views of the mysterious planet Mars.

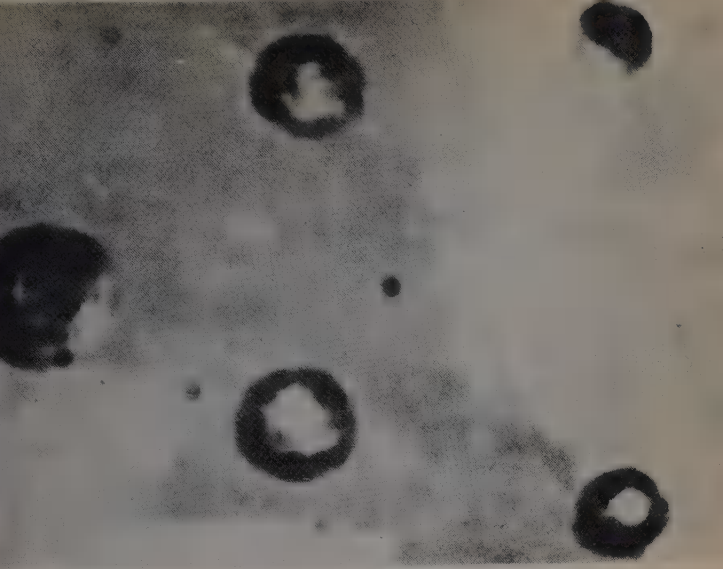




6. Photograph of a "flying saucer" taken by Barney Wayne in Bulawayo, Southern Rhodesia.

7. A photograph taken from a Coast Guard air station in Salem, Massachusetts.





8. Another American photograph of "flying saucers."



9. This luminous object, photographed in Sweden at the time of the Operation Mainbrace, resembles a meteor, but it moved at a slow speed and in a capricious course.



10. Peculiar appearances in the sky: a cylindrical cloud (*stratus arcus*) over the English Channel.



11. Photograph of the Bouffioulx phenomenon by Hermann Chermanne.

2. The "saucer" photographed July 18, 1952, at Lake Chauvet by André Fregnale.



13. The same "saucer" as in Plate 12. The direction of movement was from left to right. Since both the object and the distant clouds (but not the trees) appear to be in focus, it must have been of considerable size and at some distance from the photographer.

was clear, the sun shining, visibility perfect. The Meteor was crossing the airfield from east to west, when suddenly I noticed a white object in the sky. It was round and silvery and circular, and seemed to be following the Meteor at about two miles distance at a speed less than that of the aircraft but on the same course, though a little above it.

“What on earth is that?” I shouted. My friends looked up where I was pointing. One of them said it might be the metal cone capping of the Meteor’s engine which had come off, while another thought it was just a parachute. But while we were still watching the disc we saw it reduce speed for some seconds and then begin to come down. As it lost height, it began to flutter like a leaf or, if you prefer, oscillate like a pendulum. The Meteor swerved to circle the airfield before landing. The object began to follow it but stopped dead after a few seconds. It seemed to remain suspended in the air, revolving like a top. Suddenly it took off, accelerated and flew off westwards at a terrific speed before changing course and disappearing southeast. The whole thing lasted for about twenty seconds.

“While still in sight it seemed to change shape and become elliptical. During the short time it was revolving while stationary, we could see it shining in the sun. It then seemed to me about the same size as a pursuit plane at the same altitude.¹

“We are all absolutely certain that there could be no question of a balloon, or an optical illusion, or an effect produced by the Meteor’s jets. It was a solid object. I have never seen anything like that in the sky in all my life.”

The incident was known in all its details the next day, when an Air Ministry spokesman announced that an official enquiry would be opened. There was an immediate spate of theories. Some were for weather balloons, admittedly the explanation for the majority of bogus saucers.

¹ The officers and men at Topcliffe arrived at this altitude on the assumption, which seemed to them a fact, that the object was following the Meteor about 1,000 feet above it.

An R.A.F. officer suggested that one of the jets of the Meteor might have ceased to function for a moment, and that it produced a smoke ring when picking up again.

But these explanations do not seem to have been adopted by the Air Ministry. If the promised enquiry took place, its findings have never been published. The Mainbrace saucer story is well known in England and proved as effective as any in convincing the British public that these phenomena are a fact. Yet the air Ministry has done nothing to shatter that belief by offering an explanation.

OSCILLATING MOVEMENT, CHANGE OF SHAPE

The Topcliffe saucer bears a very close family resemblance to hundreds of other saucers mentioned in this book. The interesting feature in this case is the high quality of the reports and the way they corroborate each other. There are witnesses on the ground, in the air (the pilot of the Meteor) and—we can assume that it was the same saucer—even a number of them at sea.

One point in the report is unusual: the object seemed to be spinning like a top. This peculiarity was observed in the Bocaranga case, but it is not too frequent.

There is also the particularly precise reference to two points often observed: the fluttering like a dead leaf and the change of shape.

1. The change of shape occurred at the moment when the disc, just before disappearing in a westerly direction, suddenly changed course and headed southeast. If we assume that the object was obeying the laws which flow from Plantier's theory, what would have happened? To carry out its violent turn it would necessarily have had to oscillate and thus show itself to the observers at a different angle. The same theory postulates that an object travelling towards the horizon and accelerating at a fantastic rate would present its lower surface, tilted almost vertically, to a ground observer. At the moment of turning, the dark patch goes off-center *toward the inside of the turn* and the object oscillates at an angle equal to that of the change of direction. To the observer of the maneuver it becomes elliptical instead of circular. This was what was seen at Topcliffe.

2. The fluttering like a dead leaf is often observed when the objects are descending. An imaginary pilot at the controls of Plantier's imaginary craft would immediately perceive the advantages of this technique.

What is it which really determines the rate at which an object of this kind will gain or lose altitude? It is *the ratio between the vertical component of the field of force and gravity*. The reader with some knowledge of mathematics will see immediately how difficult it must be to ensure constant equilibrium between this vertical component and gravity. In descending, it must therefore be simpler not to alter the intensity of the field of force, but to set the vertical component oscillating by tilting the object both ways, several times in succession. While the object oscillates, the vertical component does the same,¹ so the object descends. As soon as it resumes a horizontal position, the object finds another vertical component more or less equal to gravity and ceases to descend. Actually, the effect of gravity has increased very slightly, and the object continues to fall a little farther, but imperceptibly.

Of course, this is only a mental concept, but it shows once again how closely the behavior of the objects sighted conforms to the pattern predicted by the theory of Plantier, who believes that flying saucers are propelled by a field of force.

And this is not all, for the witnesses say that when the oscillation ceased, the object revolved like a top. What better way of stopping oscillation than by starting a gyroscopic movement?

MORE ABOUT OPERATION MAINBRACE

Toward the end of September, 1952, flying saucers increased and multiplied all over western and southern Europe and even as far as northern Africa.

On the 28th of that month a Danish communiqué disclosed that on the 20th a shining disc of metallic appearance had been seen over Karup, the most important airfield in Denmark. The 20th was the day after the Topcliffe incident and the sighting from the "Franklin

¹ It varies as the cosine of the angle of inclination.

Roosevelt." The object was detected at 7:30 p.m. by three officers of the Danish Air Force and was visible for about five or six seconds before it swiftly disappeared behind clouds to the east.

On September 20th "Mainbrace" was in full swing not far from Karup.

On September 22nd the night shift of the Mouguerre chemical factory near Bayonne spent twenty minutes following the movements of an object possessing all the usual characteristics of saucers—the oscillations, luminosity varying with movement, color changing from red to blue, and so forth.

On September 23rd, it was Casablanca's turn, where M. Grèze, a former fighter pilot, was overtaken at a low altitude by an object flying below him at a speed slightly greater than his own. At the time he was over the airfield at Titmellil-Casablanca, so that at one moment the object could be seen from the base and the next by a farmer and his family at Azemmour. After the object had passed, the latter heard an explosion like a "sonic boom." M. Grèze and the observers at Titmellil noticed that it was not travelling fast and estimated its speed at 250 miles an hour maximum.

Two days later, the head of the Geophysical and Meteorological Center announced that what had been seen was a fireball. His view seems plausible, but the long horizontal flight at 250 miles per hour remains inexplicable.¹

Four days later thousands of people, and very probably tens of thousands, witnessed a series of strange spectacles in northern Germany, Denmark and southern Sweden. For a whole hour a luminous object, "twice as bright as a big star," flaunted itself over Scania, proceeding by irregular jerks, emitting sparks and leaving a trail of smoke behind it. Press photographs were taken and published next day. For several minutes three little "satellites" were seen moving round the main performer.

Just before 6:30 next evening, there began a series of sightings as odd as any in the history of the saucers.

¹ See the paragraph headed "Accidents" in the section on the Plantier theory.

A report from Hamburg was followed by another from Neumünster and a third from Kiel, i.e., places lying roughly on a north-northeast axis. A fiery ball trailing a sort of flame behind it was seen crossing the sky in a straight line. The witnesses had an idea that its light faded as it moved away in a northeasterly direction. German observatories stated that no meteor had been reported.

A minute or two later a luminous object crossed the sky at Jaegersborg, north of Copenhagen. Numerous witnesses agree in describing it as a kind of bluish-green cigar. "The object could be seen quite easily," says M. Bent Arne, one of the witnesses, "as it was flying low, lower than the usual altitude for aircraft. I did not believe in saucer stories, but I must confess that I have my doubts now. The cigar had the shape of a dirigible, swelling out in front,¹ and it was fluorescent. It disappeared eastward at a prodigious speed."

Almost at the same moment hundreds of people at Nakskov, in the Baltic, had seen a luminous disc traversing the sky at a high speed from west to east. If this was the same object, it must have passed almost immediately over Nakskov, which would explain why it looked circular there and definitely elliptical at Jaegersborg. A few moments later, several green "fireballs" and some luminous "ellipsoid bodies" were observed at Vordingborg, in the south of Zealand, Frederikssund, further north, and over Sonderborg, in the south of Jutland. They were on an easterly course, like the others.

The Danish Air Force and observatories pronounced that these objects could not be meteors, but offered no explanation of the phenomenon.

As all these mysterious objects travelled eastward, their course must necessarily have brought them over Sweden, and indeed it did. M. Bent Arne's cigar was tracked by a large number of observers in Malmö, Lund, Simrishamm and right across the whole province of Scania (southern Sweden). A weather station reported it flying at about 3,300 feet, an estimate which, coming from a meteorologist, may be accepted, as it was probably arrived at by

¹ The same feature was observed in the Bocaranga case.

reference to a bank of clouds. Two officers in a mail plane saw it as it passed.

The last to see it was the military airfield at Ljungbyhed. The Commanding Officer, Colonel Ingemar Nygren, took the bull by the horns. He was so certain of what he had seen that he identified the cigar as a secret Russian device returning to its base. "It was heading for Danzig or East Prussia," he said.

It is worth noting that there are slight variations in the descriptions of its shape. Some saw it as a cigar, some as a rectangle (perhaps a cylinder) and others as a kind of half-moon. But all witnesses were unanimous about its color: fluorescent bluish-green.

DEDUCTIONS FROM OPERATION MAINBRACE

Most of those who believe in the existence of the flying saucers, but are inclined to regard them as Soviet inventions, cite the Mainbrace incidents in support of their argument. If my information is correct, that view has been adopted in some sections of the British Intelligence Service, who hold that these events tend to confirm the information received from Czechoslovakia, East Germany, and even Central Asia.

The Soviet theory will be examined later. In my opinion it is more logical to begin by assembling all the known facts about the machine as precisely as possible, and for that purpose, to analyze the evidence.¹

1. A number of German, Danish and Swedish witnesses speak of "rectangular" objects. To some observers they suggest a schoolboy's slate. The rectangular appearance is frequently noted. In one of the most interesting cases, that of Le Bourget, an eye-witness was reminded of a "huge sheet of zinc with the corners clipped."

Are these comparisons to be taken literally? Is not an ellipse, in metaphorical language, a "rectangle with the corners clipped"? But without going so far as to ask witnesses to give more or less arbitrary comparisons, we can say that the shape of the mysterious object, whether

¹ Of course the evidence can be rejected wholly or in part, even if it involves denying the existence of the saucer.

rectangular or elliptical, has no significance for us. Investigation has not yet gone beyond the observation stage, and the only rational procedure is to note the facts and leave the explanations for later consideration.

2. One fact (in itself as incomprehensible as the others) is rather odd, namely, that the rectangular appearance almost always crops up in observations that describe oscillation.

3. The colors mentioned seem associated in some way with the speed, or more probably with the rate of acceleration. The silvery grey with an aureole of dark red is seen when the object is stationary or travelling very slowly. Then comes the vivid red, accompanied by a dark patch (a combination particularly well observed at Bocaranga). At high acceleration the white, green, blue, and purple appear.

It is noteworthy that there is some relationship between the acceleration and the intensity of the light. The silvery grey edged with red is really a barely luminous red, almost infra-red; the silvery color is probably just reflected light. In fact, it is seldom seen except in daylight.¹

Certain movements at a high but constant speed produce none of the strong colors, which seems to confirm the hypothesis that there is some relation between the color given off by the object and the power developed at each instant by the motor. If we accept this relationship as a rule of the objects' operation, would it not account for certain sightings in February, 1954, when the witnesses felt a burning sensation in their eyes when they were watching a particularly violent maneuver? That sensation is perfectly familiar to the Alpine climber, who associates it with the ultra-violet of high altitudes and the well-known snow-blindness. If this theory is sound, the burning sensation in the eyes would mean that the pilot of the saucer had, as drivers put it, "stepped on the gas."

4. To what are we to attribute the changes of shape? Do they really take place or are they an optical illusion

¹See the account of the Le Bourget sighting, page 173. In the daytime the object seemed to be silvery grey. When it was examined through glasses a faint red halo could be seen. At night this halo alone was seen.

due to the different angles of vision of many witnesses at the same moment or of an individual witness at successive moments? I have studied a large number of reports for an answer to this question. The only conclusion I can reach is to admit the lack of accuracy in most of the reports. It is impossible at present to foresee the true explanation. Undoubtedly we shall not succeed until we multiply the number of specialized observatories like the one at Shirley's Bay. But perhaps a later sighting will one day confirm Plantier's theory, for, as we shall see, this accounts for changes of shape as well.

5. Did the swarm of saucers in the sky of northern Europe during the NATO maneuvers have any special significance? In my opinion, this question has not an answer, or perhaps I should say that it has too many. Some people would say that Soviet Russia had the maneuvers under observation. The communists would declare that the American imperialists were displaying their deadliest new weapon. The skeptics would say, to both of these groups alike, "You always end up by finding the spy you are afraid of. Spy fever is the father of saucer mania." And another saucerite, something of a crackpot, would probably insist that Heaven was keeping an eye on humanity's crazy antics.

In conclusion, I suggest that mere chance accounts for a good deal. The fact that these phenomena appeared while a war exercise on a grand scale was in progress made serious and trustworthy observation possible—a unique episode in saucer history. "Operation Mainbrace" is a landmark, with its wealth of testimony from meteorologists, astronomers, pilots, and sailors. If scientists and eminent military men are now convinced that it is time to embark on a thorough investigation on a world-wide scale, this event has been partly responsible for their change of mind.

Saucers over France

4

THE YEAR 1952 was particularly rich in sightings of all kinds, both in America and Europe. In France, some of the strangest observations ever made were recorded at the same time as those marking Operation Mainbrace.

THE "FLYING EGG" AT DRAGUIGNAN

The passage of an unknown object over Provence on the evening of October 6th, 1952, offered perhaps the best opportunity, from the scientific point of view, of establishing the existence of flying saucers beyond doubt or cavil. The documentary evidence about this event which I have been fortunate enough to collect proves that an object travelling in complete silence at a speed of at least 2,000 miles per hour flew over the south of France about 7:25 p.m. on October 6th, and proves further that it was not a meteor.

On that evening, less than ten days after the performance over the Nordic countries, two pilots of an Air France DC-4 on the London-Orly-Nice route had a strange story to tell when they arrived at Nice. The pilots were François Cavasse and Michel Clément, two experienced airmen, each with more than 5,000 flying hours to his credit.

"We had never believed in the existence of flying saucers," they said. "But we cannot deny the evidence of our own eyes, and this evening, in mid-air, we met a mysteri-

ous object travelling at a terrific speed above us." M. Cavasse speaks for himself as follows:

"It was just before 7:30 p.m. local time. We were flying over Draguignan when Clément, my co-pilot, drew my attention to the behavior of a luminous object of curious shape. It at once suggested a sort of elongated egg. It was travelling on a horizontal and perfectly straight course at a constant and very high speed. It glowed all over with ■ white light, rather faint, certainly not blinding; something like a neon light. Its glow enabled us to follow it closely for thirty seconds, without taking our eyes off of it. When it disappeared from view, it was continuing on its straight horizontal course in a westerly direction. It left behind it a white trail, slightly bluish, looking like ■ dotted line, and twenty to twenty-five times its own length. We estimated its speed to be two or three times that of a jet plane, somewhere between 2,000 and 3,000 kilometers (1,200 and 1,900 miles) per hour. That figure was not arrived at by any calculation, but is only our personal impression. When we first sighted it we thought it was about three kilometers ahead of us (two miles) and a little ahead. It struck us as much bigger than an ordinary commercial airplane.

"We are familiar with the sky and its tricks," added the pilot, "but we have never seen anything in the least like what we saw this evening. We are morally certain that the object was guided or teleguided; it was certainly under perfect control. Any idea that it was a meteor or fireball is out of the question. These bodies do not follow ■ perfectly straight horizontal course and do not glow with a steady, unvarying light. Their initial velocity is terrific, but it diminishes towards the end of their path and they seem to disappear or explode. This object behaved in an entirely different way. It was flying not far away, certainly at ■ very high speed but nothing like as fast as a meteor. It was travelling on a northeast-southwest axis, that is, toward Toulon."

The DC-4 landed at Nice at 7:40 p.m. A quarter of an hour before, M. Fonseca, an employee of Air France who happened to be on the runway of the Nice airport, had

seen an object that corresponded in all respects to the description given by the two pilots, and was travelling northward. Not far from M. Fonseca, but not in his company, Mrs. Charles Govern, an American, had also noticed the "flying egg" which so astonished the two pilots. She confirmed their report. "I cannot give a better description than that of MM. Cavasse and Clément. I agree with it entirely. I am convinced that I saw a guided or remotely-controlled object of an unknown type."

Three more witnesses came forward. Dr. Carlotto, a hospital surgeon at Nice, added some interesting details. "The trail," he said, "unlike that of an airplane, came to a point instead of spreading out, and gave off a dim light. The object itself showed rapid and regular pulsations (blinking). These pulsations were produced by the object itself, and were not the effect of clouds, because the sky was entirely clear." At the time of his observation Dr. Carlotto was on the balcony of his residence at 2, rue du Maréchale-Joffre, at Nice.

The other witnesses were Mme. and M. Pierre Fabre, of Grasse. They happened to be at Mougins, between Grasse and Cannes. Their evidence corroborates that of the others in all respects.

So there were seven eye-witnesses. Except for the pilots and Mme. and M. Fabre, they did not know each other and had never met. Their stories are identical, except as to time, which differed by seven minutes at most; doubtless they had not arranged to have their watches synchronized! Dr. Carlotto fixes the time at 7:20 p.m., and the two pilots at 7:27 p.m.

Exactly what did these seven eye-witnesses see? The two pilots categorically deny the possibility that the object could have been a meteor, and it must be admitted that this theory runs into a number of objections: the relatively low speed, the dim white light, the unvarying flight, and the horizontal course. The chief difficulty, which seems to me to rule out the meteor explanation, arises from a combination of three facts that were particularly well observed: the size of the object, its low altitude, and its comparatively low speed. If a meteor of the approximate size mentioned by the two pilots had travelled at an altitude of not more than 33,000 feet, its journey would

soon have ended with an explosion or a fall to earth, probably the latter in view of its relatively slow speed; and either event would have been seen.

We must not forget that the figures given by the two pilots are simply personal impressions, as they are the first to point out. The object may well have been more than two miles away. But in that case its size and actual speed must be proportionately increased. If we do, is the probability that it was a meteor increased? Not at all, because if the likelihood of a fall is diminished, that of an explosion increases, and when a meteor, especially such a big one, explodes, the fact is noted by observatories. At a distance of two miles the pilots thought the object was larger than any commercial aircraft, and if the true distance was four miles, for example, we should have to multiply the object's size by two and its cubic content by eight.

For these reasons the observatory at Nice, when consulted at the time, rejected the meteor hypothesis.

"From the descriptions given by the witnesses," stated an astronomer who was interviewed by *Le Figaro*, "it would appear to be a terrestrial object, some sort of a remotely-controlled machine, rather than a celestial body such as a meteor."¹

This brings me to something which proves, in my opinion, that the astronomer at Nice was correct in believing that it was a guided or remotely-controlled machine.

On that same evening, October 6th, 1952, the meteorological station at Montpellier added this to its daily report:

"6:25 p.m. A luminous phenomenon, observed at an angle of approximately 40 degrees above the southern horizon, was followed for four or five seconds, while it travelled on an east-west course, and was seen to disappear in the southwest behind a bank of lenticular altocumulus.

"Appearance of the phenomenon: a disc or sphere in shape, apparent diameter one-eighth that of the solar disc;

¹ The Institute of Astrophysics, however, prefers the meteor explanation.

followed immediately by a brilliant point of light, then by a luminous whitish trail of weak intensity."

The meteorologist included with his report a diagram of the object which provides several highly interesting details.¹ The sphere, he says, was whitish. The witnesses at Draguignan, Nice, and Mougins said the same. The point of light at the rear was as bright as a star of the first magnitude, blue-violet in color; it blinked or twinkled. The glowing trail was about six times as long as the object itself.

It will be seen that the description given by the weather specialist is fuller and more precise than that of the first observers. But can there be any reasonable doubt that all of them were describing the same object?

To begin with, the times are close. Dr. Carlotto says 7:20 p.m. local time, while the Montpellier report gives 6:25 Greenwich time, that is, 7:25 local time.

Next comes the unanimity as to the direction of travel: east to west (the two pilots say that it was northeast-southwest, but this discrepancy tends to confirm the fact that the object seen at Draguignan was the same as the one sighted at Montpellier, for a course passing north of Nice, south of Montpellier—as stated in the weather report—is in fact northeast-southwest). Nor is agreement confined to the direction of travel. All say that the path was straight, unvarying, and horizontal. Last comes the strange similarity of the descriptions, the meteorologist's being more detailed, of course. The witnesses at Nice airport did not see the blinking purplish light, while Dr. Carlotto did.

Two discrepancies should also be noted: the object that is ovoid at Nice is spherical at Montpellier, and the length of the trail has apparently diminished by two-thirds or three-quarters. This can be explained either as a subjective impression (several observers of the same phenomenon never give exactly the same description; at Nice, for example, only Dr. Carlotto noticed the twinkling), or

¹ All witnesses agreed that the object seemed larger than any commercial aircraft presently known, and travelled in a fashion distinctly unlike that of a meteor.

as an objective fact. If it was the latter—that is, if the reported change did occur—then there had been according to the Plantier theory (the only light shed on this mystery), a slowing down. The luminous egg elongates, according to Plantier, as its speed rises; and it is the same with the trail. The object would thus have been travelling more slowly when seen south of Montpellier.

This calls for detailed consideration.

THE DRAGUIGNAN CASE AND THE PLANTIER THEORY

At the time, the skeptics made fun of the Draguignan "flying egg," and we must admit that there is something about these "saucers" and "eggs," with their low culinary terminology, that tends to chill the scientific spirit.

Unfortunately, these skeptics knew nothing of the unpublished Montpellier weather report, which not only confirms but emphasizes everything incredible about the Nice-Draguignan sightings.

As to the ovoid shape, Lieutenant Plantier, who is not a skeptic, had foreseen that his hypothetical machine might under certain circumstances assume the shape of an egg. He did so long before the strange object invaded the sky above Draguignan, and even before it occurred to him that flying saucers might have any connection with his audacious look into the future.

If we could see Plantier's machine flying at high speed on a perfectly straight course, we would note that the field of force propelling it carries the surrounding air along with it in inverse ratio to the square of the distance. In other words, the nearer the air to the machine, the faster it is carried along. What will happen ahead of the machine? Between the practically motionless air some distance ahead, and the machine itself, there will be a layer of air which will be increasingly compressed as the machine approaches. The greater the speed, the greater will be the volume and density of that compressed layer of air.

What happens when a gas is compressed? It heats up. Above a certain speed, the machine will propel along with it a volume of air brought to a very high temperature. The field of force will act on this air as effectively as on the machine itself; as a result, the air will become incan-

descent. The spectator, if there happens to be one, will see a luminous ball shaped like the "equipotential surfaces" of the field. *These surfaces are ovoid*—or to be more precise, they are ellipsoidal. The greater the intensity of the field, the more elongated the ellipse becomes.

Behind this ball of compressed air will be the reverse process: ■ sudden expansion of air, whose violence will be proportional to the speed of the craft. Expansion means *cooling and condensation*—hence the trail. A very special kind of trail, let me add, very different from the trails left by aircraft, owing to the presence of ionized particles projected by the field of force. The length of the trail increases with the speed of the object. So the observation at Montpellier suggests a reduction in speed.

Can the Plantier theory also account for the blue-violet twinkling point of light? Perhaps this light marks the immediate rear of the machine where the ionization process is particularly active. In any event, the reduction in speed would certainly explain why the witnesses at Nice did not see this brilliant light. When the object was travelling at high speed (as at Nice), this pinpoint was absorbed in the elongation of the "egg." In that case, Dr. Carlotto might have attributed to the entire object the twinkling of the light, which was at that time illuminating the egg from inside.

TRUE CHARACTERISTICS OF THE OBJECT

By comparing the reports of the two pilots with that of the meteorologists, we can form some idea of the actual characteristics of the object which they saw.

Let us start with the times. Unfortunately, on this point only the Montpellier report is reliable. It fixes the time as 7:25 p.m. If we accept Dr. Carlotto's time, 7:20 p.m., for the appearance of the object at Nice, it must then have covered almost 200 miles (the distance to Montpellier) in five minutes, representing an average speed of 2,200 miles an hour. Now that figure must certainly be a minimum, because all the other witnesses at Nice say that the object passed *after* 7:20 p.m. If the actual time of its passage was 7:23 p.m., it would have travelled that 200 miles in two minutes, or at the rate of 5,600 miles an hour. But we will keep to the minimum figure. It agrees well enough with

that given by the two pilots, and if they accurately converted the apparent (angular) speed into actual speed, their estimates of the distance and the actual size of the object were also correct—if anything, perhaps a little below the true figures. In point of fact, if they had been clearly wrong in their estimate of dimensions, their figures for distance would have been correspondingly wrong, and consequently, the figure for speed also. Their figure for speed was 1,200 to 1,900 miles an hour, ■ compared with the 2,200 that is arrived at by comparing the times given by Dr. Carlotto and the weather station at Montpellier. The three figures are sufficiently close to justify us in believing that the true minimum dimensions of the object were somewhere nearer those mentioned by the pilots: it was somewhat larger than a commercial aircraft.

Nor must we forget that the object was at least two miles away when they saw it.

On the strength of these figures, the Montpellier sighting should in theory enable us to calculate the distance and minimum altitude of the object, as well as the actual brightness of the light given off by the purplish light—always provided that we accept the theory that, as the speed diminishes, the length of the egg is correspondingly reduced. If, for example, we assume that the length of the object was twice its width, which means that the true diameter of the Montpellier sphere was equal to half the length of the Draguignan egg, say 65 feet (to give a figure which tallies with the estimate by the pilots), we would obtain: 11 to 13 miles for the distance of the sphere from the Montpellier observer; 6 or 7 miles for the altitude.

I present these figures only to demonstrate that a calculation can be made. They are very hypothetical, because of the assumptions that I made, above. But if an investigating agency had asked the pilots and the other witnesses the questions which ought to have been put to them immediately after the occurrence, there would be no such uncertainties. Today we would know, with a fair degree of accuracy, the real characteristics of this object. At little expense, and thanks to the good fortune of a single well-observed sighting, the mystery of the flying saucers would perhaps have been defined, if not solved.

But in France there is no such investigating agency, and an admirable opportunity was lost.¹

OLORON AND GAILLIC, OCTOBER 1952

A fairly complete account of the flying-saucer observations made in France in the last few years alone would fill several volumes. In the single month of October 1952, Draguignan and Montpellier (Oct. 6), Morlaix (Oct. 10), and Rouen (Oct. 11) were "visited."

I pass over these sightings, in spite of their interest, to come to the affairs at Oloron (Oct. 17) and Gaillac (Oct. 27), which are undoubtedly the most baffling in the history of saucers. In these two southwestern towns and their environs, ten days apart the same theatrical spectacle was exhibited before the eyes of two groups of witnesses, totalling several hundred in number. And this spectacle was so complex, so meaningless, and so exactly alike in the two cases that for once I shall confine myself to reporting the testimony of some of the witnesses, without attempting to explain or to understand.

On Friday, October 17, 1952, the weather at Oloron was superb, with a sky of cloudless blue. About 12:50 p.m., M. Yves Prigent, the general superintendent of the Oloron high school, was preparing to sit down to lunch in his apartment on the second floor of the school. With him were Mme. Prigent, a schoolmistress, and their three children. The windows of the apartment opened on a wide panorama to the north of the town. Jean-Yves Prigent was at the window and was just being called to the table, when he cried out: "Oh, papa, come look, it's fantastic!"

The whole family joined him at the window, and this is M. Prigent's account of what they saw:

"In the north, a cottony cloud of strange shape was floating against the blue sky. Above it, a long narrow cylinder, apparently inclined at a 45° angle, was slowly moving in a straight line toward the southwest. I esti-

¹ There have been many sightings of "flying eggs." Here I need mention only the luminous "tennis ball" sighted six days before Draguignan at Kyoto, in Japan, by four different groups of witnesses. Their reports have much in common with the one from Montpellier.

mated its altitude as 2 or 3 kilometers. The object was whitish, non-luminous, and very distinctly defined. A sort of plume of white smoke was escaping from its upper end. At some distance in front of the cylinder, about thirty other objects were following the same trajectory. To the naked eye, they appeared as featureless balls resembling puffs of smoke. But with the help of opera glasses it was possible to make out a central red sphere, surrounded by a sort of yellowish ring inclined at an angle. The angle," according to M. Prigent, "was such as to conceal almost entirely the lower part of the central sphere, while revealing its upper surface. These 'saucers' moved in pairs, following a broken path characterized in general by rapid and short zigzags. When two saucers drew away from one another, a whitish streak, like an electric arc, was produced between them.

"All these strange objects left an abundant trail behind them, which slowly fell to the ground as it dispersed. For several hours, clumps of it hung in the trees, on the telephone wires, and on the roofs of the houses."

Such is the extraordinary history of the "gossamer" (*fil de la Vierge*) scattered over the countryside of Oloron by a flight of unknown machines.

These fibres resembled wool or nylon. When rolled up into a ball, they rapidly became gelatinous, then sublimed in the air and disappeared. Innumerable witnesses were able to collect some and observe this phenomenon of rapid sublimation. The school's gymnastic teacher gathered a large bunch from the playing field. The teachers, much interested, found that the fibres burned like cellophane when ignited. The science teacher, M. Poulet, examined the fibres closely, but did not have time to carry out a chemical analysis. However, he was able to witness the sublimation and complete disappearance of a thread about a dozen meters long, which he had wound on a stick.

The flying objects and the "gossamer" were observed not only by the abovementioned witnesses and by numerous other residents of Oloron, but also in the countryside round about: in the village of Géronce (notably by the mayor, M. Bordes), by hunters in the Josbaigt valley, etc.

The only explanation of the phenomena of Oloron that has ever been proposed is the following: the witnesses who describe a cylinder and saucers never saw any such thing; and those who collected the fibres were unable to recognize it for authentic gossamer, "produced by myriads of migrating spiders."

This explanation, which appeared in the newspapers of Oct. 22 and 23, was attributed to "entomologists." I have vainly attempted to discover *what* entomologists. But according to these anonymous authorities, spiders in autumn spin vast skeins which, inflated by the wind, carry them "in myriads" over plain and mountain. A far-fetched explanation, and worse than false—absurd; for it forgets one point: the fibres disintegrated in several hours *at most*. I have never observed that gossamer disintegrates in such a manner. If it did, the spiders would not be able to spin their alleged skeins: like new Penelopes, they would never have time to finish their work, constantly spinning at one end while the other evaporated in the air.

What, then, are we to think? The mystery remains impenetrable: clouds of strange form, plumed cylinder, yoked saucers advancing by zigzags, gossamer evaporating on the ground—it is all a phantasmagoria that defies good sense. Might the words "good sense" furnish the key? Must we invoke the notorious "collective hallucination"? But what an incredible prodigy would be a hallucination which, for no apparent reason, imposed on a whole region a unanimous, precise, simultaneous, and incomprehensible vision! Would we not, in this, be faced with a mystery even more inexplicable than if we adopted the naïve interpretation that the vision was real?

But never mind all that. Let us invoke hallucination, error, psychosis, whatever you please. Remember that this took place on the 17th of October. Ten days passed—time enough for entomologists, psychiatrists and yarn-spinners to recover—and then on October 27th, at 5 p.m., *the whole thing started up all over again in the sky of Tarn, at Gaillac.*

RETURN OVER GAILLAC

At about 5 p.m. on that day, Mme. Daures, living on Toulouse Road in Gaillac, was induced to go out into her

farmyard by a noisy commotion among the chickens. Thinking her flock threatened by a hawk, she raised her eyes to the sky—and saw there exactly what the Oloronese had seen ten days before.

Mme. Daures called her son, then two neighbors, then a third. But already many residents of Gaillac were scanning the skies, among them two under-officers of the police brigade—in all, about a hundred known witnesses. All give the same description, which is rigorously identical to that of Oloron: long plumed cylinder inclined at 45° , progressing slowly to the southeast in the midst of a score of “saucers” which shone in the sun and flew two by two in a rapid zigzag. The only difference is that here some pairs of saucers occasionally descended quite low, to an altitude estimated by the observers as 300-400 meters. The spectacle lasted for about 20 minutes before the cigar and its saucers disappeared over the horizon.

By this time masses of white threads were beginning to fall, just as at Oloron. They continued to fall for a long time after the disappearance of the objects.

The Gaillac observers compared the fibres to glass wool. As at Oloron, many people gathered them up. As at Oloron, they became gelatinous, then sublimed and disappeared. Neither here nor at Oloron was there anyone to be found who thought of putting some into a sealed container, or of collecting the gas given off for later analysis.

Such are the Oloron and Gaillac affairs. They confirm one another totally even in their weirdest details. But they shed no light on one another. The observers are trustworthy: aside from the number and concordance of the observations, the high quality of some of them should be stressed. For example, M. Prigent had had experience in meteorology before he became general superintendent to the Oloron school. And under-officers in the police are not prone to visions which might prejudice their advancement. Thus pure and simple denial is impossible.

On the other hand, does there exist any *natural* spectacle which could possibly be confounded with the one here described twice over with the same wealth of concordant details? For my part I can conceive of none.

All that remains is comparison with other saucer obser-

vations. This does not take us very far, yet certain correlations do seem to be suggested:

1. The plume of white "smoke" above the upper end of the cylinder is obviously reminiscent of a "turbulent cloud." If, as Plantier theorises, all these craft are powered by force fields, and if the cylinder is equipped with field motors only at its two extremities, and if it was moving slowly (as the witnesses tell us it was), its upper end would give rise to a strong ascending air current, with probably condensation.

2. One detail is remarkable: if the whole group (vast cylinder and small discs) moves together, it implies some mechanical device, since the cylinder follows a uniform rectilinear path, while the smaller machines zig-zag. How are they kept together? This is purely hypothetical, but there is no need to draw back on that account; it is only necessary to bear in mind that hypotheses are not the same as hard fact. Let us suppose then that, as mentioned above, the cylinder carries engines only at its ends. In other words, we assume that the cylinder is simply a tube with a flying saucer at each end. If so, the middle of the cylinder will partially escape the effects of the force field, and the acceleration undergone by the middle of the cylinder—which is pulled along by its ends—is greater than that of the surrounding air. The cylinder is thus a *subsonic* craft; for the considerations which impart silence and thermal resistance to the saucers will not apply here. (See Part III Chapter 3, "Lieutenant Plantier's Theory.") The slow speed of the cylinder tends to indicate that it really is made up from two saucers in this way.

3. There is another point which further increases the plausibility of this hypothesis: the inclination of the cylinder in its direction of motion. In order to move in a fluid medium, the saucer must tilt and remain in a somewhat inclined position. A cylinder with saucers for bases must therefore tilt *as a whole* while it is in motion. If it had come to a stop, it would then have assumed a vertical orientation. (See Fig. 13 in "Lieutenant Plantier's Theory.")

4. I suggest to the reader with some idea of mechanics that he reflect on the complexity of the problem of balanc-

ing two force fields (those of the terminal saucers) against a third (the gravitational field). The craft must neither rise, nor fall, nor turn; and it must be able to maneuver when necessary. The complication of requirements is formidable, and we may hope for their own sake that the presumed passengers in the vessel are well versed in the use of electronic feedback circuits. It is clear that the cylinder must move with care, for the slightest gust of air could upset its equilibrium.

In fact, these considerations lead one to the thought that such a cylinder could hardly be of much use except as an interstellar vessel, moving in space remote from strong ambient force fields. Of course, this is only speculation.

If the observers really did see what they described, and if all these objects were machines guided by a single intelligence, then what mysterious experiment were they performing? What purpose was served by the strange ballet of paired saucers? What was the meaning of the whitish streak appearing between two saucers on separation? What, finally, was the "angels' hair" that sublimed so readily in the air?

How one must regret that there was no investigating commission at the time to secure the maximum information from the observers' reports. If, as Plantier thinks, the "angels' hair" results from the alteration of the chemical properties of atoms and molecules of the air, effected by the ultra-heavy particles projected by the field, suitable experiments made without delay might perhaps have revealed something. It is deplorable that not even a simple chemical analysis was attempted.

However, none of this was done. Such as they are, the Gaillac and Oloron observations do not at present convey any enlightenment. Some day, no doubt, everything will be cleared up and will take on a meaning, but we are far from that day.¹

¹ Two strikingly similar cases were reported in the United States: The first, on October 22, 1954, occurred at Jerome, Ohio. The principal of Jerome Elementary School, sixty students, and one teacher observed a cigar-shaped object which

Other saucers were observed in France at this same period.

On October 27 at 5:30 p.m., i.e., only a few minutes after the end of the phenomena at Gaillac, a silvery-grey disc of metallic luster was noticed at Brives-Charensac, in the Haute-Loire. The machine crossed the sky rapidly and silently and disappeared in the southeast. It was followed almost immediately by a "cigar" of the same color, which stopped in the sky for more than half a minute, then accelerated and disappeared. Five witnesses saw the two objects.

At Tarbes, the next day about 4 p.m., a "ball" crossed the sky at high speed. The observers noticed no details. But undoubtedly the most astonishing incident in those final days of October, 1952, was one that occurred at Marignane airport, at Marseilles, where M. Gachignard, a customs officer, saw a machine land, remain for a moment, and depart.

THE MARIGNANE CIGAR

The Marignane cigar deserves a place by itself in the history of flying saucers, for the evidence is remarkable both for its dramatic features and the absence of proof: there was only one witness. In spite of this defect, however, all those who have talked with this one witness are convinced of his good faith. I myself think that if the reports I have presented in this book have any basis of fact, there is every probability that the evidence in the Marignane case is reliable. If so, it becomes of exceptional interest, because no man in the entire world has ever come so close to a saucer as the customs officer, Gabriel Gachignard.

The following story resulted from a cross-examination lasting for four consecutive hours, conducted by M. Jean Latappy, who illustrated this book and is one of the

emitted a stream of "angel hair" as it swiftly flew off. The second occurred at Whitsett, North Carolina, on October 27, 1955. Again a large number of school children, their principal and several teachers, observed large amounts of "angel hair" falling to earth at the same time about ten objects resembling "shiny steel balls" were seen flying overhead.—AMER. EDS.

best-informed men in France on the subject of flying saucers. His questions were searching, sometimes even tricky; he missed no opportunity to catch a contradiction, an impossible detail, any hesitation or sign of deceit. But in vain. "Gachignard impressed me as a simple man, honest, without imagination, concerned entirely with his family and his job. In addition, he was obstinate, scrupulous, returning to his previous statements in order to make it perfectly clear what he had meant, and refusing to let me use words he did not understand."¹ M. Latappy even went so far as to begin the cross-examination all over again, subtly trying to get M. Gachignard to contradict himself, in order to test him. But he never tripped him up. The customs officer impressed him as a man who had seen something and stuck by what he had said. Oddly enough, he refused to say that what he had seen was a flying saucer. According to M. Latappy, this term did not correspond to anything that M. Gachignard had in his mind; it did not mean much to him. But let him speak for himself.

"At about midnight (Sunday-Monday, October 26-27th), a light blow of the mistral cleared the sky, but pretty soon it clouded over again, as if rain was coming. Toward 2 o'clock I was in the hangar. I had been on duty since 8 o'clock. I was wide awake, having slept during the day. I had just bought a snack, some bread and cream cheese. I went out to eat it on a bench, in the open air. These benches are on a cement terrace in front of the hangar. The terrace is separated from the runway where the planes park by some cement troughs with flowers planted in them. I intended, when I had eaten, to go to the control office, to make sure that the mail plane from Algiers was going to land at 2:20, as I had been told. Actually, that was a mistake: that service is suspended on Sunday nights.

"The airfield spread out in front of me in the darkness, but I know all the corners of the place by heart, and anyway, it is never pitch dark on that big space. It's so

¹ M. Gachignard was questioned on several occasions by other people as well. All of them heard the same account and came away with the same impression of his character.

clear in the Midi; you can always distinguish outlines. The runway to the hangar behind me was faintly lit up by the letters of the red neon sign, thirty feet long and three feet high, that says 'Marseilles.'

"It was not more than three minutes after two—the Nice-Paris mail, scheduled to leave at that time, had just taken off—when suddenly, to my left, I saw a small light that seemed to be approaching, flying down the runway. It was not very bright, but perfectly visible and clear, even in the darkness. It seemed to be coming at the speed of a jet plane about to land, perhaps 150 miles an hour. At first I thought it was a shooting star, and that I was wrong about the distance and the speed; the background of the field was lost in the darkness, and I could not see exactly where the sky began.

"However, about half a mile away to the left, at the edge of the runway, there is a building called the "Two Barrels" on account of its shape, and I saw the light, which still seemed to be approaching, pass over it at just about ten meters (thirty feet). Its course was absolutely straight, without any oscillation, and came down gradually toward the ground. In a moment it passed in front of me, and then I knew that it wasn't any shooting star, that it was something that was really flying.

"All this happened very fast, without my having time to think.

"The light had hardly passed me when it touched the ground and suddenly stopped completely, without slowing down. A dead stop from 150 miles an hour, with no transition! It was about 100 yards away from me, on my right. At the exact moment when it touched the grillwork runway, I heard a dull noise, as if it were muffled, not metallic, the noise something makes when you set it flat on the ground. That was the first sound I heard; the approach had been made in total silence.

"Then I realized that the object was not a plane, because it hadn't slowed down, or rolled along the ground. Fifteen or twenty seconds had passed since it appeared, and there it was. It wasn't a plane, but it wasn't just a light either, because I had heard a noise. It was something solid.

"I got up right away and went toward it, partly out of curiosity, of course, but also because it's my job.

"It took me about thirty seconds to cover half the distance, and it was during that time that I discovered that the light belonged to a larger object.

"The larger object stood out dimly against the lighter background of the small yellow *Météo* building. This building hid the landing strip from me; the strip is always well lighted, but unluckily it couldn't light the place where the shape was.

"The object was dark, darker than the shadows around it. What was it made of? I don't have any idea, and in spite of all the questions they've asked me about it, I can't tell them anything. It could just as well have been made of metal as of cardboard.¹

"Using the distances and the dimensions of the building behind the object as landmarks, all we have been able to do is estimate the object's height as three feet and its length as fifteen feet. It had the shape of a football with very pointed ends. The only part of it that was clearly visible were the two ends, because the weak neon light outlined them vaguely, in the shadow. They were very sharp, very tapering. The curve of the object underneath was in complete darkness, which prevented me from seeing whether there were any wheels. I couldn't see anything, so I can't tell you anything about them.¹ On the upper curve the same shadows, and I couldn't make out anything there either. The only thing I can be accurate about is this: the light I had seen from the start came from four perfectly square windows, eight to twelve inches on a side. They were placed on a line, and this line wasn't straight but curved, following the upper curve of the cigar, in such a way that the upper edge of the windows seemed to be on a level with the top of the machine.

¹ Verbatim. M. Latappy thinks that this odd idea occurred to the customs officer because of the strange dull noise heard when the object touched the ground.

² The customs officer, M. Latappy says, seems to have been keenly disappointed at being unable to discover any wheels on this curious flying object.

"The four windows formed a group centered exactly in the middle of the thing, so that the extreme right-hand and left-hand windows were at the same distance from the two pointed ends. But they were in pairs: there was the same distance between the windows of each pair, while the space between the two inner windows was wider. The two outer windows seemed to me slightly inclined.

"Behind these windows a strange light was flickering. It was not steady or fixed or vivid, but ghostly and soft, almost milky at times. It seemed to go back and forth behind those windows, with changing tints, bluish or greenish, on a pale background. Anyway, it wasn't strong enough to light the dark parts of the object. Its intensity was always the same; it didn't vary when the object was moving. On the other hand, it never stopped 'throbbing,' like the movement of waves.

"I noticed all this while I was walking towards the object.

"But suddenly, when I was not more than 50 yards away from it, I saw a shower of sparks, or rather, a sheaf of tiny white glowing particles, spurt out from under the rear end, on my left. But they did not give enough light to help me distinguish the shape of the object any better. This fiery stream was inclined toward the ground.

"This lasted for only a second, and at the same time the cigar took off so suddenly, and with such irresistible force, that I lost my self-control and retreated instinctively, five or six steps. During that second I wondered what was going to happen, whether the machine was going to shoot flames or rush over me! I certainly believed there was danger. And besides, even if I couldn't see 'them' clearly, because the machine was in the shadow of the building, 'they' could see me perfectly, silhouetted against the light of the neon sign!"

M. Latappy says that while the customs official was recalling this scene, his features were completely disordered. The jet of sparks, the lightning take-off, everything in the silence of vast powers used without effort, had suddenly revealed to this simple man the unleashing, close to his defenseless body, of an unforeseeable and unimaginable force. At that moment, says M. Latappy, Gachig-

nard had the face of a man who finds that he has been at the verge of an abyss.

But let us hear the end of the story.

"The shower of sparks and the departure were accompanied by a slight noise, a kind of swish, like a sky-rocket on the Fourteenth of July. There was no air stream, no blast, no preliminary downward tilt. It's true, I was 50 yards away. *But in no more than two or three seconds the object had disappeared*, in exactly the opposite direction from its arrival. Just as the speed of approach had been moderate, the speed of departure was terrific. There wasn't even the appearance of acceleration, but it changed instantly to a frightening speed, impossible to estimate. The angle of ascent was small; as when it arrived, the machine went through the space, 30 or 40 yards wide, between the operations building and the runway-control building. This passage is in line with the grillwork runway where it had landed.

"After it took off, I could not have followed it by eye except for the jet of white particles gushing from the rear, as the windows and their light were not visible any more from where I was. I could see that when it flew between the two buildings it was still very low, lower than their rooftops, which are about thirty feet up. The next instant the light disappeared over the Berre pond, which is at the side of the airport, across the road."

It was all over. The customs officer was alone with his bewilderment and could ask himself whether he had been dreaming. At once he tried to find out who might have seen it besides himself. No one was on the runway. He went back to the hangar. Everyone was asleep, for there was no traffic at that hour. Finally, at 2:15 a.m., he ran into the Air France agent, Dugaunin.

"Good Lord, how pale you are!" Dugaunin exclaimed, before the other had said a word.

Gachignard told his story. They telephoned the control tower, but no one had seen anything. The tower hardly watches any area except the main runway where all the planes land and take off. Furthermore, it would appear from M. Gachignard's narrative that the cigar came and

went too low to be seen—lower than the tower itself, perched way up there, 45 feet off the ground!

“So I was the only one who saw it; if anyone’s around on an airfield at night, it’s bound to be a customs officer.”

That was the conclusion of Gachignard’s story, as told to M. Latappy.

What shall we think of this story?

As I have said, everyone who questioned M. Gachignard is convinced of his good faith. In the customs service, with its high standards, he has an excellent reputation as a steady, solid, reliable man, ■ realist. He is sure that he saw what he says he did. He is not a hoaxer. But did he really see it? Or is he the victim of an hallucination? (The possibility that it was a dream must be discarded, because he was eating at the time.) If it was a case of hallucination, it was, I think, a very strange one.

Note that this “hallucination,” so full of detail, almost duplicates the one experienced by Professor Tombaugh, the great astronomer (page 58). He too saw a cigar-shaped object, he too saw square “windows” (or rectangular ones, taking into account perspective); he too mentioned fantastic speed and silent movement. The only difference between the two observations, that of the distinguished scientist and that of the obscure official, is the landing, with the two faint noises at arrival and departure and the stream of luminous particles.

Gachignard’s report is no more incredible than Tombaugh’s. Of course I do not suggest that this fact constitutes evidence; his narrative is not susceptible of proof and can prove nothing. But it does have interest of another kind by reason of its dramatic character.

If ever the day comes when it is established that flying saucers exist and that they come from another world, Gachignard’s “vision” may well be one of the great moments of human history. For we must not consider only his emotions; we must also remember that he is the only man ever to be seen at such close quarters by these hypothetical visitors, and that in some fabulously remote corner of space, their memory of him is their sole evidence of the existence of our entire species on earth.

THE MARIGNANE MYSTERY

As I said before, there is no *material* proof of M. Gachignard's "vision." But if it is true, our next task is to consider what it would imply.

Here, for a change, we have some precise and certain data. The machine landed in front of the Météo Building as if in front of a ruler. Gachignard thus had reference marks for the length of the object, about fifteen feet, and for its height, three feet. The positions of the witness are also known exactly: when the machine landed, he was about 100 yards away from it; when it took off, he was 50 yards away.

Here are the figures which allow us to specify the angle of vision very exactly, and the perspective.

1. The machine was small. The total height, three feet, means that the extremities were $15\frac{1}{2}$ inches above the ground. Therefore Gachignard must have seen it *from above*.

2. But we must be even more precise. M. Latappy wondered if the supposed cigar might not actually be of the more usual "saucer" shape, and this theory is by no means improbable. As the object was practically "cutting the grass" as it arrived and departed, the observer could hardly have seen it except from the side. Half a mile before it landed it was only 30 feet above the roof of the "Two Barrels" building.

Let us suppose that M. Gachignard saw, from a distance of 50 yards, a disc 16 feet in diameter poised 20 inches above the ground. How would it have appeared to him? Since he was of medium height, his eyes were about 5 feet 3 inches from the ground. If we assume that the disc was perfectly flat, a quick calculation shows that he could have thought he saw a cigar 16 feet long and 4 inches thick. He would, in fact, have seen the disc as an ellipse with axes of 4 inches and 16 feet. At a distance of 100 yards, the smaller axis could not have exceeded 2 inches.

M. Gachignard, however, estimated that the thickness of the object was one yard. A comparison of these three figures—one yard, 4 inches, and 2 inches—shows that, if the object had been saucer-shaped, perspective would

have allowed him to see the under part of the machine, assuming, of course, that there was enough light to see it by. And he would have seen up to 17 or 19 inches of that lower side, according to his distance from it as he approached it.

At the two extremities, which were not entirely in shadow, he would then necessarily have seen the edge of the saucer if the object had had one. Each tapered end would have looked as if it were bisected almost horizontally, the upper part being slightly larger than the lower. But during the thirty seconds that his observation lasted, he saw nothing of this kind.

3. His description of the stream of white particles confirms the results of this calculation: the luminous jet spurted out *under* the left-hand pointed end, and its light was insufficient to enable him to get a better idea of the shape of the object. If it had been saucer-shaped, there would have been a reflection on the lower surface.

4. If we admit that he actually saw what he saw, then we must also accept the deductions of other sightings. And there is no case where a saucer-shaped object took off like lightning without the "see-saw movement"; the behavior of the cigars, which appear much less frequently, is not so well known.

All these considerations point to the fact that the object was indeed cigar-shaped. And at any rate, they are based entirely on the evidence given by the customs official, and he himself insisted that he felt certain of only a few of his statements. For all practical purposes he saw neither the upper nor the lower part of the object. He could follow the curve of its outline for only a yard at most, at each end. If he estimated that the object was one yard high, it was only because the top edge of the windows was a yard above the ground. All we can say, therefore, is that nothing proves the machine was saucer-shaped, and much of the information suggests that it was not.

5. The "windows." It is highly probable that these "windows" were something far more mysterious, something that had nothing to do with M. Gachignard's anthropomorphic explanation. The strange throbbing light, with its greenish, bluish, milky reflections, certainly stirs the imagi-

nation, but perhaps the task of explaining it should be left to the science-fiction writers.

The shape of the windows and their arrangement also present a problem. M. Gachignard saw them as "square or rectangular," and M. Latappy drew them exactly as they were seen, according to the witness. But how are we to understand about perspective? How can we apply these surfaces bounded by straight lines to a curved body? We cannot see any answer.

From the geometrical point of view, the most likely position for the windows is the one least likely to be thought of when studying the drawing: that is, flat on the object, the windows being horizontal and looking toward the sky. We must not forget that M. Gachignard saw the machine, which was only three feet high, *from above*. He stresses the fact that the upper edge of the windows coincided with the upper curve of the object, so that the windows must have been at the top and not at the side.

If we refer to Plantier's theory, this position would imply that the "windows" were really the engine, or, more specifically, the generators of the vertical field of force, which insure the equilibrium of the machine in relation to gravity.

The fact that the witness did not notice any appreciable change of brightness would be consistent with the observed movements of the machine; from the beginning of the sighting to its end, the altitude of the object did not vary by more than a few dozen yards, which means that the generators of the vertical field were contending with a practically constant pull of gravity.

And the motive power? Normally, the Plantier theory would call for some kind of luminous phenomenon in the direction of the course flown. There was, of course, the stream of sparks, but we cannot derive much information from that phenomenon.

6. The noises. The dull sound heard when the machine landed is curious. From the observer's description, it seems to have been something like the noise made when a big dictionary is suddenly shut, but louder, of course, since it was heard clearly 100 yards away. How could such a noise be produced by two metallic bodies coming in con-

tact? But if we accept Plantier's theory, there is a very simple explanation.

Remember that the machine landed on a "grillwork runway"—a runway made of strips of metal, which the American army laid down, after the war, on airports all over the world—consisting of perforated plates simply laid side by side on the ground. When the aircraft, flying at 150 miles an hour, came down to within a few inches of these plates, one or two of them must have been caught up in the field of force, lifted off the ground, and dropped down again at the exact moment when the object stopped.

To explain the swishing noise we should have to know a great deal more than we do now.

Such are the assumptions that we can make if we accept the customs official's account in its entirety. But are we justified in doing so? Can we believe this extraordinary tale? That is another matter. Once again, there is not a scrap of proof. The Marignane case is of interest only to those who are convinced, for other reasons, of the existence of flying saucers, and seek enlightenment on the subject wherever it may be found. The converted will treat my analysis as material for their own speculations. Others will regard it as a flight of fancy, and I cannot blame them.

THE CHÂLONS SAUCER

As it is necessary to make a choice among the very numerous sightings recorded, I will limit myself to two other cases, before passing on to those whose performance was presented in the skies over Paris.

At about 9:20 in the evening of November 14th, 1953, Mme. Raymond Poreaux, of 39, avenue de Strasbourg, Châlons-sur-Marne, was closing the shutters when—but I will let her speak for herself.

"... I caught sight of an extraordinary object, round, pale green, which was slowly moving across a clear starry sky. It was about the size of the full moon and it sparkled, especially at the back (by the back, I mean with relation to the direction of its travel). Its color varied like a glowworm's. It glided across the sky from north to south,

and sank down towards the horizon, where it disappeared from my sight. There was no sound. I was particularly struck by its strange color. The window from which I could see this object faces northeast, looking out over a large garden, so that quite a large expanse of sky is visible from it."

Mme. Poreaux then did what all observers of such phenomena ought to do: she reported her experience to the *Météorologie Nationale*, which duly stated:

1. That no unusual phenomenon had been reported by its nearest station;
2. That there had been no wind that evening at Châlons-sur-Marne.
3. That therefore the object in question was probably not a weather balloon illuminated from inside.

Notice that *Météorologie Nationale* was not required to give any opinion as to the reality of the object. Its reply simply meant, "If you saw the phenomenon you describe, it was probably not a weather balloon."

As it happens, on November 16th the local newspaper, *L'Union républicaine de la Marne*, published reports of the same object from two other residents of the city, Mme. and M. Rondeaux, who live in the rue de Jéricho.

About 9:15 p.m. on November 14th these witnesses were on the bridge that crosses the canal when they saw an object "flying at a moderate altitude" and approaching from the direction of Paris. It was elliptical in shape, and dark red, but it was followed by a huge triangular train the color of verdigris. It disappeared in the direction of Sainte-Menehould.

Certain differences between these two observations will be noticed. The first concerns the reported directions. Mme. Poreaux says the object was moving from north to south; the other two witnesses say "from Paris towards Saine-Menhould," that is, practically from west to east. The window from which Mme. Poreaux watched the object faced northeast, and as she saw it disappear on the

horizon, we must admit that the two witnesses on the bridge gave a more exact estimate of the direction.

The second difference is more characteristic. The object did not appear elliptical and dark red to Mme. Poreaux. There is a simple explanation, if we consider the differences in time and the orientation of her window. We must remember that the two people on the bridge gave the time as 9:15 and Mme. Poreaux as 9:20. The first two must therefore have seen the object first—they saw it approaching; Mme. Poreaux, whose window faces away from Paris, only saw it receding and disappearing. M. and Mme. Rondeaux therefore saw only the front of the phenomenon, while Mme. Poreaux saw only the "huge trail the color of verdigris," the elliptical object being hidden behind it.

This assumption seems to be confirmed by one more discrepancy, the different shapes attributed to the phenomenon. Mme. and M. Rondeaux say a *triangular* trail, and Mme. Poreaux a round object, which suggests that Mme. Poreaux somehow noticed some sort of cone on the top.

All this gives us a clear enough idea of the phenomenon observed at Châlons: a reddish and elliptical object, of the kind to which we are becoming accustomed, and behind it the luminous trail characteristic of the high speeds in other sightings. The reduced angular speed indicates that the object was huge and was travelling at a very high altitude. From her own private inquiries in Châlons during the next few days, the laudably inquisitive Mme. Poreaux obtained striking confirmation of this. She learned that several people coming out of the railroad station at Châlons at 9:16 p.m. *had seen the object motionless*. It was then round, dark red in color, and without its trail.

THE LUMINOUS GLOBES OF LAGNY (SEINE-ET-MARNE)

This sighting is interesting because it seems to be a link between the sightings at Beirut and at Villacoublay. The witness, M. Perez, is an engineer in the department of bridges and highways. He does not believe in flying saucers, and describes what he saw as "a phenomenon still unexplained." Here is his story.

"On December 10th, 1953, at 11:35 a.m., I was in my study at 11, rue de Metz, in Lagny, talking to three of my colleagues; I was looking out of the window towards the east when I saw four luminous masses of spherical shape, very brilliant but with sharp outlines, which followed each other like beads on a string. They were descending from the zenith to the horizon at immense speed, almost vertically, like falling rocket sticks. Their color was green with a touch of blue—very pretty.

"I did not think that they were really falling, but rather that they were on a course from west to east. It was 11:35 by my watch.

"I opened the window at once, but I heard no unusual sound, and saw no planes. The sky was foggy, with a ceiling of about 600 feet. I imagine that I saw the phenomenon through the fog, as otherwise the objects would have been much too brilliant for me to distinguish their shape."

The behavior of the four Lagny globes reminds us of the twelve objects seen at Beirut. In both cases there was the same straight course from zenith to horizon, and the same pattern like beads on a string.

As to the differences between Lagny and Beirut, these are extremely interesting.

The angular velocity observed at Lagny was definitely greater. At Beirut the distance from zenith to horizon was traversed in three minutes, whereas the four objects at Lagny had already disappeared by the time M. Perez opened the window; that is, hardly more than a few seconds after they had appeared.

Then, although the circular shape is the same, the colors are different: orange-red preceded by a faint blue arc at Beirut, green with a distinct blue spot at Lagny.

The comparison of speeds and colors confirms a rule that we have already mentioned in connection with "Operation Mainbrace": there is some relationship between the speeds and the energy of the radiation emitted. Beirut's red has become green at Lagny, and the faint blue which was barely noticeable at Beirut is now visible even through fog.

As a matter of fact, from the point of view of mechanics

the change of color is no doubt associated, in a fluid medium like our atmosphere, not exactly with speed or acceleration but with the energy developed at each instant by the power source of the machine. The brief sighting at Lagny thus indicates that the objects were travelling either at great speed and high altitude or at a lower speed at a low altitude. In either case the air resistance would be very great and the energy developed by the motors would have to be considerable.

Everything points to this connection between energies and color.

SAUCERS OVER PARIS

We will complete this rapid survey of a few particularly good sightings in France with two incidents in the skies of the capital. They belong to the summer of 1952, which was so rich in unexplained celestial phenomena, and they are among the cases where the lack of an official investigating body is most to be regretted. This is particularly true of the Villacoublay sighting, almost as sensational as the Ouallen affair, which offered astronomers an opportunity to make an official statement regarding the flying saucers. Unfortunately, once again the opportunity was missed. But missed by a narrow margin, which encourages the hope that when the phenomena recur, that decisive meeting between a saucer and the optical field of a telescope and of a spectrograph will finally take place.

THE LE BOURGET SAUCER

The first observation took place on June 12th and 13th, 1952. At 3:30 p.m. (G.M.T.) Jean-Paul Nahon, manager of a textile firm in the Boulevard Haussmann, had just finished lunch beside the open window of his living room, on the fourth floor at 100, rue de Lamarck. The sky was very blue, and the view, beyond the big gas tanks at St. Denis, extended as far as Ecoeu and Luzarches.

A STRANGE VISITOR

M. Nahon was absent-mindedly watching the sky when his attention was suddenly caught by a brilliant and motionless spot of light, immediately above the gas tanks at an elevation of 30 or 40 degrees, in the northeast sky.

His curiosity aroused, he went to look for his binoculars, and could then observe at leisure "a silvery body looking like a vast rectangular sheet of zinc with its corners clipped," that is, more or less elliptical. The object remained stationary for a moment, in a slightly inclined plane, and then began to move in a series of jerks—to the right, then to the left, then up, then down. These movements were extremely violent, the object accelerating and stopping almost instantaneously.

These maneuvers seemed to have brought the machine closer. M. Nahon's wife and the charwoman also had a look through the binoculars. Mme. Nahon mentioned that a kind of red aureole or halo surrounded it, a detail confirmed by the other witnesses.

M. Nahon said later that he then wanted to have independent corroboration, and he asked a neighbor to come and look at the phenomenon from the window, first with the naked eye and then through the binoculars. All four of them followed the maneuvers of the machine for twenty minutes. These movements were fantastic: violent ascents, *too swift to be followed with the glasses*, followed by gentle descents. The last of these descents was of the "fluttering dead leaf" type; then the machine swung to and fro like a pendulum for a moment, and "darted off obliquely and disappeared."

M. Nahon then telephoned the control tower at Le Bourget to report what he had seen. It had seemed to him that the machine was interested in the airport. But he was too late; Le Bourget had seen nothing.

THE RETURN AT NIGHT

Night fell and the sky became overcast. About one o'clock in the morning the duty officer at the control tower of Le Bourget was M. Veillot. His colleague, M. Damiens, was with him. His story is as follows.

"The sky was five-eighths overcast at 3,500 feet and completely at 10,000 feet. To the southwest, about 30 degrees above the horizon, I suddenly saw a red ball motionless in the sky. It seemed to me about three times as bright as Venus at maximum. I watched it for about an

hour and during that time it didn't budge. Then the mail plane F.B.E.F.M. from Nice via Lyons reported in.

"Do you see that red ball on the horizon?" The pilot asked me, as he was getting ready to land.

"Of course—I've been watching it for the better part of an hour."

"While the pilot was getting the plane into the hangar the red ball suddenly began to move. It made off rather slowly, in a westerly direction. At the end of ten minutes it had disappeared.

"As the mail plane from Pau reported just then, I asked its pilot to circle the airfield again, to see whether there was any sign of a red ball in the sky. He did so, but saw nothing. The ball had really disappeared."

M. Veillot then made his report to the superintendent of Orly airport in these terms:

"On June 13th, 1952, at 1:00 a.m., the sky being overcast, a fireball larger than a star crossed the sky southwest of the airfield after remaining stationary for a long time. This phenomenon was observed by the mail plane F.B.E.F.M. from Nice and the pilot reported it to the control tower. The object disappeared on the horizon, glowing brightly and accelerating fast.

"I have also to report that during the day on June 12, at 1:45 p.m., a woman twice telephoned from Montmartre to report to the control tower the presence of a 'silvery disc to the north of Paris.'"

WHAT THE PILOT SAW

The afternoon object had been under observation by four witnesses for twenty minutes, while the night object had been watched for almost an hour by two witnesses in the control tower, and for nearly half an hour by M. Navarri, pilot of the mail plane from Nice. M. Navarri, a man of steady nerves and wide experience of the night sky, corroborated the identical statements of MM. Veillot and Damiens except on one detail, incidentally an interesting one.

"It was while I was flying towards Le Bourget," said M.

Navarri, "that I saw a light in the sky above the horizon. It was far bigger than Venus, and orange-red in color. At that moment I was between Sens and Montereau, therefore I had it in view for nearly half an hour. Just as I was about to land, the ball moved off by about 70 degrees towards the southwest.

"I got the impression that it was avoiding a storm area which was spreading in the east. It could not have been a weather balloon, because the wind was blowing from the west; the ball was therefore retreating against the wind. The pilot of the plane from Pau could not have seen it because it had already moved off when he reached the airfield. It was behind him.¹ I should add that I myself did not notice any intensified luminosity when the ball began to move."

NO EXPLANATION

On February 5th, 1953, there was a debate on the subject of flying saucers at the Aero Club of France. M. Veillot appeared before an audience which included such distinguished persons as M. Audouin Dollfus, an astronomer at Meudon Observatory; Chief Engineer Decker, head of the Special Devices Section—and therefore in charge of French research on guided missiles; Roger Clause, head of the Information Service of the Météorologie Nationale; M. Giraud, manager of a commercial airfield; and Colonel Gallois of the G.H.Q. of the French Air Force.

Veillot told them what he had seen on the 13th of June; but he found himself something of a Daniel in the lions' den. Colonel Gallois, foreman of the jury, had an easy task in overwhelming the unfortunate witness with his knowledge of astronomy, not without a few eloquent passages in which he cheerfully exposed his own ignorance on the subject of saucers (he asserted, for example, that the only witness in the Mantell case was Mantell himself). This staff officer may be well up on top-secret documents, but those released by Project Saucer seem to have escaped his notice.

¹ MM. Veillot and Damiens say that the object disappeared when the airplane from Pau arrived.

Though dazed by the erudition and witticisms of Colonel Gallois, M. Veillot insisted that he had really seen what he said he had seen, and emphasized that he was not the only one who saw it. The other members of the jury later admitted that they were very much impressed by his evidence. M. Roger Clausee rightly considered that, instead of making fun of the witness, it would have been better to look for an explanation; he himself suggested that the object might have been the effect of a cloud altimeter at work. But a few words with M. Veillot convinced him that this explanation did not square with the facts of the sighting; the light projected on a cloud by such an instrument can move only vertically; it cannot retreat toward the horizon. Moreover, it is ■ reflected light, while the red light seen at Le Bourget seemed too vivid to be only a reflection. Finally, M. Veillot was familiar with the cloud altimeter, and he was emphatic that what he saw could not have been produced by this instrument.¹

In short, the saucer of June 12th and 13th remained, and still remains, a mystery.²

INSTRUCTIVE DETAILS OF THE LE BOURGET SIGHTING

The Le Bourget saucer seems to have been created for the express purpose of proving that Lieutenant Plantier is right. All its motions, all the characteristics noted by the various witnesses, are in exact accord with his theory.

1. When M. Nahon first examined the object through his binoculars, it was stationary and slightly tilted. At first sight, this seems to contradict the Plantier theory, which says that when stationary the machine should be exactly level. But the slight tilt is really in conformity with the theory, as a fairly strong west wind was blowing that

¹ See "The False Nocturnal Saucers of the Meteorologists," Part III.

² Here again we have conflicting opinions from the scientists: Professor Rigollet of the Institute of Astrophysics, thought that this saucer was nothing but the planet Mars. M. Audouin Dollfus of the Meudon Observatory thought it could not be Mars. Perhaps a reflection . . . ?

afternoon. To counteract the force of the wind, the object was inclined toward the west, i.e., towards M. Nahon and towards the left.

2. The luminosity postulated by Plantier was noticed in daylight by four witnesses, using binoculars, as a faint red halo encircling the object. At night this red glow alone was seen, as in numerous other sightings.

3. The maneuvers described by M. Nahon—the movement by jerks, the pendulum swing, the falling-leaf effect—are absolutely typical. They are what must be expected of a machine under the influence of a local field of force, and they are the movements which Plantier predicted.

4. The departure, M. Veillot reported, was accompanied by an intense glow—an inevitable feature, says Plantier, because the violent increase in the intensity of the field of force necessarily causes a luminous ionization at the rear of the machine.

The pilot of the mail plane, however, did not see this glow. The explanation is simple. Considering the relative positions of the object, the mail plane, and the control tower, and the direction in which the machine departed, it is plain that M. Navarri and M. Veillot could not have seen the same part of the machine at the same time. M. Veillot must have seen it from behind at the moment when it began to leave, while M. Navarri, in the plane, saw it from the front, sharply tilted (the tilt must have been very marked, because he saw it on his left). The two contradictory statements thus provide striking support for the theory that such a machine would oscillate.

5. To understand the evidence of M. Veillot and M. Navarri properly, we must see what we can do with the figures they give.

Suppose we start with the fact that the sky was five-eighths overcast at 3,500 feet and that the clouds were moving eastward. As M. Veillot never lost sight of the object for an hour, without interruption, it must have remained at an altitude of less than 3,500 feet, otherwise the clouds would have hidden it for five-eighths of the time of observation.

Next we must remember that the object was observed for an hour at an angle of 30 to 40 degrees above the horizon. From these two figures (altitude 3,000 to 3,500

feet, angular elevation 30 to 40 degrees) it necessarily follows that the object was at a distance of not less than 5,000 and not more than 6,500 feet from the control tower. In other words, it was quite close. Both the pilot and the control tower men agree that the object began to leave as the plane was coming in to land; at that moment, therefore, the plane was farther from the tower than the object itself was. At a distance of several hundred yards, perhaps half a mile to the left of the plane, the object, suddenly oscillating, must have shown its front edge to M. Navarri and its rear edge to the control tower.

There is nothing theoretical or imaginary in all this. My deductions are inherent in the reported evidence. The fact is that the witnesses, accustomed to estimating distances by guesswork, were unable to form an idea of how far away the object was, merely by reference to its appearance. Thinking that their own judgment was close to infallible, they were led to believe that the incident took place much farther away than it did.

The truth is that the Le Bourget saucer came quite close to the airport and stayed there for at least an hour that night, in addition to its visit on the previous day.

6. One further inference must also be drawn from the proximity of the saucer—that it was only a small one. When M. Nahon spoke of a “huge” sheet of zinc it was because he too, in the absence of anything near the machine to compare it with, overestimated its distance. There is nothing surprising about that. The real distance of an isolated object can be estimated only if its actual size is known. Who knows the actual size of flying saucers?

In this case, through unusual good fortune, the precision of the observations enables us to estimate the order of magnitude of the object's dimensions: hardly more than a few yards.

THE VILLACOUBLAY PHENOMENA

Two and a half months later, on August 29, 1952, the meteorological station at Villacoublay recorded a series of happenings whose remarkable conclusion furnished an argument for the champions of the extra-terrestrial origin of

flying saucers. Here is the military report, with all its dry and precise eloquence.

"I. About 7:30 p.m. (Universal Time) Michel T—— and I were engaged in conversation near the meteorological station at Villacoublay and observing the appearance of the first stars in a cloudless sky.

"Our attention was suddenly attracted by the emergence, sector east, of a bright light of a markedly blue color. This light was travelling on an irregular course and proceeding by jerks. Its speed did not appear to be very high.

"Puzzled, we turned the station theodolite on it, and notified the other men on duty (Cadet D——, Corporal N——, Corporal H—— and Private D——). It was then 7:50 p.m.

"The bright light was still on the move, though a little more slowly, apparently on a southeast-northwest course. In the theodolite it looked like a luminous bar, white-hot, edged with black and accompanied by two bluish trails perpendicular to the bar itself. These trails may have been due to distortion by the lenses of the theodolite.

"We kept it under continuous observation and noticed that the light maintained its southeast-northwest course until about 8:30 p.m., when it halted close to the zenith (elevation 77° , azimuth 109°). It remained till midnight, when observation was discontinued.

"Here are some of the recorded figures:

11:00 p.m.	Azimuth	92.5°	Elevation	64.0°
11:05 p.m.	"	91.1	"	62.3
11:10 p.m.	"	91.0	"	61.9

"Having reached this point, the light seemed to increase in altitude, its image contracting in the eye-piece of the theodolite. On defocussing the lens, we obtained a blurred image: a violet disc surrounded by circles of much brighter green. After 8 p.m. we also noted the presence of a bright green spot, contrasting vividly with the bright blue of the light.

"II. While all eyes were fixed on this light, Corporal

J—, who had just come in and so was unaware of what was happening, suddenly noticed the descent of a second light.

"This was a bright red light similar to an aircraft landing-light. Its apparent fall had now ceased. In the eye-piece of the theodolite this light appeared to be a perfect circle, whitish yellow in color, and accompanied by irregular trails which seemed to spurt out from the disc. Cadet D— said that they seemed to 'twist like a whiplash.'

"The object first appeared in the east and hung motionless for a few moments before streaking away eastward, its light becoming dimmer and leaving a diffused aureole, due, no doubt, to the presence of high cirrus, which was invisible at that hour of the night (9:45 p.m. U.T.).

"Two minutes later we plainly saw something again (azimuth 316° , elevation 6°), but this time the object's position had changed from east to southeast. Ultimately it appeared to come to rest against the background of the stars, *whose apparent motion it seemed to follow.*

"Here are some figures for the period from 10 to 10:35 p.m.:

10:10 p.m.	Azimuth	313.2°	Elevation	9.0°
10:13 p.m.	"	312.6	"	9.9
10:16 p.m.	"	312.4	"	10.0
10:25 p.m.	"	310.8	"	11.4
10:31 p.m.	"	309.4	"	12.8

"III. At 10:45 p.m. there appeared, sector northwest, a red and blue light which at first we took to be the blinking lights of an airliner.

"But this light, which was very bright, remained silent and motionless; then slowly began to move. Through the theodolite it looked like a spot of bright red, which changed to yellow and then to green.

"We broke off for a moment to pick up the position of the previous light, and when we looked for this one again we found that it had completely disappeared."

The final statement in the signed report is exasperating in the extreme:

"At 8:45 p.m. U.T. the Orly Meteorology Station, duly

notified, said that the information would be passed on to its observer.

"The observatory was also notified by telephone, but we were told that there was no one there."

This remarkable report, the fullest and most careful of all those with which I am familiar, was signed by Cadet D—, Corporals N—, J—, H— and I—, and Private D—.

COMPARISONS

It may be said that almost every element in the flying-saucer mystery since 1947 can be found in the Villacoublay incident, so fully and lucidly described. We have again the rocking motion and progression by jerks (as at Le Bourget, Gaillac, Oloron, Topcliffe, and in countless other sightings), the connection between velocity and color, the whirling trails "twisting like a whiplash," and so forth.

"WHIPLASH TRAILS"

The best sighting of these trails was in Belgium, nearly nine months later, toward the middle of May, 1953.

At 8:15 p.m. a large number of people in the Bouffioulx district of Hainault saw a flat, circular, shining object—the classic flying saucer—traversing the sky. It stopped abruptly, with an oscillating motion, for a few moments, presenting its fine shining surface, a perfect circle, to the witnesses. Then followed something almost unique in saucer history—an explosion, followed by a kind of vibration, as if a piece of sheet-iron were being shaken. While the machine remained rigid and sharply tilted, what looked like white threads detached themselves from it, began to float away, twisting "like whiplashes," then disintegrated as they fell. This lasted for a dozen seconds or so, after which the object made a lightning takeoff, levelled out, and rapidly disappeared.

M. Hermann Chermanne, a photographer on the staff of the newspaper *Le Peuple*, happened to be in the Blanche Borne quarter of Bouffioulx when the incident occurred. While the object was stationary he had time to take two excellent photographs, which confirm in every respect the observations of the many witnesses. Their story and the

photographs are in complete agreement with the Villacoublay reports, except that the Belgian spectators were much closer to the object. The two observations confirm each other and leave no doubt that something real was observed twice.

COLOR AND MOVEMENT

The third sighting at Villacoublay is an excellent illustration of the relation between color and movement. Look at the evidence.

1. "The light, which was very bright and had not moved, began to travel slowly without a sound." So much for the movement.
2. "Through the theodolite it looked like a spot of bright red, which changed to yellow and then to green." Red, yellow, green—the sequence inherent in the theory that color and the energy generated are linked.

True, the report says that the movement was slow, even when the color was green. But all the spectators were a long way off, since the disc's diameter was seen only in the theodolite. In addition, its actual speed must have been considerable, since in the time required to get another fix on it in the theodolite, it had disappeared.

MOVEMENT BY JERKS

This motion is a regular habit with saucers, and we have often noticed it, particularly in southern Sweden during Operation Mainbrace. One Swedish spectator conveyed his astonishment thus: "We could have said it was keeping time to jazz," it moved with such metronomic regularity.

Again comes the interesting relationship between color and movement. The saucer which travelled in jerks was blue; in principle, therefore, its speed was high. If it continued on an absolutely straight course one would imagine that it would soon have left for parts unknown, like the object in the third observation after it had turned green.

In the light of Plantier's theory, we are justified in

wondering whether these jerks are not a technique for travelling slowly without having to reduce the power of the propelling field of force, just as the "pendulum descent" allows the object to lose altitude simply by shifting the "eccentric spot."

If this is so, it might mean that to the hypothetical occupants of the machine there is some advantage in not altering the intensity of the field of force; or to put it another way, they like to use the steering-wheel rather than the accelerator. This consideration, together with the obvious relation between movement and color, ought surely to provide some future investigating authority with a clue.

THE STARRY BACKGROUND

But surely the most startling feature of the Villacoublay report is the concluding remark in the second observation:

"Ultimately, the object appeared to come to rest against the background of the stars, *whose apparent motion it seemed to follow.*"

The implication of these simple words did not escape the men who drew up the report. Somewhat alarmed, perhaps, they toned them down: "The object *appeared* to come to rest," and "*seemed* to conform." Or were they simply reluctant to believe the evidence of their own eyes? After all, that small light in the sky was only a small light. There was no sound, no thunder reverberated over the quiet town. And yet, if it is true that this tiny spot of light, barely visible among the stars, did indeed follow the motion of the firmament and not of the earth—that it remained in space at a point where all our geographical definitions are meaningless—that its own immobility was that of the nocturnal vault and not the deceptive immobility of the earth—if all this is true, then that night was not at all like any other. The little spot of light was the most extraordinary object that those young soldiers would ever see.

What did it really mean when the object assumed that fixed position in front of the stars? It meant that the object was resuming its freedom of motion with relation to the daily rotation of the earth. The machine saw Earth revol-

ing below, and had the whole starry firmament behind it. What was its altitude? We were at the point of knowing, but no one was on duty at the observatory, and when the meteorological station at Orly was notified, no one even bothered to take a look.

It is to be noted that the object was free from the rotation of the earth, but not from its movement in space. It was like a man following someone walking ahead of him (in this case the earth) and keeping in his shadow. The object sighted at Ouallen, on the other hand, rotated with the earth. At Villacoublay it took up its station with the stars, and let the earth go on rotating below.

It would be difficult to exaggerate the importance of the Villacoublay report, as it is careful, precise, and sensational.¹ It appears to me to raise a perfectly clear question: if the meteorological people at Villacoublay did not all go mad on August 27th, 1952 (and if the inhabitants of a little Belgian village did not follow their example nine months later) flying saucers undoubtedly do exist and have other-worldly powers, whether or not they are of other-worldly origin.

¹ It is published here for the first time. There is now no excuse for invoking mental aberration to explain the whiplash streamers of the Bouffioulx saucer.

PART THREE

EXPLANATIONS AND THEORIES

Professor Menzel's Theories

1

WHAT ARE FLYING saucers? Optical illusions? Real machines of mysterious origin which range our sky for some unknown purpose? If they actually exist, how are they propelled? These are the questions that will have to be answered.

PROFESSOR MENZEL

In the pages of this book I have had occasion to make a few uncomplimentary references to Dr. Donald H. Menzel, Professor of Astrophysics and Associate Director for Solar Research of Harvard University Observatory. This man of science, who deserves our respect for his vast erudition, and our affection for his friendly feeling toward France and for many of our scientists, has taken an attitude to the flying saucers which seems to me hardly consistent with ordinary common sense. He gives us his standpoint in the preface to his book *Flying Saucers*,¹ when he writes:

"I shall use the phrase 'true flying saucer' to refer to the twenty per cent that the Air Force lists as unexplained. And in this sense I have adopted the thesis that: flying saucers are real; people have seen them; they are not what people thought they saw."

We have seen before that Professor Menzel systematically ignores the most provocative evidence, or else deals

¹ Harvard University Press, Cambridge, Mass., 1953.

with it after eliminating anything in the reports which he thinks "improbable," i.e., which resists his determination to find an explanation for everything. With such a method, success is undoubtedly easy.

PROFESSOR MENZEL'S POSITIVE ACHIEVEMENT

In other respects, the scientific part of his book is obviously sound. He certainly explains many things which *could* be taken for saucers, by an observer determined to see one.

His favored explanation is based on the fact that the horizontal layers of air which form the atmosphere have different indices of refraction. At the end of the book he gives various calculations to prove the soundness of his deductions. There would be little point in reproducing these. They would convey nothing to the non-mathematician, and the mathematical reader may easily imagine their nature.

"ATTENDANT" SAUCERS

1. Take a bowl filled with water and throw a coin into it. If you look at the coin from a position immediately over it, you will see it in its true position.

2. Now move away and look at the coin from an angle. The ray of light from the coin no longer reaches your eye in a straight line but in a broken one—the break being at the surface of the water—and the coin will appear to be at a point where in fact it is not. On the other hand, at the point where it really is, you will see nothing. (Figure 1.)

3. Now take a flat-bottomed glass and use it as shown in Figure 2, that is, not vertically above the coin, but so that the direction in which you are looking is exactly perpendicular to the bottom of the glass. You will probably be surprised to see two coins: one through the bottom of the glass, and the other through the water.

Figure 3, after Menzel, illustrates the situation he imagines as existing: it will be seen that the bulge in the cold-air layer fulfils the same function as the glass in Figure 2.

According to Professor Menzel, this experiment explains the flying saucers seen maneuvering around the guided

Figure 1. Effect of refraction: light rays from O to the eye are bent as they leave the water, so that O appears to be at O'.

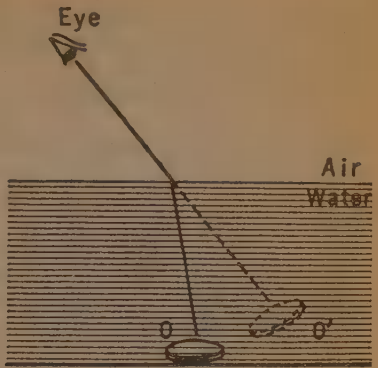


Figure 2. The ray through the tilted glass is not bent, since it leaves the water perpendicularly. Thus O can now be seen both at O and O'.

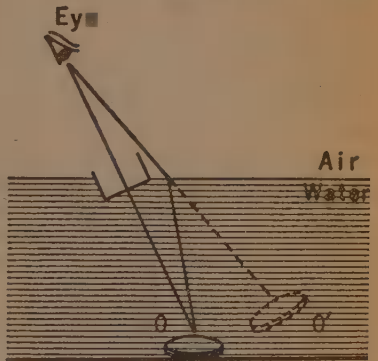
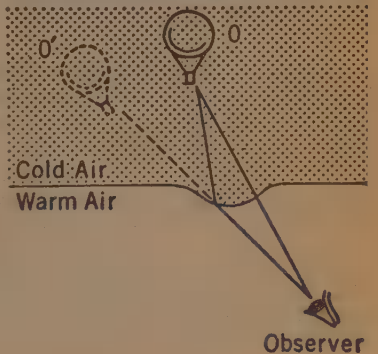


Figure 3. Menzel's proposed "explanation" for saucers near balloons: double image produced by bulge in cold-air layer. (Identical in principle to Fig. 2.)



missiles at White Sands and the "Operation Skyhook" balloons sent up by the American Navy at Minneapolis for the study of cosmic rays.

In reality, says Professor Menzel, the "attendant saucer" is simply the missile or the balloon itself, seen in two places at once because the rays of light have reached the witnesses' eyes by two separate routes.

OBJECTIONS

How far are we to accept this explanation? On paper it is most attractive, and I do not deny that it could conceivably account for the phenomena observed. But I must stress how difficult it is to imagine that all the physical conditions necessary to its operation could be simultaneously present in the atmosphere. Note the following:

1. As I have already pointed out, the movement of the phenomenon when accompanying a balloon should be very different from what it is when accompanying a projectile—slow in the first case, fast in the second. Yet we have never heard of any such difference.

2 Let us look at the case of the missile a little more closely. It rises at an enormous speed. In order that there should be two images of the same missile, the atmospheric prism would have to be very small¹ and very sharply defined: it must occupy only a few dozen cubic yards of air. The difference between the temperature of the air in the prism and that of the surrounding air must be between 10 and 20 degrees, and the contact surfaces between the two volumes of air must be properly oriented.

Moreover, for the saucer to appear to be revolving round the missile, the relative geometrical positions of the prism, the missile, and the observer on the ground must be very complex: unless—which is even more difficult to imagine—the prism of air moves very rapidly without changing shape, by maneuvering in such a way as to

¹ Very small, so as to produce two images of the projectile, rather than a single displaced one. There must always be the possibility of the rays from the projectile reaching the eye by two different paths.

preserve the illusion; or unless, without moving, it changes shape in record time, always in a manner calculated to mislead the observer; or unless the missile in some miraculous way makes all these requirements unnecessary by its own movements.

3. Menzel has calculated that, if all these conditions were satisfied, one could expect displacements of the apparent object from the real one amounting to as much as a quarter of a degree, or nearly half the diameter of the sun. He considers that this angle (and the illusion) could be increased by the effect of mirage or the presence of small ice crystals in the prism. This is not impossible. But here is the most serious defect of his explanation: the "attendant" saucer could only be seen from one point on the ground. Under no circumstances could observers more than a few yards apart enjoy the same illusion. Unless, of course, we can imagine a series of prisms arranged with such diabolical cunning as to deceive everybody—in which case it would be advisable to exorcise the sky above White Sands, or to organize pilgrimages there, like those to Dr. Tombaugh's house.

4. Nor is this all. Professor Menzel, unquestionably more ambitious than prudent, invokes not only atmospheric prisms, but atmospheric lenses as well. Of course it is not impossible for turbulent air at the interface between two atmospheric layers of different temperature to produce a lens. Nor is it mathematically impossible for such turbulence to preserve for a few seconds the geometrical shape and focal length of the lens. It is not even impossible for that focal length to be the same which is mathematically essential to produce the observed illusion. It is possible that all these conditions, and a few more, should be present at the same time. But in what terms should we describe so marvellous a concatenation of circumstances?

In short, Professor Menzel's explanation by atmospheric lenses and prisms is extremely interesting. Nothing I have said should be regarded as an attempt to refute his views. I have simply indicated some of the difficulties which suggest themselves when one tries to reconstruct the phenomenon described by the Harvard professor. I could

mention others, but there is no need, as they are all of the same kind: they arise when one tries to account for the *details* of the observations.

For one of the sightings at White Sands in particular, Commander McLaughlin gave precise data: circular shape, a diameter of 100 feet, appearance, speeds, behavior, etc. To explain the phenomenon, must we begin by rejecting the observations?

MIRAGES

The mirage phenomenon, which Menzel is so fond of invoking to explain saucer observations, has always been well known to desert travellers. And since the era of paved roads, it can be observed on any hot summer day even in temperate countries, appearing like distant puddles of water on the hot asphalt surface. A mirage may be simple or complex; this one seen on the roads in summer is the simplest kind of all. How is it produced?

Figure 4 is a diagram of the situation. A layer of heated air overlies the road. This hot air, being expanded, is less dense than the cooler air above it; hence light travels through it at a higher velocity. Thus, when a ray of light passes through this air, the "warm-air side" of the ray will run ahead of its "cool-air side," and the ray will be curved toward the cooler air, rather than following the normal straight line.

The diagram on the opposite page (Figure 4) clearly illustrates the result; a ray of light from the sky is bent by the hot air, and rises again to reach the eye. Thus, the eye receives horizontal rays normally from the landscape; but from the road it receives rays *from the sky*. The blue sky seen on the road gives the impression of being a reflection in a sheet of water.

This explanation, which the mathematician Monge was the first to develop, accounts for the simple "inferior mirage" of roads and deserts. But there are other more complicated and deceptive types of mirage—for example, those produced by temperature inversion.

TEMPERATURE INVERSION AND ITS EFFECTS

As most people are aware, the temperature of the air falls with increasing altitude; on the average, it drops five

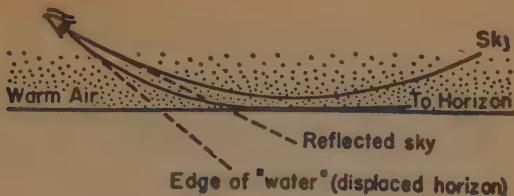


Figure 4. Mirage of sky in a layer of warm air below eye level: "inferior mirage".

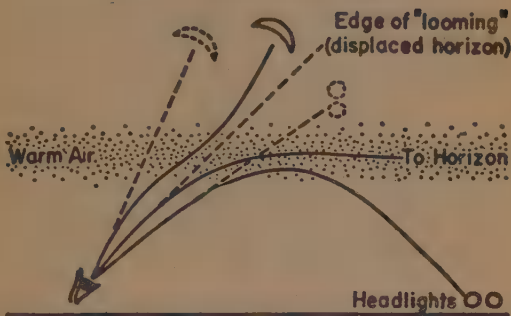


Figure 5. Mirage of ground in a layer of warm air (inversion layer) above eye level: "superior mirage".

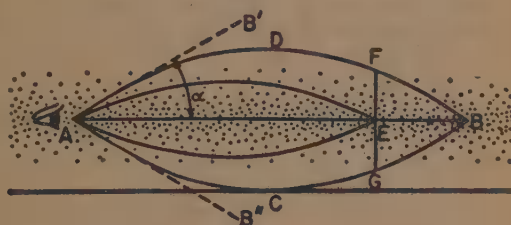


Figure 6. Menzel's diagram illustrating light-ray paths in a layer of cold air.

degrees with every thousand feet. This is why there is perpetual snow in the high mountains.

But it sometimes happens that the normal situation is temporarily reversed, and there is a layer of warmer air

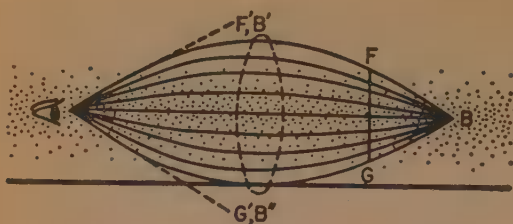


Figure 7. Light-ray paths giving the effect of a convex cylindrical lens: FEG is magnified. (This situation does not occur in reality.)

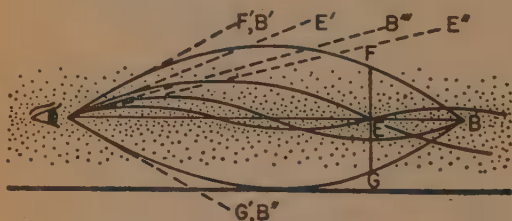


Figure 8. Some of the actual light-ray paths in a layer of cold air (*Fata Morgana* mirage).

above surface air which is cooler. This condition is called an "inversion." If the temperature difference is large, the layer of warm air will bend light and give rise to mirages in the same way as the layer of hot air on a road.

In this case, the mirage effect can be observed from *either side* of the refracting layer. For an observer above the layer, in an airplane, for instance, an image of the sun, a bright star, or an airplane light may appear *below* the plane, giving the impression of being not far above the ground. This is a simple "inferior mirage" similar to that on the road.

For an observer *below* the layer, the effect is even stranger. Here the rays are curved downward, and he will see, apparently floating in the sky, the "superior mirage"—an inverted image of objects on the ground. If at night, he will see *lights in the sky*: street lights, automobile headlights, or the illuminated windows of houses.

At first sight, this seems to be an excellent explanation for many cases of luminous "saucers" observed by night. But a closer consideration shows that the mirage explanation has serious limitations.

In the first place, a large temperature differential, on the order of 8° to 10° , is required to produce the mirage, and such a differential is decidedly uncommon. However, suppose that the necessary conditions are realized. Consider the observer in an airplane. When he sees the light of a star or an airplane below him, beneath the horizon, this means that in the region where he sees the light, he is really seeing a refracted image of the sky; it will be impossible for him to see the ground there, just as it is impossible to see through a mirror.

This means that an inversion effect of this sort is far more striking and unmistakable than one would realize from Menzel's description. An aerial observer will see, in effect, just what a driver sees on the hot road, or a Bedouin sees in the desert. He will appear to be flying toward a lake of still water, but a lake that flees before him at the speed of his own plane. To the best of my knowledge, this spectacle of the moving lake has very rarely been described by pilots.

What is required to produce a convincing illusion is an at least partially *transparent* mirror (like a sheet of glass) in order that its presence may go unsuspected. A mirage never furnishes this. If the temperature difference is too small, or the inversion layer too thin, the light passing through it is less strongly refracted; but the result is not that the "water" (the mirrored sky image) becomes diaphanous, but rather that its edge retreats toward the horizon and ceases to attract our attention.

It will not do, of course, to suggest that the refracting surface might be a small one, inconspicuous except that from the observer's position it happens to reflect Venus or an airplane's light. Since the observing aircraft is in motion, a localized mirage of this kind would be observable only for a fraction of a second.

In short, if the mirage is of large extent, it is recognizable, and if it is small, it does not explain the phenomena.

INVERSION EFFECTS AS SEEN FROM THE GROUND

The "superior mirage" seen by an observer below the warm-air layer is perhaps more deceptive, since it can show us, apparently in the sky, luminous objects that are really on the ground. But Menzel shows excessive optimism in thinking that an observer would attribute enormous velocities to these lights in the sky.

According to him, when the car in Figure 5 takes a turn, its headlights, traversing a wide angle in the sky, can produce a rapidly moving image. But this is an entirely different phenomenon, which should not be confused with a mirage: the projection of spots of light on a screen. We have all seen the luminous spots which searchlights project on the base of clouds, and which under some conditions might be mistaken for flying saucers by an incautious observer.

Whether automobile headlights can reasonably be expected to produce anything comparable (as Menzel suggests) is certainly questionable: they are incomparably weaker in power, and are hardly ever directed into the sky. The occurrence of a "screen" of sufficient reflecting power to give a visible spot from such a source (Menzel suggests dust and haze layers at the bottom of an inversion layer) must also be uncommon; and when it is added that this *highly reflective* screen must also be so *tenuous* that its presence is overlooked, we are surely justified in a certain scepticism! It is to be noted that Dr. Menzel *does not attempt to adduce a single instance* in which automobile headlights have been observed to produce light spots in the sky that might possibly have been mistaken, even for a moment, for flying saucers.

Setting aside this notion, and returning to the true mirage effects, what will be seen by the observer on the ground?

If the mirage is well-developed, he will see exactly what he would see if he could perceive the source (e.g., an automobile) directly: a pair of lights moving with an apparent slowness due to their distance. A house with lighted windows will be seen as a house in the sky—upside down, of course, and probably somewhat distorted. But note that *all the surrounding landscape* will also be mirrored in the sky—not only the lights in it, as Menzel seems

to suggest. As we have already stressed, a mirage is an *opaque* appearance, not a semi-transparent or a selective one. The observer after nightfall will perceive an enormous opaque "body" looming up from what is normally the horizon, but with a fluctuating edge—the greatly lifted and distorted horizon. This is the refracted image of the ground. Small lights, some slowly moving, will appear against the dark background. Only above the opaque edge (which corresponds to the edge of the "water" of the inferior mirage) will he be able to see the objects truly in the sky, such as the moon and the stars.

Why Menzel fails to make this situation clear in his book is difficult to understand. Figure 5 shows the paths of two rays, one from an object on the ground, another from an object in the sky, (e.g., the moon). The observer sees the automobile in the sky, but against its normal ground background. If the moon is actually in that position, he will not see it; he will see it instead in a displaced position, beyond the looming "horizon" of the mirage. (As the diagram shows, this ray traverses an S-shaped course, with an "inflection point" in the inversion layer.)

This is the phenomenon to which Menzel has recourse to explain the majority of flying saucers. Perhaps, if he had described its effects more fully, his explanation might have met with less success. Flying saucers, rare as they are, are not so rare as flying houses and fleeing lakes!

Another instance of incomplete analysis is seen in the last lines of the mathematical appendix of Menzel's book (p. 309), where he discusses in qualitative terms the mirage effects produced by a layer of cold air at the level of the observer's eye. I reproduce his diagram (Figure 6). It will be seen that we have here a superior mirage *above* the cold layer, with any objects in its plane apparently looming up into the sky, and an inferior mirage *below* it, with a "lake" in which these objects are reflected upside down. Menzel describes the effect in these words:

"The distribution of atmospheric density acts like a convex cylindrical lens. . . . Thus the line FEG will appear to subtend the angle $B' AB''$ ". The more distant the object, the greater the magnification. This apparent magnification of distant objects is very sensitive to the position of the

eye. A small shift can produce a very rapid change of apparent diameter, which the senses tend to interpret as rapid motion and high acceleration away from the observer."

Now, this is not correct: the atmospheric density distribution does not, as Menzel says, act as a convex lens (Figure 7). Instead, the rays to the eye will behave in the more complicated fashion shown in Figure 8. It is apparent that an object FEG will *not* simply be magnified and appear as F'EG' (as with a lens): its upper portion F'E' will appear raised and its lower portion E'G' lowered, but these will be separated by a zone containing a multiplicity of distorted and partial images, some erect and some inverted, produced by the rays which pass *through* the cold-air layer one or more times. The exact effect will depend on the distance and size of the object, but it is never a simple lens-like magnification. If the object is moving, it would take Walt Disney to give an idea of the appearances. Indeed, this type of mirage is famous as the rare *fata morgana*, which produces "castles in the air."¹ As to the likelihood of many flying saucer reports being explicable by *fata morgana* illusions, we may quote Minnaert: "A calm surface of water ten to twenty miles across is essential."

As with Menzel's other explanations, we see that he has given an account so oversimplified that the effects he indicates differ considerably from those that occur in actuality.

OTHER OPTICAL ILLUSIONS AND ERRORS OF INTERPRETATION

To my great regret, I must admit that I have never seen a flying saucer. Undoubtedly this fantastic phenomenon shows a certain coquettishness, preferring to manifest itself to the sceptics and the indifferent. But on two occasions, for just a few seconds, I thought its choice had fallen on

¹ Described and illustrated by M. Minnaert (*Light and Colour in the Open Air*, Dover Publications, N. Y., 1954), pp. 52-54. Minnaert makes the same error as Menzel in stating that a simple lens-like magnification will be produced.—AMER. EDS.

me. May I be permitted to recall these two shattered hopes. They are instructive, and far from unique.

One afternoon in October, 1952, I was out walking in the forest of Fontainebleau with Jacques Perrot, of *Télévision Française*, and his wife, when suddenly glancing up at the sky I saw a shining silvery object at about 60 degrees south-southeast, but too far away for me to make out its shape.

At first I thought it might be Venus, but at three in the afternoon Venus could not have been as bright as that. Moreover, the object was distinctly larger than a mere point. It appeared stationary, but in order to make sure of this, I sat down on the ground in a position from which it was exactly at the end of a leafless tree branch. I was thus able to observe that it was slowly ascending with an eastward drift.

I decided that the object must be the weather balloon which is sent up every day from the meteorological station at Trappes. Some time later this was confirmed when I inquired at the *Météorologie Nationale*.

Such balloons account for many alleged flying saucers.

Generally speaking, all reports which make no mention of violent acceleration should be regarded as quite unconvincing, unless there are specific details which suffice to refute the balloon theory (as at Villacoublay). On the other hand, complete and long-continued absence of movement relative to the earth, or especially relative to the celestial vault, is (in the daytime) a practically un-failing criterion of the true saucer.

On the second occasion when my hopes of seeing a flying saucer were disappointed, a true optical illusion was responsible. One evening in August, 1953, I was driving a car along the left bank of the Tiber at Rome, when suddenly a fine luminous saucer, elliptical, sharply defined—the saucer of my dreams, in short—entered my field of vision on the right at a tremendous speed, practically stopped in its tracks, drifted slowly over the *Janiculum*, and then shot ahead and disappeared.

Alas! a moment's thought showed me what my saucer really was: the window of the car was closed, and the first street lamp lit that evening had been reflected in it. If it

had been really dark my eye would not have been drawn to this fleeting vision. But a second before it appeared there was no light in the city save that of the setting sun. Nothing beyond simple combination of circumstances and the spells of Rome had been required to create so sensational an illusion.

We must always be on our guard against anything seen, or apparently seen, through glass. It was by superimposing reflections on a background that Méliès, the master of the trick-film, produced some of his most startling effects.

THE FALSE NOCTURNAL "SAUCERS" OF THE METEOROLOGISTS

Saucers share the sky with meteorologists, who do not hesitate for professional purposes to send up light signals which readily lend themselves to misinterpretation. Their object in doing so is usually to measure the altitude of clouds.

The first method is to release a lit-up balloon at night. As the rate at which the balloon ascends is known—300 feet per minute—all that is required for ascertaining the altitude is to ascertain the time between the release of the balloon and its disappearance in the layer of cloud.

The second method is to make use of what is known as a nephoscopic projector, a searchlight with a vertical beam which produces a spot of light on the base of the clouds. A bearing is taken on this spot at a known distance from the projector, and a simple trigonometrical calculation gives the altitude of the clouds. The projector is operated for only a minute or so at a time.

The third method is to ascertain the time taken by a flash projected vertically from the ground to reach a cloud and return by reflection. The pulse of light is so short that the reflection on the clouds is not visible to the naked eye; it is observed by means of a photo-electric cell.

The fourth and last method combines the continuous use of the nephoscopic projector with observation of the spot by a photo-electric cell. As the observation is continuous, the purplish glow of the lightspot is visible all night.

In short, as Roger Clausse pointed out in the debate on flying saucers at the Aéro Club, the meteorologists can be

held responsible for three kinds of nocturnal phenomena:

1. The illuminated balloon ascending at a rate of 300 feet per minute;
2. The luminous spot, visible for one minute only, produced by the nephoscopic projector;
3. The purplish spot last mentioned. It lasts all night, and rises and falls with the cloud layer.

PARHELIA (SUNDOGS)

Menzel has tried to explain certain saucer sightings as parhelia.

What is parheliion? It is well known that certain high-altitude clouds, the cirrus clouds, consist of a vast number of tiny ice crystals suspended in the atmosphere. These crystals have faces, and these crystal faces form prisms. Each time that a cirrus passes across the sun, a vast number of prisms refract its rays, which is why this interesting type of cloud is sometimes iridescent with all the colors of the rainbow.

The parheliion is also an effect of refraction in ice crystals, but one requiring that the crystals be oriented in a certain way. The result is a bright horizontal circle passing through the sun (the "parhelic circle," produced by reflection), which at certain points bears intense concentrations of light known as "mock suns" or "sundogs." This is a curious sight, because of its shape and its position in relation to the sun: instead of being in the center, as in the case of a halo the sun is embedded in a luminous ring nearly as broad as itself.

It can be demonstrated by geometry (and confirmed by observation) that there are two kinds of parhelia. The parheliion of 22 degrees, the most common, is a spot of light with a red edge on the side nearer to the sun. Menzel thinks that Mantell's saucer was such a mock sun, because of its red color. (But the object seen by Mantell displayed a blinking light.)

The other, known as the 46-degree parheliion, is extremely rare, and even more nebulous than the first. It can only be seen when the sun is below $30^{\circ} 12'$.

An unreal appearance, semi-transparency, and nebulousness characterize these phenomena. Menzel believes

that the Prophet Ezekiel's wheel was a display of parhelia. We must leave to the theologians the task of appraising this odd explanation.

SHOOTING STARS AND FIREBALLS

According to the English astronomer Newcomb, some 150 billion meteors annually penetrate the earth's atmosphere to an altitude of less than 75 miles. All can be seen by the naked eye—though only at night, of course! Quite a lot of potential "flying saucers."

But shooting stars and fireballs can easily be recognized. Man has been delighting in that streak of light piercing the night sky ever since he raised his eyes above the horizon and was capable of expressing a wish. But he has never seen a shooting star stop, accelerate, or change direction, without exploding. So we must have our doubts about brilliantly luminous "saucers" which travel in a straight line; for what is there to show that it was not a meteor?

But even if it is difficult to make this mistake, meteorites interest saucer enthusiasts for another reason—that, before 1803, official science regarded with utter disdain the idea of stones falling from the sky, a ridiculous myth spread by backward mentalities. One has only to hear the learned discussing flying saucers today to have a good idea of the fun their eighteenth-century predecessors had over "moon-stones."

But on April 26th, 1803, a huge bolide exploded over Laigle, in the Orne department, and the savants were able to pick up three thousand of these "myths" in one place alone. It was a revelation. Once science had decided to take them seriously, astronomers such as Biot, Laplace, and later Schiaparelli discovered a great deal of fascinating information about their composition, types, and so forth.

UNKNOWN NATURAL PHENOMENA?

*"There are more things in heaven and earth, Horatio,
Than are dreamt of in your philosophy."*

So said Hamlet, and he was right.

Very little is known about the upper atmosphere, and

what we do know is sometimes bewildering. For example, the temperature is about— 67° at 20 miles, but between 30 and 36 miles it reaches 160° . Higher up again it drops to less than— 25° at 50 miles but then rises sharply, reaching 200° at about 75 miles.

What is the cause of these thermal vagaries? What sort of phenomena can be expected in such conditions? No doubt White Sands or Colomb-Béchar have ideas on the subject, but here we are encroaching on matters of military security. The spies of the presumed enemy probably know all about these researches, but the common man is less favored.

THE AURORA BOREALIS

We know more about the aurora borealis, that scene out of fairyland which is staged at altitudes of between 50 and 600 miles. The great Swedish scientist Arrhenius explained its mechanism, and Professor Birkeland has even reproduced it in his laboratory. Should we look to its fantastic pyrotechnics for an explanation of some of the saucer sightings? Then why not the zodiacal light, to say nothing of the *novae* and *supernovae*?

The Mystery of the Saucers

2

THE SENSIBLE COURSE, in my opinion is to recognize that unexplained phenomena have been observed in the sky by thousands of people, or perhaps, by now, by tens of thousands.

These phenomena, which have hitherto resisted all at-

tempts at explanation, all present the same strange but definite characteristics, and it is those characteristics which constitute the inexplicable element. They are what Captain Clérouin and Lieutenant Plantier have called *the four mysteries of the saucers*: the mystery of their tremendous and repeated accelerations, apparently conflicting with the mechanical law of mass-ratios; the mystery of their resistance to the vast amount of heat which the friction of the machine against the surrounding air should generate; the mystery of their silence—no whistling sound, no supersonic boom; lastly, the mystery of their changes of shape.

THE LAW OF MASS-RATIOS

The law of mass-ratios, to which I have often referred in this book in discounting certain explanations of saucers, is the fundamental law of reaction propulsion. It must be studied in some detail if we are to understand the deep-seated reasons for the scepticism of so many scientists towards saucer sightings.

First of all, what is meant by reaction? Let us take a familiar example. Everyone knows that when a rifle is fired there is what we call the recoil, something which will dislocate your shoulder if the butt is not pressed firmly against it. But many people imagine that the recoil is due to the resistance of air to the bullet, while others think that it is the ejected gases which push against the air and force the gun back.

These two "explanations," so frequently heard, are without foundation. Or, to put it better, they are meaningless.

What really happens is that the bullet forces the gun back just as much as the gun forces the bullet forward. If the bullet goes one way the gun must go the other, and the bullet goes faster only because it is lighter. By Newton's third law, action and reaction are equal.

If a projectile as heavy as the gun took the place of the bullet, one could equally well put the bullet to one's shoulder and shoot away the gun. (This would be rather dangerous, but no more so than putting the gun to one's shoulder.)

This recoil is reaction. A reaction motor is an engine which utilizes the effect of recoil to propel a vehicle.

A simple example will show how a gun can be transformed into a motor. Suppose I seat myself in a small stationary cart and fire a rifle in a backward direction. The recoil of the rifle thrusts me back, and the cart with me. It thus drives the cart forward. If I immediately fire again, the impulse of the second shot is added to that of the first, and the speed of the cart increases.

Now if I substitute a loaded machine gun for the rifle, and fire off the whole belt, the cart will rapidly gain speed as a result of the successive recoils, and *the machine gun becomes a motor engine*. If I want to increase the speed of the cart, I must go on firing belt after belt and use up large quantities of bullets. The cart, relieved of their weight, becomes progressively lighter. If I continue this procedure for a long time, the cart will go faster and faster until it attains the muzzle velocity of the bullet—of course in the opposite direction.

It can be demonstrated mathematically (and confirmed by observation) that, when the cart has attained this speed, it will be about $1/2.72$ times as heavy as when it began to move. The technical expression is that the mass-ratio will be 2.72.

The mass-ratio at any given moment is thus the ratio between the original mass of the vehicle and its mass at that moment.

GENERAL APPLICATION OF THE MASS-RATIO LAW

The law of mass-ratios in the realm of pure reaction propulsion (i.e., rockets) admits of no qualification or exception. Consider a rocket which weighs 272 pounds before being fired and ejects gas backward at a velocity of one mile per second. To attain that velocity when traveling horizontally, it must eject enough gas to become $1/2.72$ times its original weight. When it reaches a speed of 1 mile per second it will weigh no more than 100 pounds.

Now suppose I want the velocity of the rocket to be twice that of the gas ejected? In this case calculation shows that it will attain that speed only after losing more than six-sevenths of its mass in ejected gas. It can be seen

that the progression is tremendous.¹ To travel three times as fast as the ejected gases, the rocket must eject all but 1/20.1 of its original mass; four times as fast, all but 1/54.6; and so on. To travel twenty times as fast as its exhaust gases, it would have to eject all but 1/492,000,000 of its original mass—which is as much as to say that nothing at all would remain.

Thus mechanics teaches that to give a mass of one pound a velocity of 20 miles per second, with gas ejected at 1 mile per second, a supply of gas amounting to 250,000 tons would be needed. In the present state of science, since reaction is the only conceivable method of escaping the gravitational pull of the earth, we can agree with Alexandre Ananoff that the mass-ratio law is "the nightmare of astronautics." To dispatch a camera, weighing a few pounds, to the moon by means of a rocket, reaction offers us nothing but machines weighing thousands of tons at the outset, costing enormous sums of money, and usable only once. Such are the fetters forced on us by the law of mass-ratios. The law operates *whenever there is acceleration*, or, of course, deceleration, so that a reaction engine is necessarily reduced after a short time to one-thousandth or one ten-thousandth of its initial mass. The pay-load of a rocket ship is practically nil.

RESISTANCE TO HEAT

Shooting stars and meteors are familiar to us all. They are chunks of stone or metal travelling in space which happened to encounter the earth. Before reaching the ground (if they do), they have to travel through the atmosphere; and as soon as they enter it, they pass in a split second from the icy coldness of interplanetary space to incandescent heat. This is because of the friction of the air, which is often sufficient to make them explode or disintegrate in a shower of sparks.

No body moving at high speeds through the atmosphere can escape this frictional heating. No known body could stand up to the heat produced, for example, by the

¹ It is a geometric progression in powers of Napier's number e , the base of natural logarithms: $e = 2.71828 \dots$

speed of the Draguignan-Montpellier "flying egg," or of the discs sighted at White Sands hurtling along at 20,000 miles per hour. There is a flagrant contradiction between the observed speeds of flying saucers and the best-established principles of fluid mechanics.

THE ABSENCE OF NOISE

Bullets whistle, shells whine, jet planes make an infernal din. When they "break the sound barrier" there is an explosion violent enough to break windows and bring down walls. All this is normal. It can be expressed in equation and even predicted by theory. We cannot imagine an object travelling fast through the air without making some sort of noise, any more than we can imagine a ship cleaving the waves and leaving no wake.

Yet saucers make no noise whatever. Apart from very rare exceptions (the Bouffoulx case is a noteworthy example), the saucers are absolutely silent. Here again, science and observation cannot be reconciled.

CHANGING SHAPES

No one can deny that there can be few sights more bewildering than an object which is spherical one moment, elliptical or lenticular the next, and which can assume either of these shapes according to its speed. A solid body is a solid body; if it is spherical, it is not lenticular. The great mathematician Henri Poincaré used to say that if there were no solid bodies there would be no arithmetic and no geometry. The flying saucer's disregard for shape is profoundly shocking to our science, based as it is upon arithmetic and geometry.

CAN THEY BE MANNED VESSELS?

One last question must be considered. If flying saucers really exist, how can they be piloted? It is no use ascribing mysterious and unknown qualities to life on other worlds than ours, and imagining that the saucer pilots (if they exist) literally have iron constitutions. The fact remains that life implies freedom, flexibility, and therefore fragility. How could living beings, however strange, endure the tremendous accelerations which have been observed? How

could even a complex automatic mechanism be subjected to their effects and not be shivered to fragments?

Such are the main reasons for the scepticism of scientists. They are based upon the soundest and best-established scientific truths, the results of the observation of nature over many centuries. It is easy to understand that if men of science have to choose between certainties which have stood the test of time and a few thousand fleeting visions, their attitude is apt to be sceptical. Prudence dictates such a course.

But is it certain that this choice is inescapable? I myself thought so until the day when Roger Clausee drew my attention to a striking article in *Forces Aériennes Françaises*, the official organ of the French Air Force. There, for the first time, a solution of the flying-saucer riddle was offered, a solution both simple, all-embracing, and revolutionary. The name of the author of the article was Lieutenant Plantier.

Lieutenant Plantier's Theory

3

THE STORY OF Lieutenant Plantier's intellectual adventure is a strange one.

A few years ago this young officer, one of the most brilliant minds in the new French Air Force, was suffering from boredom in one of those minor posts to which military discipline at first invariably condemns the men who were attracted to it. Intensely interested in everything pertaining to aviation, Lieutenant Plantier had devoured all the

technicalities of his field, particularly those relating to jet propulsion.

Sooner or later, he thought, men would make machines capable of escaping the earth's gravitation and propelling themselves through interplanetary space. That was what he must work for.

He soon discovered the disappointing character of rocket propulsion, with its intolerable mass-ratio law.

"If we must always be satisfied with rocket propulsion," he soon came to think, "perhaps rockets can be sent to the moon, but they will be appallingly heavy, expensive, and dangerous. It will be necessary to spend on a governmental scale—hundreds of billions of francs—just to send photographic apparatus around our satellite and back to us. Meagre results at enormous expense. Let us see if we can find something else."

BEYOND THE ROCKET

Here we see the young officer's intellectual integrity. In *Forces Aériennes Françaises* (September, 1953, p. 219) he tells us how his speculations began, and one can only congratulate him on his courage and good sense. Conscious that he lacked the material resources to carry out practical research (which ruled out experiment), but also that the absence of experiment might launch him on the sterile slopes of science fiction, he confined himself to the formulation of a few well-chosen hypotheses—unverifiable at the moment, but plausible and in no contradiction with anything now known. From these assumptions he proceeded to deduce a series of mathematically-entailed consequences, which soon led him to the conception of *the ideal interplanetary vessel*, the goal toward which all astronautical research should be directed.

This attitude of mind on his part, even if it yielded no immediate results, was perfectly logical. Sooner or later it will be possible to verify his basic hypotheses. When that day comes, there will be only two alternatives. They may prove to be unsound, in which case his work will have been wasted. This is a risk which he has accepted. Or they may be confirmed by experiment; and in that case, thanks to the quiet perseverance of an officer bored in the

colonies, the principle of the ideal interplanetary vessel will be ready to leave the filing cabinets of the French Air Force and to give rise to sensational applications.

What are these remarkable hypotheses? Briefly they are as follows:

1. There exists, distributed throughout space, an energy of as yet unknown form, which has not yet been detected by the physicists' instruments except in the guise of cosmic rays, whose "clicks" may be heard in the Wilson cloud chamber at the Palais de la Découverte.

"The existence of cosmic radiation lends weight to my hypothesis," writes Plantier (*loc. cit.*, p. 222). "These particles represent condensations of energy ranging up to . . . about 100,000 times the energy furnished by the hypothetical and unrealizable complete "evaporation" of a uranium nucleus. . . . Their existence presupposes an energy of fabulous magnitude: gigantic cyclotrons would be necessary to impart such energy to particles. Nothing has been found in space that can explain these mysterious bundles of power."

This then is Plantier's first assumption: that a hitherto-unknown form of energy is distributed in space in practically unlimited quantities.

2. A way exists to liberate this energy, by transforming it into energy of a more degraded kind, in the same way, for example, as the stroke of a hammer against an anvil transforms kinetic into thermal energy.

In the engine which will thus transform the cosmic energy, says Plantier, there will be a local difference of potential due to liberation or absorption. To illustrate what would take place here, Plantier compares his hypothetical machine to the Crookes radiometer, which turns simply because one side of its vanes absorbs light, being painted black, and the other reflects, it, being white. This is sufficient to set the wheel in rotation as soon as it is exposed to light.

3. Plantier's third hypothesis: the liberation of this cosmic energy makes it possible to create, at the point where it operates, ■ *local field of force that can be varied and directed at will*. This local field may be likened to the



Figure 9. Principle of Plantier's force field. The curved arrows symbolize the lines of force. The dotted ellipses represent the ellipsoidal surfaces of equal field intensity.

magnetic field existing in a solenoid, or between the poles of a magnet or of the earth itself.

Such are the hypotheses which were sufficient for Lt. Plantier to imagine the ideal interplanetary engine. Clearly, they are only hypotheses. Everything that they entail depends on their truth.

But, after all, only the first presents a problem. For it is almost certain that if the famous cosmic energy were actually to be revealed, we would eventually succeed in liberating it and in creating the motor postulated by the force-field of the third hypothesis. No long time passed between the discovery of nuclear energy and the explosion of the first atomic bomb.

PLANTIER'S IDEAL SPACESHIP

Having framed these hypotheses, Plantier undertook to see whether it was possible to envisage astronomical applications of the putative cosmic energy. To his surprise he found, not only that this was possible, but also that something fairly definite could be envisaged—not definite enough to satisfy a technician, but sufficiently so to carry the imagination a long way.

"It may be imagined," he writes, "that the engine utilizes a method of liberation analogous to that which, in nature, creates the primary cosmic rays. The resulting cosmic corpuscles would radiate through the engine in the direction of propulsion, in the form of a "corpusculo-undulatory" (particle-wave) fluid moving at a velocity close to that of light. One would thus have a sort of continuous cosmic jet traversing the engine. This jet emitted by the engine would follow it in its movements, propelling it, and supporting it when it was stationary, somewhat in the fashion of a ping-pong ball supported by a jet of water."

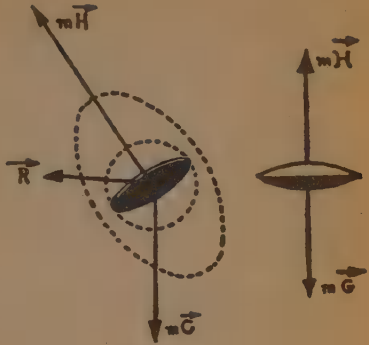
Plantier is careful to specify (in accordance with his third hypothesis) that this "cosmic jet" would not be a jet of artificial cosmic rays, but a force field (Figure 9). Reasoning by analogy with other known force fields, e.g., electromagnetic fields, he then defines the essential characteristics of his machine. The result is quite startling:

1. To attain its full efficiency, the machine should have the form of a disc perfectly symmetrical about its axis. (Plantier gives no proof of this in the brief exposition of his theory, but I dare say the reader with some acquaintance with mechanics will easily supply it for himself.)

2. Such a vessel would be able to move at the most terrifying speeds without noise, and to break the sound barrier without producing the "sonic boom." For the force field centered on the engine would also act on the surrounding air. The air molecules would be dragged along *at speeds proportional to their proximity to the engine*. As a result, whatever may be the real speed of the craft, its speed with respect to the nearest molecules will always be much less than the speed of sound; these molecules in their turn will travel more slowly than the engine, but more rapidly than the molecules of the next layer, and so on. Thus no *relative* supersonic speed will be observed, even if the engine is travelling at 20,000 miles per hour.

This reasoning seems perfectly logical: what causes the strident noise typical of supersonic aircraft, and the "boom" of the sound barrier, is their continuous impact against the *motionless* air. But according to Plantier's reasoning, the air is drawn along at a distance by the

Figure 10. Composition of forces at low speed and while hovering motionless. The vertical component of the field must be equal to the opposing gravitational field.



engine, so that there is never any shock, but a gliding upon one another of the successive layers.

3. For the same reason, the machine would be able to travel through the atmosphere at enormous speeds without overheating: the frictional heat, instead of being concentrated on the skin of the vessel, would be dispersed in the vast volume of air drawn along by the force field.

4. The most frightful accelerations would be, not merely tolerable, but actually imperceptible to passengers in such a craft. *The passengers themselves would be subject to the force field.* Consequently, since every atom of their bodies would be equally affected, they would perceive nothing whatever, and could calmly play chess while their vessel accelerated like a cannonball, or made 90-degree or 180-degree turns. For the chessmen too would be carried along by the field, like the aircraft and everything else in it.

Lieutenant Plantier had just reached this point in his deductions, when suddenly a wild idea crossed his mind—an idea which, I am sure, has occurred to the reader as well: his hypothetical engine, born of garrison boredom, his impossible engine existed, it had been seen, it was the flying saucer!

“I then undertook,” he tells us (*loc. cit.*, p. 223) “a careful study of the best-authenticated sightings, and discovered with ever-increasing astonishment that all of the supposed extravagances denounced by the saucer skeptics

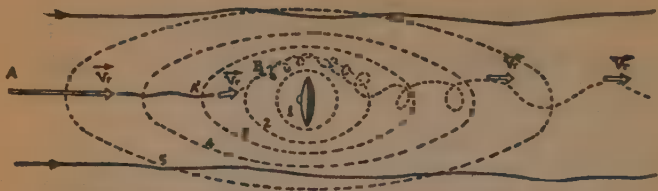


Figure 11. The field also moves the surrounding air, in proportion to its proximity to the engine, which explains the silence and the absence of shock waves.

were normal consequences of the propulsion system which I attributed to them. I was able to explain, for example, the *silence*, the *thermal resistance*, the *changes of shape*, the *maneuverability* . . .”

He did even better than this: “for I was able to *foresee* certain characteristics later confirmed by eyewitnesses, such as the off-centre spot and the turbulent cloud.”

We have just seen that this theory perfectly explains the silence, thermal resistance, and maneuverability. Let us see the other points.

CHANGE OF SHAPE

Imagine Plantier’s craft in flight. How will it behave? To remain motionless in the sky, it will have to direct the force field vertically, giving it an intensity exactly equal to that of the earth’s gravitational field, but in the opposite direction, i.e., directed upward. As seen from below, the machine will have exactly the aspect of the classical saucer, circular for observers directly beneath it and elliptical for others.

Now suppose that the craft wants to take off horizontally at top speed. First of all, during a fraction of a second, it will *tilt upward*, changing abruptly from the horizontal position to a sharply tilted position, so as to direct the force field in the desired direction. Simultaneously, *the field strength will be sharply increased* (inversely as the cosine of the angle of inclination) so as to sustain the altitude as well as producing the horizontal acceleration.

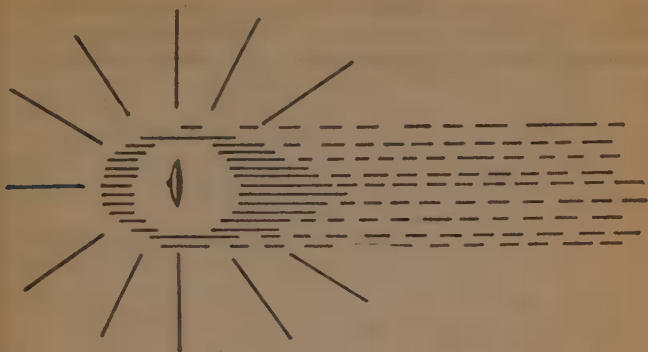


Figure 12. The mutual friction of the air layers, and their compression, can heat them to incandescence, which explains the luminous train at high velocities.

Now, Plantier here makes the pertinent observation that at the exit of the particle-accelerating machines used in nuclear research, a strong luminescence is produced by the particle-wave fluid "vomited" by the accelerator. Inasmuch as the violent increase in the engine's force field can only be obtained by an acceleration of this kind, one should expect that at the instant of take-off the machine will exhibit various luminous phenomena: changes of color, brilliant luminosity, etc. (Figure 15.) *And exactly this phenomenon is regularly reported in saucer observations.*

Moreover, the air adjacent to the engine should also undergo the luminous effects of the field, and should glow as a result of ionization. Here again Plantier makes what seems to be a justifiable comparison. "It is known," he writes, "that the American physicist Noël Scott has experimentally created orange balls in a rarefied atmosphere, simply by the application of a copper ring at high potential. He believes that he has thus demonstrated the natural electrostatic character of the phenomena. But has he not, rather, unintentionally confirmed an electrical or electromagnetic aspect of the propulsion of these machine, i.e., the presence of an extremely powerful field of force around the saucer?"

In any event, a strong ionization of the atmosphere surrounding the machine would provide justification for the adjectives such as "marvellous," "uncanny," etc., used by everyone who has described nocturnal observations: e.g., Chiles and Whitted, Combs, Tombaugh, and numerous French observers. Naturally, the aspect of the light, its brilliance and color, would vary according to the intensity of the field, i.e., according to the maneuvers of the machine (cf. the Bocaranga observation).

In short, Plantier's hypothesis perfectly accounts for the changes of appearance observed in flying saucers. His machine would change in color and brilliance at each application of the accelerator, the brake, or the rudder. And this is just what the eyewitnesses have reported.

THE OFF-CENTER SPOT

Here certainly is a detail impossible to invent, at least by witnesses who had never heard of it. How could a number of people independently invent something so apparently meaningless as a less-luminous spot moving about on the saucer at each "turn of the rudder"? Now Plantier not only explains this spot, but he predicted it in his machine *before it had been observed*. In the passage devoted to the orientation of the engine (*loc. cit.*, p. 238) he states that the change of orientation (i.e., of inclination) will be obtained by decentering the resultant of the force field. This would be accomplished by means of a movable screen, which would nullify or attenuate the effect of the field on the surface covered by it. Since the ionization effects would vary according to the field strength, the position of the screen would be *visible from the outside*—to ■■ observer on the ground, for example. The spot in question can be seen quite clearly on the photograph taken by M. Fregnale at Lake Chauvet. And we can predict that in all photographs of saucers one part of the object will be underexposed if the exposure is adjusted to its average luminosity: there will always be a dark shadow in the vicinity of the center.

THE TURBULENT CLOUD

"One of the strangest consequences of the force-field type of propulsion, according to my predictions, was the chance of seeing a small cloud form, in a cloudless sky,

Figure 13. The flying "cigar" can be constructed from two or more saucers. Its travel will necessarily be oblique to its axis, becoming horizontal only at high speeds. Observed most notably at Oloron and Gaillac, it was accompanied by the emission of the famous "angel hair."—Note that these cigars were more elongated than (for convenience) they are represented here, probably for the purpose of keeping dangerous radiation away from the central cabin. It should be recalled that "flying bananas" have also been observed. This would solve the problem without recourse to elongation but would preclude very high speeds in the atmosphere.

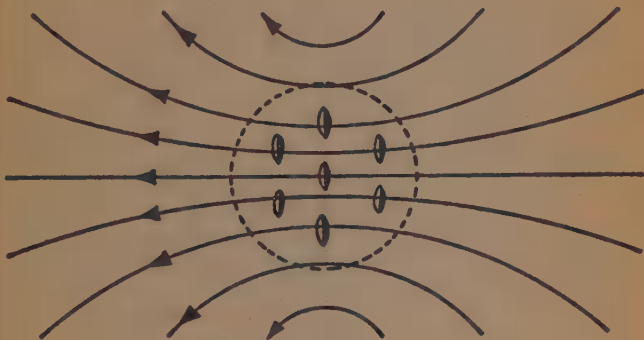
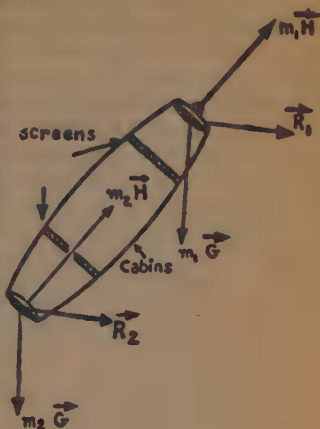


Figure 14. Alignment of lines of force in a group of machines. Equipotential surfaces exist (dotted line) and the same conclusions may be drawn in the case of a single machine.

above the machine when it hovers at low altitudes." (*Loc. cit.*, p. 234.) For the column of air affected by the field "weighs" little or nothing, and therefore will produce a rising current of air strong enough to lead to condensation. Plantier cites as example the experience of M. René

Saclé, Courçon-d'Aunis, Charente-Maritime, whose observation of Dec. 29, 1952 was reported in the newspapers of Jan. 3, 1953. While hunting snipe, this former Air Force pilot saw, with astonishment that can be imagined, a small cumulo-nimbus cloud rise vertically in a clear sky, then eject an indeterminate object which rapidly disappeared, leaving a white trail. This seems to indicate that the pilot of the machine voluntarily remained in the camouflage that he himself was creating by the action of his force field, until he was ready to take off again.

Another "turbulent cloud" that was especially well observed was the one described by the surveyor, Hall.

OTHER PECULIARITIES EXPLAINED OR PREDICTED BY PLANTIER

We have seen that Lieut. Plantier's hypothesis explains almost everything that had previously resisted explanation. I will mention here a few other mysteries that fall into

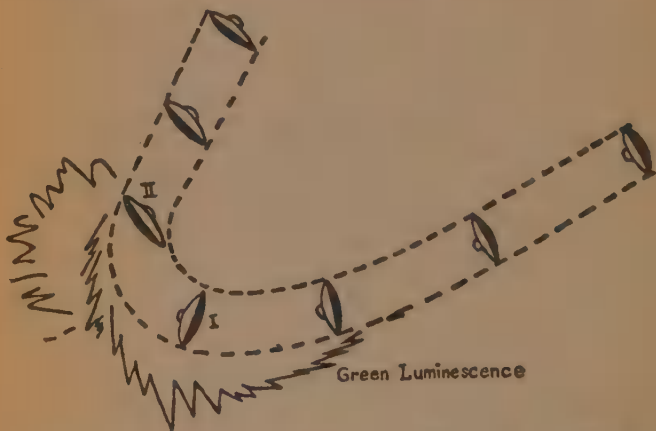


Figure 15. A right-angle turn. Between I and II, the pilot tilts the craft violently, to counteract centrifugal force by a corresponding effect of the force field. A green flame appears; this is merely a normal by-product of the drive, which is hidden by the reddish train in rectilinear flight. The inertia of the incandescent column of air that follows the engine can produce "flames" on the outside of the turn in spite of the action of the field.

place in his ingenious theory. His force field accounts for the green and red flames observed in very rapid turns.

One can also understand on this basis the "ball-of-light" appearance so frequently noted (Gorman, p. 68); the "falling-leaf" descent in maneuvers at slow speeds; and the machine's appearance in the form of a "flying egg" or an inverted mushroom at certain speeds.

Finally, the Plantier theory explains the zigzag movements, the bizarre maneuvers, and even the observation, perhaps the most marvellous record, of the famous "angels' hair" that was gathered in profusion from the fields, trees, and rooftops of Gaillac and Oloron in October 1952, after a whole formation of objects had passed over.

For, according to Plantier, the ionization of the atmosphere in the wake of the craft would be sufficient (because of the colossal intensity of the field) to produce ultra-heavy positive particles, which in contact with the molecules of oxygen, nitrogen, water, etc., of the surrounding air would exhibit novel chemical reactions. The product of these reactions—the famous angels' hair—would disintegrate as the ionization disappeared.

THE PLANTIER ENGINE AND INTERPLANETARY TRAVEL

It is clear that Plantier's force field, if it could be achieved, would completely solve the problem of space flight. In particular, it would furnish a very elegant solution to the difficulty presented by the danger of encountering one of the billions of meteorites that travel in space at lethal speeds.

The large meteorites, because of their size and their rarity, are not very dangerous. Being so large, they could be detected by radar at a distance; the astronaut could then move politely aside, without much danger of encountering another one. But the little ones swarm in space, and the danger of meeting them would be a very real one. Plantier's force field might have the advantage of simply deflecting them away from the path of the spaceship. These small meteorites and cosmic dusts, which technicians regard as one of the chief perils of space navigation, would behave in just the same way as air molecules under

the influence of the force field. Swept up by the field, they would change their trajectories, and "follow" the vessels without striking it.

BREAKDOWNS AND ACCIDENTS

"With this engine," says Plantier (*loc. cit.*, p. 233), "accidents would be difficult. By simply reversing the force field the pilot would apply a perfect brake. If necessary, a simple radar-type device could be made to apply this brake automatically at the approach of an obstacle."

What if the mechanism that creates the field were to break down, so that the field vanished? We can foresee two possibilities:

1. If the breakdown occurs at low speed—i.e., for an engine of this sort, a speed comparable to that of a jet airplane—the same thing would happen as with an ordinary terrestrial aircraft: the machine will fall and be smashed, unless a nearby craft arrests its fall by "snatching" it up in its own field.

2. If the field disappears suddenly at high speed, the surrounding air ceases to be swept along, and the machine will "collide with the motionless air with terrific kinetic energy, causing its disintegration and volatilisation in a fraction of a second with a thunderous detonation" (*loc. cit.*, p. 234). If this happens at night, there will be an immense flash of light lasting until the particles cool below incandescence, i.e., several seconds.

How can we fail to correlate this terrifying description with what happened over Dieppe on January 7, 1954, at 4:27 in the morning? What mysterious drama lay behind that fantastic explosion that flung the citizens of Dieppe out of their beds, breaking doors and windows over a radius of several miles? The astrophysical laboratory pronounced it a bolide. But the phenomenon followed a broken or curved course, coming from the north of Douai, via Arras, to Gournay in Sein-Inférieure, then turning and passing over Serqueux before exploding above Dieppe. Could a meteor have made such a turn before its explosion?

Plantier cites two other observations that seem to suggest accidents to his machine. One was reported by two pilots of the Aéro Club of Morocco, who were overtaken in September, 1952, by a cigar-shaped object that disappeared in a shower of sparks. The other was the unexplained explosion which, a month later, shook the area around Glen Cove, near New York.

MERITS AND DEFECTS OF THE PLANTIER HYPOTHESIS

Criticism of the Plantier hypothesis is made easier by the fact that its author has been foresighted enough to undertake it himself. In the present state of knowledge, it is a purely intellectual construction. There is, of course, a certain probability that cosmic rays do originate from a ■ yet undiscovered interstellar source that fills all of space—since these rays arrive with equal intensity from all parts of the sky. But other (equally hypothetical) explanations have also been proposed. One of the most frequently mentioned connects the cosmic rays with the famous primordial atom of the Abbé Lemaître and with his theory of the expansion of the universe. Since Plantier's hypothesis is very general, and has been submitted (at the time of writing) only to limited mathematical development, there is no proof that the two theories are not complementary, rather than mutually exclusive.

But it is not necessary, in order to retain the virtues of the Plantier hypothesis, to insist on its cosmic-ray aspect. Since the publication of his article, the Lieutenant, bedridden with a tropical illness in Indo-China, has been using his enforced leisure to revise and clarify his ideas. On November 6, 1953, he wrote me:

"I merely wanted to show that as soon as one can apply to the atomic nucleus ■ force than can be varied and directed at will, the three prime mysteries of the saucers (silence, thermal resistance, maneuverability) will be solved; and so also will the fourth (changes in appearance), because it is not likely that such an attack on the ivory tower of the nucleus could be made without accompanying perturbations of the electron shells, perturbations which have a 90% chance of manifesting themselves as luminous phenomena."

That is the root of the matter, Plantier's fundamental conception: "the possibility of applying a force which one can vary and direct at will to every atomic nucleus of a machine and its contents." If this possibility be granted, all the rest follows, with or without recourse to "cosmic energy."

But is there any such possibility? In nature, of course, every atom is subject to the force of gravitation. But neither the strength nor the direction of that force can be varied. So far, only the novelists have been able to do what they like with it, thanks to that imaginary substance called "cavorite" which takes such remarkable liberties with established physical principles, such as the law of conservation of energy. Magnetic fields also act on every nucleus—but not of all substances. Even if we consider only the substances that are sensitive to the magnetic field, the possibilities of this field seem too limited to allow of the construction of machines anything like Plantier's. Yet technical periodicals and news agencies frequently refer to secret research work which they say has been proceeding in Canada since 1952. A news dispatch, reporting a statement by an anonymous official, has even said specifically that Canadian experts are now working on terrestrial magnetism, and that preliminary results justified the hope that "revolutionary" developments were in sight. What does this language mean? Why are these investigations secret? Are they connected in any way with the well-known statement of Field Marshal Montgomery, after inspecting the Avro aircraft factory in Canada, that he had seen incredible things? Are they connected with the flying saucer observatory at Shirley's Bay? At present, all this is wholly in the dark.

To return to Plantier: as previously mentioned, he has himself supplied a critique of his theory.

"It is obvious," he writes (*loc. cit.*, p. 239), "that at present we do not know of any force fields that have the attractive property of being controllable with equal ease in space and in time. Even if the possibility of such a field is granted, the laws of classical mechanics require a *system of reference for the field to react upon*, and classical physics gives us no inkling of such a reference system.

'Cosmic energy,' differing in potential from place to place, could very well furnish it, but this cosmic energy is likewise very hypothetical. If the cosmic radiation can be attributed to it, then how does it happen that it has not revealed its existence before now by other electromagnetic effects?"

We see that Plantier goes as far in his self-criticism as in the boldness of his deductions. He emphasizes the hypothetical character of the principles on which his theory depends. But perhaps he will allow someone who has been deeply impressed by his explanation to speak here as his advocate.

It is true that his hypothesis is, as of now, at least 99% speculative. But what is speculation today may be demonstrated tomorrow, and therefore it may be true now. The atomism of Epicurus and Lucretius was pure speculation, yet true, for two thousand years. Of course, if we did not need the Plantier hypothesis, its highly speculative character would tempt us to leave it to the poets. But it happens to be the only theory (aside from pure and simple denial) that explains the mystery of the flying saucers.

One is therefore justified in adopting the following attitude as the most reasonable one: either the flying saucers are a myth, in which case we need not concern ourselves with the Plantier hypothesis, or else they actually exist. If they do, where else can we find so convincing an explanation of the turbulent cloud seen by Hall, Saclé and others; of the silence, the thermal resistance, the maneuverability, and the changes in appearance? *If the flying saucers exist, there are 99 chances out of 100 that the speculative hypothesis is correct.*

And this is the attitude adopted by Plantier himself. "We must make a rational search," he writes, "for the cause of these phenomena. If they are natural, so much the worse for my theories and my vanity. But if it is proved that we are indeed confronted with flying constructions, no effort should be spared to determine their nature and origin."

N. B. The diagrams illustrating this chapter have been

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The Key to the Riddle

4

FOR THE TIME being, the mystery of the flying saucers is virtually complete. What we know about them enables us to form a vague idea of their behavior and perhaps to make a good guess as to what propels them and how it is used. Otherwise we know nothing. The fact itself, the flying saucer phenomenon, has not been proved, in the sense in which proof is understood in scientific circles, i.e., in a manner which carries conviction to all scientists. This definition will not satisfy everyone, but in science, there is no truth except by universal consent.

Will reports like those in the Villacoublay ~~cases~~ compel that universal acceptance? It remains to be seen, but I doubt it. To appreciate what the scientists are thinking about the whole business at the present time, we must recall the history of meteorites, those absurd "moon stones" which official science derided as a proof of popular credulity until 1803. Some may consider scientists as men of narrow outlook, lacking in imagination and afraid of the unknown. But critics forget that science has been built up only by pitting the force of logic against the crazy but attractive speculations of romantics and dreamers. There have been cases in which the dreamers proved to be right, but for one case of this kind there is a vast number of

others in which wild fancies ultimately had to surrender to the results of patient and methodical investigation. Thirty-five centuries ago, the dreamers asserted that thunder was the wrath of Jupiter, volcanoes the huge chimneys of the forges of Hephaestus and tempests the breath of Aeolus. The majestically slow thinking of science is certainly no matter for reproach. We can be sure that whatever the truth about flying saucers may be, some day science will know where it lies.

Speaking for myself, the investigations I have conducted for the past few years, whose first results have been recorded in these pages, have taught me a number of things which I hope will contribute to the progress of knowledge.

1. In the first place, the flying saucer phenomenon is *extremely rare*. Confining ourselves to the authenticated cases in the last few years which exhibit the characteristics now regarded as classic (silence, tilting, lightning accelerations, relationship between movement, color, and shape, etc.) it is safe to say that every Frenchman has twenty or thirty times as good a chance of being killed in an automobile accident as of seeing a flying saucer.

If flying saucers really exist, one must conclude that there are very few of them. Flocks of them, as in the Oloron and Gaillac sightings, are extremely rare. They are usually seen singly, or in pairs.

The rarity of the phenomenon would lead scientists to certain reflections. If they all refuse to take any interest in the subject until they actually see one, fifty years hence we shall be just where we are now. The number of scientists who are run over by automobiles is, thank heaven, extremely low. The number likely to set eyes on a flying saucer is twenty or thirty times as low. Is it not sufficiently interesting that Tombaugh and Hess saw one? And should the scientific world not regard as worthy of its attention the patient and toilsome labors of a handful of amateurs throughout the world, whose only desire is to serve it?

If there is any force in these considerations, it seems that it is now for the scientists themselves to take up the work of investigation.

The rarity of the occurrence has no bearing upon its importance. This seems to me self-evident. If it were proved that a single interplanetary machine had been seen on a single occasion by a single witness, that fact alone would be of more importance than the greatest battle in history. Thus there can be no doubt that systematic refusal to study the records about flying saucers is nothing less than willful blindness. To my way of thinking, the Villacoublay sighting, for instance, should be enough to arouse in every well-balanced mind the desire to pursue the matter further.

2. Several years of research have led me to the paradoxical conclusion that since the mystery of the flying saucers was all but solved on so many occasions, it means that a little more human effort would have made all the difference.¹ *The mystery would be fathomed very soon, if we really tried.* The failure of the American investigations (though we cannot be certain that they have failed, since they are now secret) proves nothing: these investigations were undertaken for the specific purpose of finding some sort of an "explanation" by hook or crook. Up till now, all their efforts have been confined to tabulating statistics: such and such a percentage of cases attributable to balloons, such and such to Venus, etc., such and such a percentage unexplained—with effort directed toward keeping the last figure down, rather than toward classifying it if it exists.

Yet this is the very category which calls for the closest investigation. It seems to me the reasonable attitude is to shed all preconceived ideas, and if some cases defy explanation they should be examined with even greater care, instead of being discarded as has hitherto been done.

3. If only one quarter of the cases that I have had an opportunity of studying had been reported with the same care as the Beirut and Villacoublay incidents, the real existence of the phenomenon would no longer be in ques-

¹ If there had been a movie photographer at Bocaranga; if the Ouallen case had occurred near an observatory; if someone had been at the Observatory on the night of the Villacoublay incident, etc.

tion. Scientists would have already arrived at unanimous agreement one way or the other.

It is therefore imperative that the fullest publicity should be given to a comprehensive questionnaire, so that every witness of a celestial phenomenon knows exactly what he should look for and report, and to whom his report should be sent.

Here is my idea of such a questionnaire.

- (a) **WITNESSES.** Names in full, occupation, age, state of eyesight. (If witnesses were more than 300 yards apart, or if their descriptions vary, each should fill out a separate questionnaire.) The number of witnesses not filling out a questionnaire should be stated.
- (b) **DATE, HOUR** (as accurate as possible). The local time should be given. If universal time is used it should be so stated. If possible, give the exact time of the various maneuvers, changes during observation, beginning and end of observation.
- (c) **PLACE.** The field of vision of the witness should be indicated, the direction in which he was looking, if he was indoors or outside. If the former, specify whether he was looking through glass. Altitude of the place of sighting; town, country, forest, etc.
- (d) **STATE OF THE SKY.** Clouds (description or classification). Ceiling. Visibility. If there is a fog, state if possible at what distance it becomes opaque. Temperature (exact, otherwise say: warm, mild, cold, etc.).
- (e) **DESCRIPTION OF PHENOMENON.** Place in sky where it appeared; direction, height above the horizon, either in degrees or in handbreadths at arm's length. Say, for example: the phenomenon appeared at a height equal to four and a half times the breadth of my hand, in the southeast. Of course, the ideal is to check by theodolite.

Give the same information to direction and elevation for all features of interest, such as changes of direction, reversals, changes in speed, shape or color, hovering, and lastly, disappearance.

Describe the movements and maneuvers; direction of travel, whether the speed seemed constant or whether there were accelerations and decelerations, changes of direction (if so, in which direction). When the object travelled in a straight line, the distance so travelled should be indicated in handbreadths, as above, and the approximate time taken to cover it. If the object hovered, state for how long.

Describe the object. First give its apparent size by comparison with the full moon (or the sun). Say, for example: the length of the object seemed—times its width, and its length seemed equal to half (or double, etc.) the diameter of the full moon. If there is any change in the apparent size, this should be mentioned. If the object passed in front of a mountain or a cloud, etc., state their distance, if possible.

Describe the original shape of the object and any changes in it. Describe any structural details which you note.

Colors. Changes, if any, and conditions at the time they took place. Did the object shine? Did it seem transparent or opaque? Luminosity. Did the light seem to be reflected, or emitted by the object itself?

Noises, if any. Was anything left behind? Any details not provided for in the questionnaire. When necessary, the answer "Not known" should be given.

A drawing should be added, if it will make any point clearer. If any photographs or movies of the object were taken, the fact should, of course, be mentioned.

Persons who have seen "something" but cannot answer all the above questions should be requested simply to report what they have seen and answer as best they can. A report which is vague and of no interest in itself often bears out and confirms another which is much fuller but lacking proof. Such evidence can thus become of prime importance. If only we had some evidence, however vague

and badly reported, to corroborate the story of the Marignane customs officer!

4. Of course, it is not sufficient to collect and analyze accounts of sightings. One urgent task is to try for an "ideal" observation, and this means distributing the appropriate apparatus or information all over the world. The Americans and Canadians, each in their own fashion, are already working on these lines.

THE SHIRLEY'S BAY OBSERVATORY (CANADA)

During the last quarter of 1953 the Canadian government commissioned the Ministry of Transport and the National Defense Research Board to build an observatory specially equipped to solve the problem of flying saucers, which are known officially as "UFOs," i.e., "Unidentified Flying Objects."

With the funds supplied by these two departments, the Observatory has been established at Shirley's Bay, about ten miles west of Ottawa. It is directed by Mr. Wilbert Smith, Telecommunications Engineer at the Ministry of Transport and electronics specialist. Some of the electronic apparatus installed at Shirley's Bay by Mr. Smith himself is "entirely new to electronics" according to a statement of November 12, 1953.

Mr. Smith has gathered round him a team of specialists in various branches of science: Dr. James Wait, a physicist from the Defense Research Board; Mr. John H. Thompson, a telecommunications specialist; Professor J. T. Wilson, of the University of Toronto; Dr. G. D. Garland, the Dominion Observatory's gravitation expert, and other research workers.

The observatory at Shirley's Bay is only the outward and visible symbol. Standing orders have been given to all meteorological stations from the American frontier to the Polar regions, commanders of vessels at sea and on the Great Lakes, airmen and everyone in public service, to report every flying saucer sighted.

This research establishment can be regarded as a model of organization. The fact that such resources have been

placed at its disposal justifies the assumption that the decision was taken at a very high level. Indeed, it was stated in November, 1953, that the project had strong support of two of the highest Canadian scientific authorities: Dr. O. M. Solandt, Chairman of the Defense Research Board, and Mr. Dean Mackenzie, ex-President of the National Research Council.¹

Both have been interested in this problem since 1948, and consider that the *appearance of visitors from another world in the earth's atmosphere during the last few years is a possibility which cannot be dismissed*. Mr. Smith himself thinks that it has a sixty per cent chance of being the truth.

He bases his belief on a very curious fact which the European records at my disposal seem to confirm—the frequency of flying saucer sightings increases at times when the planet Mars is in opposition to the sun.² (Opposition corresponds to minimum distance between Mars and the earth.)

Little information is available about this observatory, but the fact that several eminent specialists in electronics and telecommunications are working there suggest that it is equipped with the latest apparatus for automatic location of objects. One of the instruments in use is probably the radar-controlled radio-theodolite, which is able to follow and record the course of an object moving at great speed in the sky.

But the most significant member of this research center is undoubtedly Dr. G. D. Garland, *gravitation specialist*. For it is through precise observation of the gravitational variations when saucers pass over that we shall know some day whether Plantier is right. It should not be forgotten that, even if the intensity of his postulated force-field diminishes as the square of the distance (as is probable),

¹ On Nov. 13, 1953, Dr. Solandt denied to the press that the Defense Research Board had any official connection with the project.—AMER. EDS.

² I have noticed, however, that oppositions of Mars seem not to be the only periods when the frequency increases. Take, for example, September-October, 1952, and September-October, 1954.

sufficiently sensitive instruments will be able to detect the gravitational variations several miles away. If such variations were observed when saucers appeared, his theory would be triumphantly vindicated.

Does the presence of Dr. Garland at Shirley's Bay then indicate that the Canadians have also thought of machines propelled by a field of force? It is quite likely, even though it is doubtful whether they have carried that theory as far as Plantier, of whom they had not heard as late as the spring of 1954. Another indication is the name, *Project Magnet*, officially given to the observatory. Why "Magnet"? The very word suggests a field of force.¹

THE WHITE SANDS CENTER

If the Canadians say little about their researches and methods, the Americans say practically nothing at all. White Sands is essentially a military center.

However, we have some information on the methods of detection in use. Two hundred special cameras, designed to cope with the fleeting appearances of the UFOs, have been supplied to selected observers by the Air Force. These cameras are distributed all over the United States.² According to an official statement of December 1, 1953, the same photographic apparatus has been installed in seventy-five American bases abroad, so there must be two hundred and seventy-five American cameras on watch all over the world.

What are these cameras like? It would appear from the statement that they "comprise two coupled lenses, of which one is an ordinary lens for taking photographs, while the other is a spectrograph. The light from the object, dispersed by the grating, will register on a plate, and the spectrum thus obtained will be studied by the research department" (the Air Technical Intelligence Center at Dayton, Ohio).

¹ On August 31, 1954, Mr. Baldwin, the Assistant Minister of Transport, announced the closing of the Shirley's Bay observatory, since it had made no worthwhile observations; however, this has been contradicted. (See, for example, *Flying Saucer News* [British,] Winter 1954-5).—AMER. EDS.

² U.S. *Camera*, November 1952, p. 39.

We are told that "the decision of the Air Force was taken after an examination of reports on appearances of unidentified objects received from a number of bases."

But it would appear that the spectrum-camera project met with no success. No report on its results has ever been published in spite of the pressure of public opinion, which is always anxious for information on the subject.¹

On March 4th, 1954, the Air Force announced investigations along fresh lines. According to the statement, dated New York:

"The American Army is carrying out research at White Sands, New Mexico, with the object of discovering whether the earth may have hitherto unknown satellites.

"This research is directed by Dr. Clyde Tombaugh, the astronomer who discovered the planet Pluto, and Dr. Lincoln LaPaz, Director of the Institute of Meteoritics of the University of New Mexico.

"Although the moon is our only known satellite, American experts consider it quite possible that there are others of smaller dimensions which circle the earth in an orbit nearer than that of the moon.

"Such research is particularly difficult, as these satellites are unlikely to be visible on photographic plates, except in the form of black dots on a luminous background. Moreover, to photograph one of these satellites, the camera must move in the same direction and at the same angular velocity.

"Any such discovery, even if it were of only one satellite, would facilitate the conquest of space, as it would remove the necessity of launching an artificial one by means of rockets capable of overcoming the gravitational pull of the earth, an operation which, in the present state of science, would cost several billion dollars."

The statement ended by stressing the dual importance, astronomical and military, of such research.

¹ It has since been stated by Ruppelt (*op. cit.*, p. 298) that these cameras were of inadequate design and proved useless. The number of cameras in the U.S. is given by him as eighty. (*True*, May 1954, p. 126.)—AMER. EDS.

It is impossible to read this statement without being struck by the selection of Clyde Tombaugh as co-director of the investigation. He is the most eminent eyewitness of a flying saucer appearance. The terms in which he has described his amazement at what he saw are the best proof that he has not forgotten it: "In all of my several thousand hours of night-sky watching, I have never seen anything so strange as this. I was so astonished that my impression of it was somewhat confused."

It is hardly likely that Tombaugh has dismissed from his mind the most amazing sight that ever met his gaze during his career as an astronomer. And the researches in which he has been engaged at White Sands since the early part of 1954 are exactly those that would be indicated in order to answer the question: are flying saucers vessels from another world?

Tombaugh and LaPaz have, in fact, been commissioned by the Air Force to ascertain whether there are any solid bodies moving about in space between the earth and the moon. It is true that the statement speaks of "Satellites," but so far as this research is concerned, there is no difference between satellites and flying saucers. Differences will enter only when it is a question of the nature of an object which has been discovered. In other words, if these two scientists are in a position to detect satellites travelling around the earth, they are in an equally good position to detect the approach of saucers flying through space, if these are extra-terrestrial contrivances. We may be quite sure that Clyde Tombaugh has not overlooked anything so self-evident, and of such special interest to him.

What methods are being employed at White Sands? Photography alone has been mentioned so far, but it may be supposed that radar will also be used. Everything else is conjecture, at any rate for the time being.¹

¹ See Ruppelt (*op. cit.*, Chapter 15) which describes the experiments, in 1950-51, of a private group of scientists to determine whether there was a connection between sudden increases of radiation in the air and sightings of flying saucers.

THE GREAT INVESTIGATION HAS STARTED

As we have seen, Canada and the United States seem to have decided to elucidate the mystery. In Canada the purpose of the enterprise has been made public. In the United States, where the official attitude has always been extremely guarded because public opinion is somewhat apprehensive, the tendency has been to undertake separate projects without saying too much about their purpose, and perhaps without having fully decided what it is. It will be remembered that the first investigation, "Project Saucer," closed down at the end of 1949 with a contradictory report which left the question as unanswered as ever.¹ It was replaced by Project Blue Book, which has issued no full report on its activities.² In the meantime, Tombaugh and LaPaz have been commissioned by the Air Force to explore extra-terrestrial space adjacent to the earth. That is as far as we have got, but there is every reason to believe that, with the resources now made available, it will not be very long before the problem is solved.

THEORIES

Here we reach the most difficult point in our inquiry. In our present state of knowledge, derived from what has been published and what can be seen through a veil of official secrecy, what is the most plausible theory as to the origin of flying saucers? Lest any possibility be overlooked, let us follow the 2,000-year-old example of Plato, the master of dichotomy.

In the first place, there are only two alternatives: Flying saucers actually exist, or else they do not. In other words, either they are devices, machines, or else they are natural phenomena not yet identified.

In my opinion the probability that natural phenomena account for the cases of Mantell, Tombaugh, Gorman, Bocaranga, Oualen, Tessalit, Bangoi, Draguignan-Mont-

¹ A description and critical discussion of the project's report is given by Ruppelt (*op. cit.*, pp. 94-99).—AMER. EDS.

²Project Blue Book's Special Report No. 14, dated May 5, 1955, was released to the press on October 25, 1955; it is similar in nature to the "Grudge Report" of 1949.—AMER. EDS.

pellier, Operation Mainbrace, Topcliffe, Villacoublay and innumerable others is very small, though I admit there is an element of a doubt. The purpose of this book is not to prove anything at all, but to provide the reader with such materials for his own judgment as several years of patient inquiry, good fortune and a certain number of friendships in scientific circles have enabled me to accumulate. But one may speak of probabilities, and here it seems to me that Wilbert Smith's estimate is thoroughly sound: there is at least a sixty per cent chance that flying saucers are a reality.

If these machines exist, where do they come from? We can envisage three possibilities: they come from earth; they come from elsewhere; they come from both earth and elsewhere. When Kenneth Arnold saw the mysterious objects for the first time, the field was wide open to speculation. It is not so today. It could then have been assumed that the United States, as the end of the war, had kept their most startling weapon a secret. Had not the secret of the atom bomb been kept inviolable for years? But that was in wartime. Scientists and ideas were practically unable to travel. The military, ruthless and all-powerful, was in control. But that is long ago. *If the flying saucers were an American invention, by now the fact would be generally known.* The same may be said of all Western nations.

Besides, there are ninety-nine chances in a hundred that if the saucers exist they are propelled by a force field, and that this method of propulsion is beyond any scientific possibilities known to the West at the present time. *A fortiori* it was beyond their ken in 1942, the date of the Ouallen sighting. The Plantier theory is, for the moment, outside the vast realm of science.

Are the Russians ahead of us? They like to boast that they are, but there is no proof. In the November, 1953, issue of the periodical *Sovietskaya Kultura* the Russian academician Artobolevsky wrote: "In certain fields we have not only equalled the scientific achievements of the West, but surpassed them." According to Artobolevsky, the fields in which the Russians are ahead of the West cover mathematics, certain branches of physics (stellar and planetary cosmogony), nuclear physics, electro-technology, Michurinian biology, etc. Their superiority in

this last field is ■ notorious self-deception; can we assume that the same holds good for the rest? The question is wrapped up in mystery. The reference to "stellar and planetary cosmogony" is interesting, but what exactly does Artobolevsky mean by "cosmogony"?

French scientific circles are aware that the Russians are actively going ahead with research in cosmic rays. In this subject the results they have obtained are top secret. Might they have proved the validity of Plantier's theory by actual experiment? No one knows. But it is hardly likely. To intelligence agents in the scientific and technical field, there is no such thing as complete concealment. Hitler knew enough about the nuclear research of the Allies to be very worried about it.

The fact is that even if technical details can sometimes be kept secret by military precautions, in the wider fields—general direction of research, practical results obtained, etc.—almost everything is an open secret. Paradoxically enough, information so obtained can seldom be acted upon with any certainty; one is almost always uncertain whether or not it is actually true.

Do the Russians have the flying saucer? It is not very probable, in spite of certain unverifiable rumors of alleged tests here and there (Czechoslovakia, East Germany, Central Asia). But it is worth noting that the Soviets—by periodically accusing the Americans of deliberately spreading rumors of sightings "to justify their policy of armaments and war" and stubbornly denying the existence of a phenomenon which surely has not stopped at the Iron Curtain—are acting as if they were anxious to persuade us that the mysterious machine *is* in their possession. This is good strategy, no doubt. It is ■ trick which costs nothing, and may produce some slight effect. But it proves nothing.

On the other hand, it has often been pointed out that:

1. If the Russians had it, they would hardly go out of their way to exhibit it to the American Air Force (Gorman, Mantell, etc.).
2. They would not loose it all over the world, at the risk of its coming to grief on hostile territory.
3. The guiding radio signals would be heard, for the

Russians, like ourselves, haven't gone beyond the use of radio waves for this kind of operation.

And what about the Ouallen case? Scientific impossibility apart, what would such a Russian machine have been doing in the middle of the Sahara, at a time when the Red Army was struggling desperately to stop the German advance in Russia?

So neither a Western nor an Eastern origin seems conceivable, and we are driven to the conclusion that, if flying saucers really exist, it is most unlikely that they are terrestrial devices. But here improbability yields place to something far more reprehensible in the eyes of science—romance.

How can we seriously think that Pliny was not simply yielding to popular delusions when he wrote in 100 B.C.: "When L. Valerius and C. Marius were consuls, a fiery shield flashed across the sky from west to east at sunset"? Of course this fiery shield (*clypeus ardens*) may have been a meteoric fireball. But what of the document discovered at Byland Abbey in Yorkshire, which tells us that in 1290, a sort of flat, silvery disc flew over the monastery and caused the utmost alarm (*maximum terrorem*)?

To be sure, this seems romantic. But the facts are there, and they call for an explanation. According to J. Stubbs Walker, the English scientific writer, the number of recorded observations throughout the world was approaching 10,000 by February, 1954. It is a large number for a mere myth. So anyone agreeing with Wilbert Smith's estimate of a sixty per cent probability of an extra-terrestrial origin is not necessarily mad. But we must face the objections to this proposition squarely and see what they amount to.

The first is the antiquity of the phenomenon. If visitors from another world have been haunting the terrestrial atmosphere for so long, why have they never landed? One can well understand why they might not be able to leave their ships and walk about in the open air. Beings who breathe methane as we breathe oxygen, and quench their thirst with ammonia or hydrochloric acid—or who, perhaps, neither breathe nor drink—would obviously die at once in our atmosphere. It is quite likely that there is a closer resemblance between conditions on the top of

Mount Everest and the depths of the Pacific than between the native habitat of these hypothetical visitants and ours.

This is why the "War of the Worlds" will never take place. Wells' story was entertaining, but not probable. But to produce a film based on this story is a monstrous imbecility, because it tends to create alarm for which there is no basis. The fact is that, whether the existence of flying saucers is probable or not, their inoffensive character is a certainty. If we are being visited, it is by beings whose courtesy and tact need no further demonstration. We could learn from them, in addition to their knowledge, a lesson in respect for others. With all the power at their disposal, they have never once attempted to interfere in our affairs.

Even if they are unable to adapt themselves to terrestrial conditions, why have they never established contact? Our air is humming with communications. Radio and television stations are active all over the world. If curiosity has brought them so far, why have they not used our facilities for "talking"?

I can think of only one explanation—*fear*. Assume that all this is true and that they are courteous and thoughtful beings, who have watched the course of human history for centuries—or even for only the last few decades. Considering our bloody past, would they not be justified in thinking that their best protection is an "iron curtain"? Life on earth seems normal to man. But what might *an outsider* think, for example, of the daily slaughter of millions of domestic animals to satisfy our needs?

Moreover, on reflection we see that contact would be a bad bargain for them. It would teach us far more than it would teach them and in every way reduce their margin of superiority over us. And supposing we found out the secret of their machines? Would we use the knowledge as prudently as they have done?

But the same argument tends to show that their friendship would cease the moment our science gives us the power to do on their planet what they are (perhaps) doing here. In other words, there may be a chance that these beings who have been watching us for some time without showing themselves may some day welcome the

contact that they have hitherto avoided. That day will come when contact does them more good than harm. It could be the day on which we too begin to explore outer space, spurred ■ usual by the murderous and destructive instinct which is the deplorable sign manual of all our great enterprises.

Another objection to the extra-terrestrial hypothesis runs as follows. These objects cannot all be manned craft. But if they are remotely controlled, we should pick up the control signals; moreover, there must be some sort of intercommunication between them. Yet we are unable to detect anything of the sort.¹

This argument is founded on ignorance of certain strange but well-established facts. In the early part of this century, when the emission of wireless waves was still confined to the laboratories of ■ few scientists who knew each other, the great radio-electrical expert Tesla detected some signals which he could not trace to any known source. This was in 1901. The same signals were detected several times in the years following. In 1924 these very characteristic and very mysterious signals were picked up almost everywhere. Nobody was ever able to explain them. All that could be said was *they coincided with oppositions of Mars*, and that their intensity was a function of that planet's distance.

Marconi himself took an interest in the matter, and in ■ attempt to solve the mystery he arranged for the unknown signal to be received simultaneously in both America and the Mediterranean. It consisted of a group of three dots, corresponding to the letter S in Morse. Professor Todd arranged for all broadcasting stations in the world to stop for one minute, so that the signal could be heard more clearly. But nothing came of it. What was this

¹ On a phonograph record issued by Cook Laboratories in 1955 under the title "Out of This World" may be heard strange electrical discharges in the ionosphere ("swishes," "whistlers," "tweaks," "the dawn chorus") recorded by Dr. M. G. Morgan who declares: "These are *not* the sounds of flying saucers." However, what *does* cause them is in most cases quite unknown.—AMER. EDS.

signal? It is still a mystery. What was the significance of its variations of intensity according to the position of the planet Mars? That also remains unknown. But we might note that flying saucers likewise seem to show a periodicity synchronized with the opposition of Mars.

This mysterious signal will probably not satisfy those who insist on hearing radio control signals of flying saucers, or listening in on conversations between them. But they should be reminded that even if it is true that we hear nothing, it proves nothing. If, as the Plantier theory suggests, the saucers use a type of energy utterly unknown to us as a means of propulsion, we can well imagine that this energy is also the vehicle for the transmission of the necessary signals. We can no more hear them with our receivers than we can hear radio waves with our ears.

But the most frequently heard argument against the extra-terrestrial origin of the saucers is this: since all the planets and planetoids of the solar system are uninhabitable, where could they possibly come from?

This argument has little force. It is true that of all the bodies in the solar system, the earth alone is habitable *for us*. But for others? Think of the infinite flexibility of life on earth. It is everywhere: in the darkness of the sea's remotest depths, in equatorial swamps, on the polar ice, in the mountains and in the atmosphere. Might it not also flourish in the chilly deserts of Mars, or the clouded seas of Venus? Those who dismiss the possibility should bear in mind Captain Clérouin's favorite quotation from Fontenelle: "When one does not know, everything is possible, and everyone is right."

Of all the intellectual speculations in which men engage, the possibility of other inhabited worlds is that in which the mind demands most, and the universe offers least. Once more it is Captain Clérouin who, by way of illustrating the infinite possibilities, poses the terrifying question: "Can it be that the saucers have travelled, *not* through space, but through time? Have we before our very eyes men of future centuries exploring their own past?"

Here, beyond all question, the greatest humility is called for. At the moment of embarking on the last phase

of our inquiry, we must bear in mind our own ignorance, like a blind man carefully feeling his way to avoid a fall.

Life on other Worlds

5

THE GREAT TELESCOPE of Mount Wilson, directed at ■ particularly dark and star-poor section of the sky, was able to photograph 12,000 galaxies in an area no bigger than that occupied by the moon. Of course there was nothing special about that particular section; it would have found just as many in any other section. I might add that the telescope picked up a mere 12,000 solely because it is not powerful enough to penetrate farther into space. There is every reason to suppose that with an instrument twice as powerful the number of galaxies to be counted would not be 12,000, but eight times that number.

What is a galaxy? Our own, which light takes 100,000 years to traverse from end to end, contains about 40 billion suns. And every one may have its little swarm of planets similar to our earth. From one end of the sky to the other—if it has any ends, which is most unlikely—there may be trillions, and indeed quadrillions of planets, ■ numerous as the drops of water in the sea, launched through space, all with an individual history, from fiery birth to ice-cold death.

THE FISH'S-EYE VIEW

Once we realize this stupendous fact—and it is not easy

because the daily round and common task makes us blind to it—how can we really believe that, of all these countless heavenly bodies, our earth alone is inhabited? Of the nine planets forming our solar system, one is already overpopulated—our own. Another, Mars, is inhabited at any rate by lower forms of life, for astronomers are for the most part agreed that the telescope and spectrograph reveal evidence of rudimentary life. Another planet, Venus, has an atmosphere rich in carbon dioxide, which is not incompatible with some sort of plant life comparable to that on the earth during the Silurian age.¹

We will say nothing of the other solar planets, where the conditions are utterly different from those favorable to the forms of life we know. But even three planets out of nine is quite a fair proportion, if it is typical of the multitude of planets scattered through the immensity of space. Moreover, our idea of life is in all likelihood childishly anthropomorphic. As Flammarion amusingly put it, to believe that everything which exists resembles what we see is "a fish's-eye view." The trout who sees above his head the limits of the aquatic world no doubt thinks that beyond it there is only the realm of death; for how could it suspect that it is possible to live out of water?

Let us consider this idea more carefully. What really is meant by the word "life"? Of course, science is still quite unable to formulate a total definition of this phenomenon, i.e., a definition specifying how it may be synthesized from the non-living. Nor is there any certainty that science will ever succeed in doing so. And even if it does, we may well think, like the great physicist Langevin, that the success will involve a revolutionary transformation of its fundamental concepts, and in particular, the concept of determinism.

LIMITS OF DETERMINISM

That last word provides us with a starting point, for the role of determinism in vital phenomena is not a simple question. If we study the interaction of chemical elements in living bodies, for example, we never find any exception

¹ In any case, spectral analysis tells us only about the external surface of the atmosphere on Venus.

to the determinism arising from the normal chemical properties of these elements: carbon always behaves exactly like carbon, hydrogen like hydrogen, and so on. It is the same with all phenomena of ■ physical order, electrical, thermal, mechanical, etc., involved in the functioning and evolution of organic bodies. When the observation of life seems to reveal the existence of some physico-chemical anomaly, it means either that the phenomenon has been imperfectly observed, or that a new property has been revealed, which will be discoverable also in the non-living. When Berthelot developed organic chemistry, materialistic theorists believed that they were now about to fathom the secret of life; they did not realize that in vital phenomena there is no departure from the general laws of the physico-chemical world. We can go on analyzing vital phenomena from the physico-chemical point of view and carry our analysis to extreme limits, but we will never find in that way what makes life what it is for the same reason that the most refined chemical analysis of the Venus of Milo will never show any difference between that stone and another of the same sort which has not been carved.

But we must go further than this simple comparison and find out why the phenomenon of life has so far defeated the physico-chemical sciences, or, to put it better, why their complete victory is also ■ complete defeat.

LIFE—A GAME OF DICE THAT DISOBEYS THE LAWS OF CHANCE

Life never *violates* physico-chemical laws. What it does is simply to make ■ choice from among the enormous number of possibilities left open by these laws and it generally selects the most improbable outcome.

Let us imagine that we possess a machine capable of throwing a pair of dice and picking them up again every five seconds.

We know very well that this succession of operations is governed by a strict determinism. If one die falls on the four and another on the three, it is because a certain mechanical impulse combined with certain others have necessarily deposited them in these two positions. But we know nothing about those impulses, which is why this is ■ *game of chance*.

Now let us suppose that our machine suddenly begins to throw sevens every time.

The elementary reaction is to suspect that it is bewitched. But the scientific mind would say: "If the same results are obtained each time it is because the causes are exactly the same each time, since the same cause necessarily produces the same effect. My machine must be so accurately set that there is no variation of its action."

This seems unanswerable logic. But let us go on with our imaginary experiment. I take my perfect machine and, in order to break the monotony, make some alterations in its setting. I get a surprise as the seven comes up again, once, twice, three times! I make another alteration. The diabolical seven still comes up! Three, four, five further alterations are no more successful than the first; the machine is determined to win, whatever I do.

How should such a result be interpreted if (contrary to all probability, I admit) we were ever faced with it?

There can be little doubt that most of us, struck with superstitious awe, would keep our distance from the miraculous machine—or, like a frightened child, destroy the uncanny thing with a sledgehammer.

Why? *Because we would recognize in its behavior something monstrous in a simple piece of machinery—life itself.*

In its obstinate insistence on seeking a goal with apparent disregard of causality, we would recognize the essence of life.

LIFE THROWS SEVEN EVERY TIME

And yet we can perfectly well imagine that this diabolical obstinacy is to be explained by purely mechanical causes.

We can imagine that the first alteration of the setting, while eliminating the causes of the dice falling on a seven, created *by chance* other causes producing the same result but by a different process,¹ and that the second elimi-

¹ We must not let ourselves be misled at this point by the fact that the final result is the same: the dice can take an infinite number of paths and still come up seven.

nated these, but still *by chance* created a second set of conditions which necessarily produced ■ seven—and so on.

In all suppositions there is nothing incompatible with the most determinist mechanics.

Yet there is one point which we could not accept. Even if there is nothing mathematically impossible about carelessly destroying a deliberate setting and producing *by chance* ■ different one giving the same result, we know well enough that there is practically no chance that such ■ possibility could be translated into fact.

The fact that, contrary to all expectation, this very possibility has been translated into fact not once, or twice, or three times, but an indefinite number of times, would lead even the most positive minds to think: "There is nothing strictly impossible about this, and yet I neither understand nor believe it. *Perseverare diabolicum*. This machine *means* to win. Its working is purely causal, but its behavior is determined by the end it has in view. The devil's in it."

Or, to put it simply, it is alive.

Such a machine would indeed be terrifying, so true it is that what we fear is not the mysterious but the unexpected. The most surprising mysteries do not bother us in the least so long as we come across them every day.

If we throw a cat up into the air once, twice, or even twenty times, it will always land on its feet, and yet we will not conclude that it is bewitched. Why? *Because the cat is alive*, or, more accurately, because since the beginning of the world we have been seeing cats land on their feet, and do countless other things *which can all be defined as perseverance in the improbable*.

Perseverance in the improbable is the real definition of life in relation to the determinist system of reference.

However, this improbable is not chosen at random.

The word "improbable" is only used in a negative sense. It is extremely improbable that four plus three will result a thousand times in succession, but no more so than if the numbers were three plus five, or five plus one.

From the determinist point of view all these numbers

are alike, but from the finalist viewpoint, it must be four plus three if the machine is to win.

We can see here, I hope, that determinism and finalism are not mutually exclusive: finalism merely chooses from the infinite number of possibilities offered by the physico-chemical world. To understand what this choice means, we have only to consider what happens when it is not available.

Long experience teaches us that the cat I have mentioned always lands on its feet, and mathematics shows that its persistence in doing so is something extremely improbable. But the improbability would be just as great if, for instance, it always landed on its nose.

And so, to the question: why does a cat always land on its feet? there are two answers, both equally true and yet essentially different:

1. Because it has used certain muscles, thanks to certain reflexes, and so carried out a series of movements which have brought its feet below its body at the moment it lands. (Which is quite true.)

2. The cat always lands on its feet so as not to hurt its nose.

These two answers do not exclude or contradict each other, but they coincide only so far as they explain the same phenomenon, each referring to one of the two essential demands of the mind. The first, looking backward, inquires into causes. It explains in particular all the transfigurations of energy which lead to the final result. The second, looking forward, inquires about the end in view. It concentrates on an aspect of phenomena which it is absolutely useless to try to explain apart from causes.

DETERMINISM AND FINALISM

Such, perhaps, are the relations between determinism and what is customarily called finalism in vital phenomena.

To ignore determinism and substitute finalism in the physico-chemical domain is to end up with Bernardin de Saint-Pierre's remark about melons "which have grooved sides to make it easy to cut them into equal slices for

dessert." But if we refuse to see that determinism permits choice and chance, we are shutting our eyes to a fact which marks the whole evolution of life, from primitive times to the twentieth century, and from infusoria to man. Biologists and paleontologists know it well, and have given the name of "anti-chance" to this stupendous succession of choices regularly and unfailingly exercised in pursuit of an end by even the most primitive organisms since life first appeared on earth several hundred million years ago.

THE LIVING ORGANISM DOES NOT WANT TO DIE

The discussion of this end is beyond the scope of this book. Roughly speaking, it amounts to the eternal ambition of living things to "persist in being," as Spinoza puts it.

In order to persist in being, living things have always "sought" to escape from their environment. If its surroundings become a few degrees warmer or cooler, or its alkalinity or acidity changes a trifle, a one-celled organism will die, because it has no means of escaping such vicissitudes. But when we come to more and more complex living organisms, we observe that their independence of their surroundings progressively increases. When we reach man, we find that he has become so independent of the environment in which his species developed (the surface of the soil) that he can fly, swim, dive underwater, protect himself against inclement weather and the attacks of other animals such as microbes, and in general provide for his future.

And when, using a "finalistic" expression, we say that life has been ceaselessly trying to free itself, we are simply saying that man is the latest development on our planet, and that the latest is also the best armed to persist.

THE MYSTERY OF LIFE

Now let us make an effort of abstraction. If it be granted that we know nothing of the origin of life on earth or of the reasons why the empire of organized existence has been given to the chemistry of carbon, oxygen and hydrogen, there is no authority for saying that two things—life and the chemistry of those three substances—are necessarily associated. We can conceive of innumerable

special circumstances, astronomical or otherwise, that might have produced their association by mere chance.

M. Jacques Bergier, of UNESCO, likes to cite the case of a certain catalyst used by the Germans in producing synthetic gasoline. This catalyst seems to work properly only in a particular region of Germany. In America, it proved inactive, while in a laboratory in Lyons, it produced an unexpected reaction, and the laboratory was demolished by an explosion.

Until the mystery of life has been elucidated and its origin scientifically demonstrated (if this is possible), we have no grounds for saying that only the chemistry of these three elements furnishes it an adequate substrate. All we can say is that we know of no vital phenomena based on any other chemical system.

Now if we consider the general aspects of life already analyzed in these pages, we can conceive of vital phenomena of a thousand different origins. Of course, our ability to conceive of them does not mean that they exist, but simply that we have no logical and scientific reason to say that it is impossible that they should.

For example, chemists have noted certain resemblances between carbon and silicon, one being placed immediately above the other in Mendeleev's periodical table. Silicon gives an oxide, silica, with the same formula as carbon dioxide. But at the temperature in which life on earth develops, silica is not a gas, but a solid. If we can imagine a change of temperature sufficient to wipe out the difference between the two conditions, could not silicon produce the same variety of "organic" compounds as carbon?¹

This is a first possible supposition: that there may exist somewhere in space a heavenly body where the thermal, mechanical and physico-chemical conditions are such that the compounds of silicon behave analogously to the hydrocarbon compounds on earth.

¹ As a matter of fact, an "organic chemistry" of silicon is already known: there are mixed carbon-silicon compounds and also those with a pure silicon skeleton, e.g., the silicones.—
AMER. EDS.

In this case the slightest variation in the conditions might start a chain of combinations in which the laws of chance would come into play owing to the immense complexity of the phenomena.

And when chance intervenes, we have seen that a single new development—that utterly mysterious element of *choice*—is sufficient for the phenomena to begin a process of association and organization. All the fundamental conditions of life are present.

In a word, the emergence of life seems linked with the possibility of a choice between equally probable chances.

When the *choice becomes systematic*, vital phenomena are not far away.

Here, it seems to me, is a definition of great generality, opening a door to ideas which are anything but anthropomorphic, ideas quite removed from our old-fashioned human speculations about life in other worlds. *Life can emerge in any environment where a chance-determined situation makes possible the development of finalistic behavior.*

Before looking into some of these ideas, let us linger for a moment over the conception of chance. There is an old philosophical maxim that “there is no such thing as chance: it is merely our own ignorance.” In other words, what we call a chance situation is really strictly determined, but so complex that we cannot trace the mechanism. It must follow that, if chance is nothing but our own ignorance, it cannot produce physical phenomena.

DIGRESSION ON CHANCE

This is a very ancient and familiar problem, which is no reason for leaving it unconsidered. Naturally I do not propose to offer a solution now, but the work of physicists since the introduction of wave mechanics has accustomed our minds to all sorts of novel gymnastics in connection with the ideas of chance and causation.

1. It used to be said that two identical causes must necessarily produce identical effects, “as otherwise the difference between the effects would have no cause, which

is absurd." But this is an absolute argument, valid in metaphysics, of course, but far removed from the cautious attitude adopted by scientists in their own fields.

To begin with, there are no two identical phenomena in the physical world. Moreover, as Poincaré showed, the concept of "cause" is quite elastic from the strictly scientific point of view. The scientist actually isolates phenomena in a quite arbitrary fashion, and notes their interconnection. Within the narrow limits of science, causation goes no further.

2. If the phenomena of the physical world offer us only concatenations of facts, this means that all extrapolations in time and space are uncertain. It can even be said that the best-established scientific laws offer us no more than probabilities. Of course, it is very unlikely that the law of gravitation was discovered on the basis of facts related merely by chance and not by the operation of that law. Yet, strictly speaking, this improbable notion is possible.

3. At present the great debate in science is on this very subject. Is chance inherent in things themselves, or is it merely the creation of our own ignorance? There are phenomena giving evidence for both views.

4. There can be little doubt that this question will be settled some day. Some new law will account for both the phenomena which favor the reality of chance and those which do not. All that I here ask of the reader is permission to speak (like Heisenberg) as though chance were real, although I realize that, scientifically speaking, we do not yet know exactly what lies behind this idea.

THE INFINITE FIELD OF LIFE

If it is true that physico-chemical phenomena can support the development of life wherever there is a choice between innumerable possibilities, what have we to expect?

We must expect *anything*. Perhaps, for example we shall have to take Pascal's words about the two infinities quite literally. Life can exist everywhere, in the infinitely great, as in the infinitely small. Moreover, Pascal envisaged only the two infinities of space; we must think also of infinities of time.

If this idea has any foundation, the astronomer Pierre Salet may not have exaggerated when he wrote: "It may be that the agglomerations of stars, like the showers of sparks from a blacksmith's hammer, answer to some phenomenon which is not on our own scale and which we shall never know. The spirals of nebulae which populate space are perhaps only the tiniest part of some much greater movement, ■ a coagulation of blood corpuscles is only ■ fragmentary aspect of a human being."

Thinking on a smaller scale, but on the same lines, we can imagine bodies in which some sort of thermal, gravitational, chemical and electromagnetic equilibrium might give to any of the metalloids or metals the same preeminence as carbon on our earth. Or we might see vital phenomena based upon some law of the physico-chemical world which would produce living creatures utterly remote from our conceptions—electro-magnetic or nuclear beings whose life would last only for a few billionths of a second.

Here imagination leaps all bounds, and a Swedish astronomer has gone so far as to challenge anyone to prove that life is impossible on, and even in, the sun, at temperatures of several million degrees.

Of course, all these speculations borrow nothing from science but its ignorance. If we can indulge in them without colliding with logic, it is only because we do not know what life is. The only general rule more or less established from one end of the world of life to the other, from paleontology to biology, is what has been called "anti-chance," the systematic choice of the improbable with an eye to the final result. It is fair to assume that, as we advance in our knowledge of the vital phenomenon, the field of possible theories will progressively shrink.

FLYING SAUCERS IN THE IMMENSITY OF THE UNIVERSE

This brings me to the point I have been leading up to. When we begin to talk of flying saucers and the possibility of their extra-terrestrial origin, the old problem of "the plurality of worlds" once more presents itself to the minds of those who are desirous of transcending "the fish's-eye view." Unfortunately, though the relevant data have enormously increased since Fontenelle's day—a tremendous

fund of new knowledge in the fields of biology, paleontology, astronomy, etc., has accumulated since the eighteenth century—the problem itself is as poorly stated as ever.

The astronomers can offer the biologists comparisons between the conditions prevailing on Mars, the Moon, Venus and those on our globe, but nothing more. These comparisons are disappointing and uninformative, because our complete ignorance of the conditions associated with the appearance of the vital phenomenon prevent us from either affirming or denying that that appearance requires similar conditions to those on earth. The only reply which biologists can make to astronomers is that life, *as we know it on earth*, is not possible on any other planet in the solar system, and that does not take us much further.

And so, bearing in mind our ignorance, it is utterly absurd to deny, without enquiry, the existence of any phenomenon which could be interpreted as a manifestation of extra-terrestrial life, on the ground that the Moon or Mars cannot be habitable. Who knows? It may be that the most "populous" heavenly body is one which we consider cannot possibly be inhabited, such as the raging sun or ice-bound Pluto. How can we affirm or deny anything at all on this subject?

WE LOOK TO THE BIOLOGISTS

It is to the biologists that we must look for the first step on the road to a solution of what is now a mystery. When they have completely identified the fundamental mechanism of the vital phenomenon, they will, no doubt, be able to let us know whether its diffusion over the universe is possible.

Meanwhile the mystery is with us, and we can scan the heavens for any and every sort of apparition. History alone counsels a curb on our hopes of seeing the unknown visitors we long, and yet fear, to see. How thrilling to be there when they come down some day! But what an intellectual effort such an encounter would require of us!

History gives little encouragement either to the hopes or the fears.

But history enters the future walking backwards, as

Valéry says. Neither science nor logic forbids us to think that the future may bring us what history has always denied us in the past.¹

Flying Saucers and Theology

6

*by the Rev. Father Francis J. Connell, C.S.S.R.,
Dean of the School of Sacred Theology at the
Catholic University of America, Washington,
Associate Editor of The American Ecclesiastical
Review.*

THE THEORY OF certain scientists that the supposed flying saucers are spaceships from another planet raises a difficult theological question.

Can Catholic doctrine accept the existence of a world (perhaps many worlds), different from our own and peopled by rational beings similar to the inhabitants of our globe? Or are we to conclude that since the Bible makes no mention of any other world of this kind, the earth alone

¹ The reader who is interested in pursuing further these reflections on the relation of life to the physico-chemical world might profitably turn to Norbert Wiener's *Cybernetics*, as well as the other works of the founder of this science. Here he will see how a consideration of the concepts of "information" and "entropy" makes life appear as a perpetual defiance of probability, in perfect agreement with the analysis suggested in these pages. "Information" appears as the result of a persistent neutralization of the laws of thermodynamics by an obstinate choice of the improbable.

contains beings composed of a material body and an immaterial and spiritual soul?

The reply of theology is as follows:

“Neither Revelation, that is to say, the Bible and tradition, the common teaching of the Fathers, nor the formal pronouncements of the Popes exclude the possibility of a life like ours on another planet.”

Theologians discussed this problem long before radio plays such as “The Invaders from Mars,” or spaceships, became a regular feature of the illustrated papers.

More than seventy years ago the question was discussed by Father Secchi, a famous Italian astronomer and a Jesuit, and Father Monsabré, a famous Dominican preacher. Both admitted the possibility that rational beings might exist on another planet.

A modern theologian, Father George Van Noort, professor at a Dutch University, who died recently, also dealt with the question in his book *God the Creator*, where he says:

“It is not in the least incompatible with the faith to admit, that rational beings exist on other heavenly bodies.”

To theologians there can be no such thing as setting bounds to the omnipotence of God.

None the less, if there are other worlds peopled with rational beings, such beings do not necessarily partake of the same dispensation of grace as that bestowed upon the descendants of Adam and Eve. These beings would not have incurred original sin flowing from the fall of Adam, so they would not necessarily need the gift of redemption bestowed by the Son of God upon our frail nature, by his death upon the Cross.

If God has indeed created other beings endowed with reason, the theologian can conceive of a number of spiritual states in which these beings can live.

1. It is possible that these hypothetical beings have received from God, like our first parents, a supernatural

destiny together with preternatural gifts. And it is possible that, like our first parents, these beings have sinned and forfeited these gifts. (The preternatural gifts forfeited by Adam and Eve consisted of the immortality of the body, the will's perfect control of all the reactions of the senses, and a highly enlightened intelligence. The supernatural gift which they lost was sanctifying grace.)

Even supposing that these beings have sinned it is equally possible that God has extended to them the benefit of Christ's merits and made it known to them by a revelation. But it may also be that God has made other provisions for their redemption.

In conformity with a principle laid down by St. Thomas (Summ. Theol. III, q. 3, a. 7), it is possible that the second Person of the Trinity assumed the nature of rational beings dwelling on another world, just as that same Person did for human nature on earth. But it is likewise possible that one of the two other divine Persons was incarnated on another planet (*ibid.*, a. 5).

2. Another possible supposition is that God might have created these beings in a state of "pure nature," without any supernatural or preternatural gifts, with a purely natural, but none the less eternal, destiny. In other words, they might have been destined, after their death, to a purely natural felicity for all eternity, without the possibility of seeing God face to face. Their condition would then approximate that of children dying unbaptized.

On this hypothesis, these creatures would be mortal and, in a certain sense, akin to men on earth, but devoid of all supernatural attributes due to grace. In this case, their intelligence might be more perfect than ours; or it might be less.

3. A third possibility is that these postulated extraterrestrial beings have received the supernatural and preternatural gifts of Adam and Eve and have not forfeited them by sin.

On this hypothesis, these beings would be living in conditions of the "paradise of pleasure" mentioned by Genesis in speaking of Adam and Eve before their fall. In this case, these beings might be very superior to us, both intellectually and physically. It is not unreasonable to suppose, quite hypothetically, that, as a result of their

preternatural gifts and superior intelligence, they have been able to master the problem of interplanetary travel.

Once we assume that there exists such a world of superior enlightened intelligences, of wills fully submissive to God, it is equally reasonable to assume that these beings could never make war upon the men of earth or harm us in any way. It would be equally unthinkable that such beings could fight among themselves, or invent weapons to kill one another.

If these hypothetical beings, endowed with reason, should according to this last hypothesis possess the immortality of the body which Adam and Eve enjoyed for a time, it would obviously be madness on the part of our jet plane pilots, or by means of rockets, to attempt to kill them, for they would of course be invulnerable.

4. A fourth possible hypothesis is to imagine rational beings who, like the fallen angels, have sinned against God and never have received another chance to be reinstated in His grace. This could give us a world of evil geniuses. The inhabitants could then be endowed with superior intelligence, but perverted wills. Such beings obviously could not confer any benefit upon our human kind.

I have no intention of discussing the problem whether or not the supposed flying saucers are, in fact, spaceships from other planets. I am actually inclined to believe that more prosaic explanations will be found for the mystery of their origin. But it is good for Catholics to know that the principles of their faith are entirely compatible with the most startling possibilities concerning life on other planets.

At any rate, it is in conformity with the solemn teaching of the Catholic Church to affirm the existence of a multitude of intelligent beings, who are not human beings. They are the angels in Heaven and the demons in Hell.

FRANCIS J. CONNELL, C.S.S.R.
(N. C. W. C.)

EDITORS' NOTE

Father Connell's remarks are only one of several instances of serious consideration given to flying saucers by Catholic and Protestant theologians. On November 7, 1952, *CIVILTA CATTOLICA*, the official Jesuit periodical, published an article by the Rev. D. Grassi, in which it was said that flying-saucer reports had not been satisfactorily explained, and that "if, in the near future, science should ascertain the existence of life in other worlds, neither dogma nor theology would be in difficulty." Similar views have been expounded more recently by Dr. Michael Schmaus of the University of Munich (*TIME*, September 19, 1955).

On July 29, 1954, the Rev. Philipp Dessauer, a Bavarian Catholic theologian, was quoted as saying at Munich that "the evidence seems to demonstrate with adequate certainty that intelligent beings from another planet have been observing the earth for the last eight years. . . . If it is possible to make contact with these beings, it will be the most dramatic event in human history. It is the duty of governments to prepare man for the possibility of such an encounter."

Some Protestant theologians have expressed themselves in similar terms. On Oct. 27, 1954, Gerhard Jacobi, the Lutheran bishop of Oldenburg, published an article in the Lutheran weekly *UNSERE KIRCHE*, in which he accepted as proven that visitors from outer space are present in our skies. However, Bishop Jacobi did not consider that so many theological possibilities are open as did Fathers Grassi and Connell: "Although their size and shape may differ from ours, Christ is their Lord in any case, whether they are aware of it or not. . . . The faithful have always known and confessed that Christ is the Lord of all the beings that live on any of the billions of planets."—AMER.

EDS.

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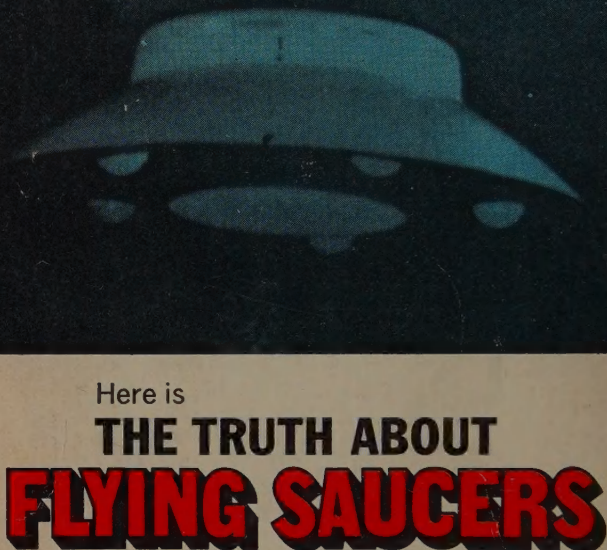
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