Lyons

Goulet, 51, captain, Ontario Central Airways, Gimli, Manitoba.
lives at Winnipeg Beach, Manitoba. ☎ 204-389-3324 (by phone 8/31/76)

May 6, 1973

There were 3 of us coming out of Churchill last spring. I think it was about May. We were southbound with a DC3 at 6,000 feet and we were clming coming up on Lake Winnipeg, which is on our route, and coming up to Berens River and we could see the lake over to the right. and there were 3 of us on board, all pilotsm, and we sp spotted an aircraft or what appeared to be an aircraft coming toward us. ~~at~~ at ~~xx~~ quite a distance. It drew closer and closer. Actually, it didn8t get close enough to identify it, but what happened was that it--we were both watching it (pilot and co-pilot) trying to determine just what it was. and it didn't--we noticed then that it wasn't flying straight and level. Itwas flying at an angle of about 45 degree bank, b but it was still coming straight toward us. and as we watched it, it didn't turn around. It just went directly the other direction, straight away from us. And without changing its angle of bank or anything else. it just went off into the distance directly away fromus. and a puff of smoke appeared, an odd shape, like a small cloud. And it disappared in that. And then another one appeared over toward our right, approximat ely 20 miles faryher off to the right, and all we got of that was a dot and a puff of smoke. Then it disappeared. and then the one we were previously looking at re-appeared, came back toward us again, and unfortunately it didn't get close enoughagain ~~tazzzzy~~ to, say, really say that this is 'I can positively identify what it was.' we didn't have field glasses but again we saw this thing come up toward us and do the same thing, disappear again. Unfortunately, that's all we saw. we didn't get close enough to really get a good look at it. but I've got 17,000 hours inthe air and I've flown all types of aircraft including Boeing 737s and all types of small aircraft on floats--there's nothing that I can imagine that could perform like that. There's just no way that anything I know of could come directly toward us and ~~thaxz~~ not turn

around to retreat.

Q. This was a daytime thing ?

A. Yes, this was indaylight on a clear day. About noon . . .

Q. Who were the other two guys with you?

A. One of them was one of the captains with OCA (Ontario Central Airways), Jim Rogoza, of Red Lake, and the other was John Wilson, who was flying first officer with us. He, I think he's probably in the Siloux Look area or Thunder Bay now. He's not with OCA. You can locate Rogoza through our Gimli office here. He is a captain as well. He was riding down with us in the aircraft. Rogoza now lives in Gimli. He bought himself a farm over here.

Q. Was this DC3 a passenger or cargo plane?

A. Cargo.

Q. You were coming out of Churchill. Where were you headed.

A. Here for Gimli, ourmain base. Ontario Central Airways' box is 1248, phone number is ~~642-5142~~ 642-5142.

Q. How old are you?

A. 51.

Q. Weston said you had some 20 years of flying experience.

A. Close, actually it's like 26 years.

Q. What were the weather conditions like that day?

A. It was clear and there was very little cloud--there was scarely any cirrus. It was a clear day, except for these ~~xxxx~~ puffs of smoke we saw. which were associated with whatever type of aircraft they were.

Q. You saw these off to your right over toward Lake Winnipeg.

A. Towards the ~~xxxxx~~ lake. The one was almost directly infront of us, about 10 degrees off to our track, and our heading was toward Gimli, and the other was 30 degrees or 20 degrees farther to the right.

Q. How far from Gimli k do you think you were?

A. We were a out 150 miles out of Gimli at that time.

Q. So, would you be over Manitoba or over Ontario?

A. We were in Manitoba.

Q. And this object--did it ever come close enough that it got adistinct shape to it?

A. No. Actually, yes. Just a, well, I would aay just a flat--not to get a real good look at it to see whether it had any windows, but it was a flat cylindrical shape.

Q. No color other than dark?

A. No, I couldn't distinguish color. All I could see was the form at that distance.

Q. Since you don't know the size you don't know the distance?

A. No, we couldn't--there w really was nothing to gauge any size to it.

Q. But you could plainly see that it was coming toward you.

A. Yes,

Q. And then it want back inthe opposite direction without turning around?

A. That's right. We were both looking right at it.

Q. You say both--you and Wilson?

A. Yes. Myself and Wilson. We drew Rogoza's attention to it. He was in the back and he came up and looked at it. By this time it was receding, and he couldn't see it as well as we could.

Q. The puff of smoke--did it dissipate before you got to it or what?

A. Yes, it did. We didn't actually get to the smoke. It wasn't in our track and it did dissipate.

Q. And then it went back and you saw an object to your right, maybe 20 miles off to the west?

A. Yes.

Q. And was it coming toward you?

A. Well, no. All we saw there was a puff of smoke and a speck. like a black dot and we thought it was perhaps another one because the smoke had drawn our attention to ir, or a puff of smoke, because it was so similar to the other one. It was almost identical. with the way the other one looked. It was identical except fpr the shape of the smoke.

Q. With your experience in the air, it could definitely not have been a jet going away from you?

A. Well, t e jet would have to turn around--

Q. I'm talking about ths second object.

A. Well, the s econd one--

Q.As if you were looking straight at the exhaust of a jet . . . I'm thinking of seeing jets taking off with all of the exhaust coming back, say going directly away fromyou. With cyour experience you don't think it would be that type of thing.

A. Well, that 's possible, witht the one on the right. But, not with the one on the left.

Q. Would this be on any particular airline route?

A. No, it's not. It's north of the north of the regular airline routes, which I have flown.

Q. Then after the second object disappeared, the first one came back?

A. It did. It re-appeared. It came d toward us and then did exactly the s ame thing--reversed without turning around. And disappeared. Then we lost sight of it entirely and nobody ever saw it again. We just--prior--avter having he of-- heard what made us possibly think of, we'd just heard of some sightings in rumors the Sioux Lookout and Thunder Bay area(in Ontario) . . . the previous day. It's a few hundred miles to the southeast of where we saw the s ightings.

Q. How long do you think you had these objects in sight?

W A. Well, the one we had in sight for approximately--well, it didn't really completely disappear the first time in so much as the smoke was still visible and I think we could still see the speck. And then when it turned around or reversed and came toward us again--the total time of sighting of that one would be 3 or 4 minutes. We had time tp get the guy (Rogoza) out of the back and bring him up front and he had a look at it, and he was well backin the aircraft and we yelled at him and he sort of took his time comig up front.

Q. And the second time was it on a 45-degree angle?

A. Yes.

Q. As you were looking at it would it be slanted t down to your right or your left?

A. To our right.

Q. But it was thick enough to get a definite flat shape to it?

A. Yes.

Q. What did you think about all this?

A. Well, I thought to myself that in view of all the rumors I'd heard that I could actually say that I felt that I had seen something that I couldn't describe , that I could possible say that was a UFO. This is what my thought was. I've never gone out of my way deliberately to look for them but I've heard of --we've had some reports fromsome of our airline people, on Transair we've had people who've seen them . . . I felt at that point that that was an actuall sighting. something that I could say I couldn't explain. in any other way than that it could have been a UFO.

Q. You've flown airliners--you said you flew a 737. that's a jet, right?

A. Yes, a passenger airliner, out of Winnipeg on the Toronto run on down to, of, Barbados, Nassau, Freeport, xzxzxz New York, etc.

Q. Wilson's no longer with the airline?

A.He's no longer with OCA, no. (Agreed to check his log book to get exact date and call me later) . . .

Q. And this was a cargo plane?

A. Yes. . . . I wish ever since I saw it that I did get a better look at it, but certainly what we saw was something I couldn't possibly explain any other way.

Dr. Allen G. McNamara, head, Planetary Sciences Section, Herzberg Institute of Astrophysics, National Research Council, Ottawa, Canada (personal interview 8/3/76, 10-11 a.m.) 100 Sussex Drive, Ottawa 613-993-9245

(The Planetary Sciences Section is officialy charged with receiving and evaluating UFO reports from around the country.)

Q. How long have you been doing this?

A. Since 1967 approximately.

Q. Who handled them before that?

A. The Department of National Defence.

Q. Is it a national policy that the RCMP, the provincial police, the military forces and so onsend UFO reports to you?

A. Yes, if they have anything in this line to report, they send them in the the National Research Council (NRC).

Q. Is this a request that they do this or standard operating procedure or what?

Q. It's standard operating procedure. Basically, how it happened is that it arose through the our meteor program, which has been in existence for a long time. Of course, big meteor fireballs can occur at any time, any place, and we like information on this if there is any possibility of recovering meteorites. A long time back--I can't remember when--we set up established procedures, so that these reports, which of course normally go into local police departments or any sort of agency would be forwarded to us so we could gather meteor or fireball reports. And this was the reason, of course, why we were the natural ones to also start receiving UFO ones because actually they are all mixed up. They were one and the same initially and they all come in essentially by the same mechanism, and when we get them we sort of sort them, whether they appear to be meteoric origin or something else.

Q. Is there a standard report form the the RCMP and other agencies use?

A. Yes, particularly when they send it in by Telex or something, there are a few standard items that we ask them to get information on. The exact time and location, characteristics such as color and so forth. But if there's any more detail, we don't have a standard report for detail.

Q Again, is this a requirement or just a request?

A. I would call it just a request.

Q. But you do receive reports from all provinces?

A. Yes, whenever they happen to arise.

Q. And what do you do with these reports when you receive them?

A. We, as I say, the first action is to see whether they look like genuine fireballs. If they are, they go into our fireball file and anything else

goes into the non-meteor sighting file, which is popularly called UFOs--it may be anything--and we code the basic information onto cards so we can have a card index to find them. Then the original report, which may be any form--typed, telex, handwritten and so forth--anything which is original we keep in files on file cards index so we can file them orderly and we look at them, make an assessment to see if we can tell roughly what it might be

Q. Do you have any people who investigate these cases, other than fireballs

A. Not as such, no.

Q. But do you occasionally investigate some cases?

A. If there appeared to be any possible scientific interest, we do. But if--in the investigation we're capable of, what resources we have but we don't do a routine investigation on everything. It's just impossible. The previous investigations that have been done in detail have yielded nothing of interest scientifically, so you have to extrapolate how much additional time is worth putting on more. With negative results, you can't justify putting very much effort into any one, unless there is something very unusual about it. We do as much assessment as we can. For example, if we get something that is a bright light at a certain time in the evening, certain direction, one of the astronomers will check it against the star charts and invariably Venus is one of the great UFOs. Every time Venus or Jupiter or any of the other planets (is in the sky) we get all sorts of UFO reports.

Q. But when all these things are checked out and it's not a meteor and not a planet, star etc, what do you do?

A. If there's insufficient information at that time, we file it away. We don't have the resources to do it in great detail and experience in the field has shown that the return from expended effort on these is zero or next to zero. So it is just, it's a matter of priority. We've got a lot more important scientific areas to investigate and we can't put a lot of effort into chasing down these things which, in general, lead to naught. Our policy is, all the original information is there. We don't destroy anything. We may add something if we should get any additional information or anything. If anyone wants to do anything with these at any time, our files are open. We don't xerox or copy or send things out but anyone who wants to come in and use it, they're welcome to it. We have one stipulation, that anyone seeing these files must sign an affadavit that they won't use anyone's name without going to that person to get their permission.

Q. Are any of these--after you've eliminated this, this, this and this--still "unknown"?

A. Oh, yes, many times.

Q. Any percentage?

A. I really can't put an accurate figure on it. Many of them--and the reason is perfectly obvious and natural--there's just no more information there. There is a tendency inthis business, particularly with the public, you should be able to say "Yes" or "No." Everything is either black or white. As in all areas of science but more in this are of UFOs, there's an area where you can't say anything because the information is lacking. You know, somebody says, "Sometime last week or last night I saw a bright light in the north or west or somewhere." Well, that's as far as anybody goes.

Q. But don't you get more specific descriptions of the sightings? Specific details, accurate figures, etc.?

A. Yeah . . .

Q. Then it does this go into the "unknown" category?

A. Yes, it's just one of the UFO observations. But, you see, really I don't know how much time you've had to look into this area, but really a large factor--and probably the most important factor in the UFO business--is not physical science. It's psychology of the human observer and the way the eye and brain function. For example, in court cases you'll find two so-called reputable, reliable witnesses who will swear the complete opposite. There's nothing untruthful or anything like that. It's just the way the human observation mechanism works. It's a subjective mechanism and you see what you want to see and what you expect to see. We see this all the time in our own observations of meteors. A person who knows what a meteor is and understands it knows what it is supposed to look like, will recognize a meteor when he sees it. But for the average member of the public who perhaps never even heard of a meteor or seen one before, when he sees a bright one he'll get everything out of it. You know, little green saucers, portholes and jet engines and whirling discs and everything else, but they are just not there. And we see this all the time. We get suc reports and through auxiliary reports of a real meteor you can see this over hundreds of miles and triangulate it and you know exactly what it is. You see something which you know is positively a meteor, but to many people you generate these spinning discs and colored lights and even little green men sort of thing. So you see this time and time again and you realize how completely inaccurate the human mechanism is when they see something they don't understand. And there's nothing unusual about it. To a psychologist, people like this there--

Q. There are some astronomers and scientists who have seen these things

and know these are not meteors and are not Venus or Jupiter, etc.--
A. I personally don't know of any scientist who has seen anything sufficiently unusual that he couldn't see some kind of a rational explanation for it.

Q. I personally don't either, but I've read or heard of scientists who have. Clyde Tombaugh, for example, the astronomer who discovered the planet Pluto, says he's seen UFOs or a UFO.
A. There are a lot of strange phenomena which over the years--for example very strange refraction effects have created, for example, published from the late 1800s, four or five multiple images of the moon, crescent moons in a cluster. This is extremely unusual. I doubt if any sort of, you might say living scientist has seen this phenomenon . . . Well, if anyone saw something like that, they'd be flabbergasted. (Phil) Klass in his book cites at least one case where there was unusual refraction of the moon seen, I think, in late wartime by the crew of a military aircraft. They got quite excited by these strange lights and his analysis was that it was a case of unusual refraction of the moon . . . And some of these classical cases of sundogs and things in the ideal case of very strong atmospheric crystalization of structures, ice crystals and so forth, can make very unusual shapes, hues and so forth. So there are many unusual atmospheric effects that many people have never seen. For example, I am surprised, here in Ottawa aurora is not all that uncommon, if you're in a dark place, no moon and look up in the sky at nights. You'd be surprised how many Ottawans--far more than half the population--has never seen an aurora, just because they've never taken a look.

Q. But there are a certain percentage of these things that are in th "unknown" category?
A. Oh, yes.
Q. You can't say 10 percent of 20 percent or whatever?
A. Well, of course it's got to be a qualified. How much effort are you prepared to spend on tracking then all down. I'd say, with sort of average effort--one has to be open with these sort of things--maybe, uh, well more than half aren't easily identified. But if you were prepared to spend all of your working days tracking these down and traveling around gathering data from all available sources, you could spend not only millions of dollars but thousands of hours and in the end may be able to reduce the so-called "unidentified" to 10 percent of 5 percent. There's always going to be some percentage where the information is completely lacking. For example, one person will go out--this happens all the time and I'm sure in

many cases it's the landing lights of aircraft and these can produce some very, very startling effects particularly when they flash head-on--well, one person will describe this in all sorts of fanciful ways depending upon his impressions. And there's just no way you're going to find collaborative evidence for that . . .

(Tape blank for rest of side #1)

(side #2)

A . . . as far as we're concerned, the scientific evidence (that UFOs exist) is completely lacking. Essentially all you have are visual reports and, as I say, you have to study the psychology and physiology of the human eye-brain mechanism to realize the fallacy--unintential in many cases the average observer we find believes what he is saying and is perfectly credible and all that, but you have to realize the limitations of the observation process. . . . You see some stimulus and it triggers some association in the brain. That's really how you see, and what you see and interpret is based on a built-in history, essentially your life's accumulation of prejudices (??) . . .

Q. Can you tell me how many reports you get a year?

A. Since 1965 or so we've got about 1,500 reports and they range on, sort of , one year when we get many of them we get maybe 200 a year and on the sort of low points 50 to 70 a year. Typically, say 70 to 200 a year.

Q. Is the public aware of your office, or the fact that you gather this information?

A. We don't solicit it, but people who are familiar with the NRC often turn to us for queries about anything in science or send scientific reports in to us and of course when some of these major sightings are reported the NRC gets into the news or people hear of us in this connection so, one way or another a prtion of the public is aware of us either directly or indirectly. They send in either a phone report or a letter.

Q. The press comes to you on UFO flaps?

A. Usually.

Q. And how is this filed, on card files?

A. Yes, crhonologically. We give them an identifying code number, which begins with the year number and the sequence within the year.

Q. To get to this file, you have to know the specific [illegible]?

A. In general. You can get in other ways, sort of thu[illegible] cards.

Q. You don't put any of this into a computer and try [illegible] any way?

A. No. We've thought about this but the statistics of th[illegible]

perturbed (??) by oh, observing factors that I sort of doubt how meaningful they are. You know, we find that whenever Venus is bright in the sky the number of UFO reports is way up. . .

Q. Where are these records kept?

A. In one of our other offices.

Q. To get to these files, just come to this office and ask permission?

A. Yes. Well, the best thing is to make an appointment ahead of time because the girl who looks after the files has to be there to steer you through the maze. You know, whether she's ill or, really just to make sure she's going to be there. So, it's advisable to phone ahead and set up a time.

Q. Do you receive any photographs?

A Very, very few. There are a few in the files, but the number of times people get photographs is surprisingly small. Many times people attempt it but --and this happened at Sudbury, we're told, one of the military chaps-- but many times to the eye a star looks big and bright, and even a saucer if you wish but you try and photograph this, if you try ~~on a~~ particularly on a short focal range camera, you photograph the stars and they turn out to be either invisible or pinpoints of light. Well, I think this is what happens in most of these ~~xxxxx~~ cases. People ~~xxx~~ think there's something tremendous and then when they try to photograph it they've got nothing. We had a good case where we got a good photograph, last fall some time in Winnpipeg, this woman got a photograph--and this was one case where the data was reasonably good. She did get a photograph of this object and she waw able to provide the RCMP with reasonably good directions at the time Well, there was no doubt about it as far as we were concerned. It was a perfectly good photograph of the planet Jupiter. . . . The other thing about photographs is that a photograph like that is the easiest thing in the world to fake. Almost anybody can do it in innumerable ways . . . and the other thing that's not widely known is the number of flaws that occur in emulsions, which give you--particularly when you start making-- print --we've had a number of cases where people send in prints of nice ovals and when we've been able to go back and get the original emulsion, negative and look at it under a microscope and you can see the pinhole through the emulsion. Various flaws in emulsions are far more common than people realize. . .

Q. Do you exchange any information on the unknowns with the US Govt?

A. No, not that there basic barrier to it it's just--

Q. Do you get queries from any ~~xx~~ agency of the U.S. Government on UFOs?

A. Not in recent years. Back at the time the Blue Book Report was written

(Condon Report) was written, (we did) . In the Condon Report there's a page or so on Canadaian activities . . .when Dr. Peter Millman was section head.

. . .

(On subject of public beliefs in UFOs, Gallup Poll, etc.)

I suspect that 99 percent of the scientists in the NRC don't believe in UFOs. . .

Q. What is the primary responsibility of your section?

A. It's upper atmosphere research and there are two main fields of research, the aurora and meteors. It's about 50 percent effort in each.

Q. How large a staff do you have?

A. 14 scientists and 14 or 15 technicians plus secretarial staff.

Q. So UFOs is sort of a minor responsibility?

A. Yes.

Q. Do you have any other (minor) responsbilities other than UFOs?

A. No.

Q. Do you have to make a report to anybody on these (UFO reports)?

A. No.

Q. Your purpose is simply to collect and store?

A. Yes.

Q. And you just keep these forever?

A. Yes, that's right/

Q. When you say a report, this could be anywhere from one to a dozen or more witnesses to the same thing, but that would be one report, right?

A. Right.

Q. And has nothing to do with the number of witnesses involved?

A. Right. If it appears to be the same phenomenon from half a dozen sources or so, we put them together and give them all the same number. . .

Q. (are Bruce MacIntosh, physicist and Ian Halliday, astronomer, the two who work on UFO reports for the section?)

A. Usually, particularly if there are astronomical possibilities Halliday is the one who can work his way through the necssary geometry etc

Q. Do you have any other disciplines that look into these things?

A. No, everybody in the section is either an astronomer or physicist. As I say, in the past we have been associated with others in the NRC. We've had soil chemists look into cases of the ferry mushroom rings. A few years ago big chunk of metal found down in the St. Lawrence area and people from the Dept, of energy, mines and resources--geologists--look into it. They did a chemical and microscopic analysis and it turned out to be slag from a foundry. . . .

Q. Do you get UFO reports from provincial police?

A. Occasionally. I would say not very often (Get from RCMP because mainly work with federal/government agencies, etc.) becaue they don't have the built in channels to the federal government. so it is more or less accidental if they do.

Q. Are military forces required to send in reports?

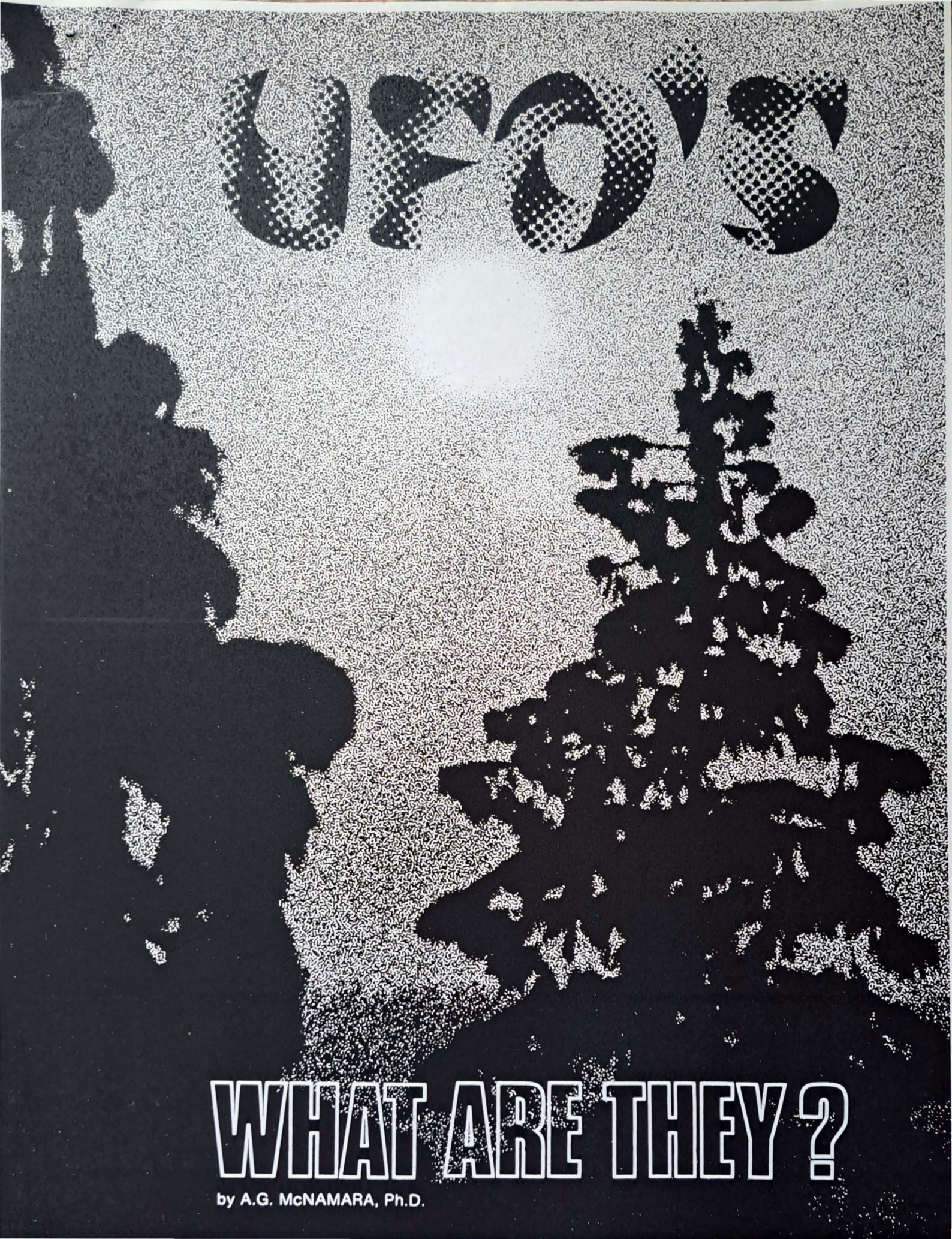
A. There agin it is just a request. They do of course have requests for the trasnmission of meteor reports . . .

Q. When the military ~~forces~~ forces spot an unknown on radar and scramble jets, do you get these reports?

A. Maybe and maybe not. They don't have any requirment to do so.

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UFO's
WHAT ARE THEY?
by A.G. McNAMARA, Ph.D.

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About the Author

Dr. Allen G. McNamara who gained his Ph.D. in Physics from University of Saskatchewan is currently Head, Planetary Sciences Section, Herzberg Institute of Astrophysics, National Research Council.

He has been involved in auroral, meteor and ionospheric research and has employed experimental techniques using radar, photographic, and photometric systems, and rocket borne probes.

The Planetary Sciences Section currently has research projects in the following areas, amongst others:

Field observations of aurora are made by radar and by optical methods at many sites across Canada, mainly in the Arctic and sub-Arctic regions. The Section also operates a Prairie Network of 12 stations for the photographic recording of meteor entries into the atmosphere, and a multi-optical and radar system at Ottawa for the observation of meteors.

DEFINING THE TERM UFO

Taken literally, the term Unidentified Flying Object means any phenomenon detected in the air for which the observer has no immediate logical explanation in terms of natural events or phenomena. However, if sufficiently good data are obtained and/or sufficient investigation and analyses are performed, then it may perhaps be found to be a perfectly natural earthly phenomenon or object. It is then no longer unidentified. There are some people, often called 'believers', who take the position that if it is not identified then it must be of extra-terrestrial or supernatural origin (often called the ETH, or extraterrestrial hypothesis). This connotation has been so widely propagated in the public media and by its proponents, that the popular concept of 'UFO' is immediately synonomous with 'extraterrestrial visitor'.

Actually, in the great majority of UFO reports there is no definite yes or no answer and there never can be, simply because the data recorded are either lacking entirely or insufficient to make an interpretation. The proper scientific attitude is to declare the observation to be indeterminate.

HISTORICAL REVIEW OF UFO's

Reports of unusual sightings, very similar to many to of today's UFO reports, go back into antiquity. Take for example, the wheels in the sky described by Ezekiel in the 6th Century B.C., or the numerous myths of the ancient Greeks. The descriptions of the appearance and behaviour of their phenomena are similar to today's, but expressed in the language and beliefs of the time. In the middle ages such sightings led to the belief in witches, demons, wizards, fairies, ghosts, elves, to mention just a few. In the 1890's, there was a flap of mysterious airships reported in the United States.

The terms 'flying saucers' and 'UFO's' arose in 1947 from the news media descriptions of a phenomenon seen by a private pilot, Kenneth Arnold, in the United States. (It is probable that he was seeing mountain top mirages.)

However, throughout the entire course of human history there has never been an authentic case of physical contact with an alien spacecraft or of the recovery of any artifact of clearly extraterrestrial origin.

In 1947, the U.S.A.F. set up Project Bluebook to collect UFO reports. This project was finally abandoned in 1969 with the publication of the Condon report on the contents of their files.

From 1951 to 1968, the Department of National Defence in Canada operated a parallel data collection project. Then in 1969, D.N.D. declassified the files and turned the collection and maintenance of the UFO files over to the National Research Council.

TYPES OF UFO OBSERVATIONS

Reports of UFO's may be categorized in the following five types:

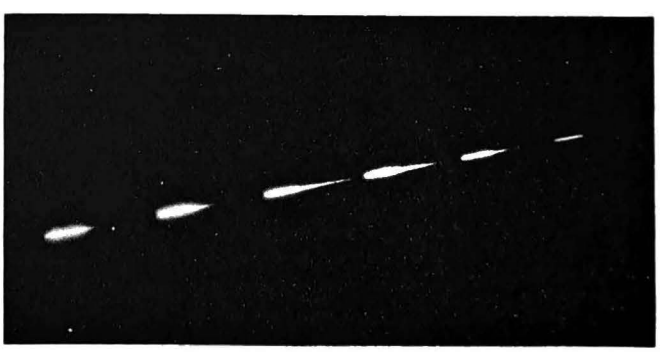
(i) Visual sightings
(ii) Photographs
(iii) Radar detection
(iv) Local effects remaining on the ground
(v) Close encounters with vehicles and beings.

Before continuing with a discussion of the types of observations, one should examine the physical and psychological characteristics of the human 'instrument' to try to understand its sources of error and limits of observation.

THE HUMAN BEING AS A 'TRANSDUCER' AND 'RECORDER'

The single most important factor in understanding the UFO problem, yet probably the most overlooked one, is the human observer himself. It is not sufficient to think only in terms of the physical laws which the alleged object must obey, but one must also recognize the data distortion which goes on in the eye-brain mechanism of the observer, and the psychology of the human both individually and en masse.

(a) **The eye.** When the eye is considered as a purely optical element, it is found that the physical limit of angular resolution is about 3.5 minutes of arc (about 1/10 of the diameter of the moon). However, when an observer reports a 'saucer' which is 30 meters in diameter with a row of 10 portholes and his estimate or some other independent observation places it at some distance more than 11 km away, then we know that the portholes are a figment of the imagination.



A bright meteor trail recorded at one of the twelve field stations of the Meteor Observation and Recovery Project which is operated by NRC in the prairie provinces. The trail image is chopped 3 times per second by a rotating shutter to provide velocity and deceleration data. This meteor trail is about 25 km long at an altitude of about 90 km. Such meteors very often generate UFO reports.

When one tests the stereoscopic depth perception of a pair of eyes, it turns out that distance estimates beyond about 100 meters are impossible by this means. Any distance estimate beyond this is based upon mental judgment of the superposition of known objects in front of it or on an assumption about the linear dimension of the object. The

fact is, the eye can only estimate the angular size (Θ) of the object. This is related to the linear dimension (ℓ) of the object and its distance (r) by the relation $\Theta = \ell/r$. For an unfamiliar object against a featureless background, the separate values of ℓ and r are unknown. Invariably for any object, the brain makes some assumption, either consciously or unconsciously, about either ℓ or r in order to estimate the other. If one value is grossly in error then the other one will be also, and the identification of the object is likely to be totally inaccurate. The same errors apply in any estimates of the linear velocity of the object.

Two examples of the most common errors of this type will make this clear. A bright star or planet such as Venus is often mistaken for a flying saucer about 10 meters in diameter at a distance of a kilometer or so. In reality, Venus is 12300 km in diameter and about 48,000,000 km away.

A bright meteor, leaving a flaming trail of hot gases 10 km long, is hurtling at 30 km/sec through the atmosphere 200 km away. Yet the observer interprets it as a nearby rocket-propelled craft flying on an imminent collision course with him.

(b) **The eye-brain mechanism.** As described in the previous section, the eye and brain do not function simply as a camera lens and photographic film. Only a small part of the optical information can be transmitted and the brain can receive information relatively slowly. What appears to happen is that a relatively few information bits trigger associative memories and patterns within the brain which then more-or-less fashions an impression or model based on its previously built-in fund of knowledge, conceptions, interpretations, and expectations. In short, the human sees what he wants to see, what he is conditioned to see, and what he expects to see. In the face of a surprising or frightening situation, the distortion introduced by the brain is greater still. Everyone is familiar with the major disagreements both in detail and in general among testimonies given in court by witnesses to an event.

(c) **The psychology of the human.** The human basically believes what he wants to believe and sees what he wants to see. Either consciously or unconsciously he interprets the signals from his senses and forms his conclusions in terms of his social conditioning and personal knowledge and experience. For example, a modern man may think that the meteor he sees is a rocket-propelled spaceship, but an ancient Greek would have described it as an angry god coming in a flaming chariot to punish him. It is believed that many people are receptive to the extraterrestrial visitor hypothesis because they secretly hope that a wise and benevolent superior civilization is near at hand to help solve the crushing problems of the world.

(d) **Effect of the Mass Media.** In a continued deluge of ideas from the public media of newspapers, radio and TV, the individual loses his capacity for individual reason and follows the flock. The reasons are not difficult to see. In the initial excitement of a spectacular UFO report, the media rush the sensational details onto the front page (too often without taking the time and effort to do even elementary checking) and many people will believe all of this. When they go outdoors they are conditioned to interpret almost anything unusual that they see as a UFO. This feeds back through the media again in an expanding wave of reports throughout an entire area. Much later, when a detailed and painstaking analysis of the case may show that the original sighting was simply a meteor or a hoax for example, this mundane explanation is either ignored by the media or relegated to some inner page as a filler. However the original (erroneous) interpretation of the report as an extra-terrestrial spacecraft lives on and may even be quoted and re-quoted throughout the UFO literature as a 'classical unsolved' case.

(i) *Visual sightings of UFO's*

The preceding section has indicated the difficulties which the human mechanism has in observing and interpreting an unusual phenomenon. Many things of natural origin produce the original stimulus — bright planets and stars, meteors, aircraft landing lights and navigation lights, high altitude balloons, aircraft contrails, sun glints from aircraft, chemical seeding experiments in the ionosphere from rockets, satellite re-entries, unusual cloud formations, birds, insects, power line reflections, reflections from windows and other surfaces, aurora, sundogs, mirages, — the list is almost endless. Coupled with these sources are additional effects introduced by refraction in the atmosphere, layers of ice crystals and clouds, as well as the physiological behaviour of the eye such as autokinesis which produces an impression of motion of a fixed source resulting from uncontrollable irregular movements of the eyeball. Moreover, when observed from a moving vehicle, a distant fixed source of light will appear to be following the observer. It has been estimated by Klass that at least 50% of the UFO reports of lights are due to the bright planets and stars.

(ii) *Photographs of UFO's*

A photograph of an object tends to be regarded as incontrovertible evidence of an event. However, to one familiar with the photographic process it is realized that fakes are extremely easy to produce but often very difficult to detect and disprove. A small model suspended by thin threads or thrown in the air against a suitable background can scarcely be distinguished from the real thing. Double exposures, internal reflections in the lens elements, lens aberrations, and defects and scratches in the film can produce startling effects. It is interesting to note that in spite of the estimated 50 billion photographs taken in the last 30 years by the estimated 80 million cameras in North America, there is not a single photo showing a craft-like UFO which has withstood close analysis (Klass 1972).

(iii) *Radar UFO's*

Electronic equipment such as radar is also subject to its own characteristic deficiences, aberrations, faults, and blind spots. Electronic 'glitches' due to circuit faults or to interference (both internal and external sources) can lead to false impressions of solid targets which show apparent velocities and accelerations of which normal vehicles are not capable. The operator of such equipment is very often not sufficiently technically knowledgeable about the system to recognize the source of the anomaly; sometimes the designer or manufacturer must be consulted to learn of the idiosyncracies of which the system is capable. In addition, anomalous propagation effects such as atmospheric ducting will give rise to echoes from ground targets or targets at unusual ranges. Such radar 'angels' can also arise from reflections from flocks of birds and even from insects. To the operator, these echoes with properties unlike any aircraft may be interpreted as UFO's.

On the other hand one has only to look at the vast radar coverage of this continent — air traffic control radars, weather radars, military surveillance radars, and ballistic missile detection systems — and one realizes that it would be impossible not to pick up and track any extraterrestrial spacecraft. For example, experiments have shown that a high-power air-defense radar can detect a single bird at ranges up to 160 km, and even a single bumblebee released from an aircraft. It has been stated that some of the best missile detection radars can detect an object the size of a 0.22 calibre bullet at more than 1600 km. Yet no extraterrestrial spacecraft has ever been tracked.

(iv) *Local effects of UFO landings*

Three of the most commonly reported observations attributed to UFO's are 'landing pad' depressions in the soil, broken tree limbs, and burnt rings in the grass. In addition to the obvious invitation to hoaxers, these effects can often be explained by natural circumstances. A 'believer' who wants to find UFO evidence will search for a patern of three or four depressions in the ground, or for limbs of trees broken in the area, or for burnt patches produced by an exhaust, and will probably find something which approximates one or more of these conditions. However, careful measurements usually show that the so-called pad depressions are not precisely spaced or oriented and are probably a random coincidence of natural roughness. Broken branches can be found on almost any tree if one looks for them. Finally, burnt rings in the grass are well-known to agricultural scientists and golf course operators throughout the country. Circular rings of burnt grass are produced at certain times in the year by the action of the fairy-ring mushroom.

(v) *Close encounters*

These cases involve stories of close encounters with either spacecraft or their occupants. No such cases have ever been adequately substantiated. After thorough investigation they have either been admitted or suspected hoaxes, or else the story had so many inconsistencies that a hallucination or misrepresentation of the truth is suspected.

HOAXES AND FABRICATED STORIES

Hoaxes and fabricated stories occur in any of the areas of visual, photographic, radar, local effects and close encounters reports. School boys have caused many spectacular sightings by flying hot air plastic bags with candles under them. Sometimes stories are fabricated to achieve notoriety, and sometimes economic gain is the motive. For example, payments for TV appearances or publication rights, attraction of tourist dollars to a community, and increasing the market value of a property.

SCIENTISTS' VIEWS ON EXTRA-TERRESTRIAL LIFE

When one considers the abundance of complex molecules revealed in outer space by the spectral studies with radio telescopes, and the fact that there are 2 x 10" (200 billion) stars in our own Milky Way galaxy, few scientists doubt that there are probably many planets in our galaxy with intelligent life forms. However, to be consistent one must also analyze the probability of an advanced civilization travelling many light-years of distance to our particular infinitesimal spot. In addition to the immense difficulties of distance and location, such a civilization must co-exist in time with our limited existence within the 10 billion year history of the galaxy.

To put the probability in even closer perspective, consider the possibility of radio communication with even the closest star (Alpha-Centauri), 4 light-years away, and assume that it has a co-existing advanced civilization which can respond to us. Even though our signals travel with the speed of light, it would take 4 years to send each message and another 4 years to wait for the reply to return. At a more probable distance of about 1000 light-years to the nearest civilization, many generations of men would die before any acknowledgement would be received to a query. Any form of physical travel would take much longer because the speed of light could not be reached by a material object. If one thinks that perhaps some alien craft might home in on earth's radio emissions, one must remember that radio wave generation on earth is only about 60 years old, and high power radio generation only about 20 or 30 years old. Hence, the outwardly advancing front of these signals is still only 60 light years from earth. Civilizations beyond this distance would not even yet be aware of our existence.

UFO FILES AT THE NATIONAL RESEARCH COUNTIL

All UFO reports received by the Canadian government since 1965 are on file at the National Research Council. These files are unclassified, and are open to inspection by the public upon appointment. The files arose as an offshoot of the cross-Canada network for collecting meteor fireball reports which assist the meteor research being done in the Planetary Sciences Section of the Herzberg Institute of Astrophysics. Reports of both phenomena are received via the communication networks of the Armed Forces, the R.C.M.P., Associate Committee on Meteoritics, and by mail from the general public. These are separated at N.R.C. into the meteoritic and non-meteoritic (UFO) files. Additional field investigations are not done in general since the available details are normally communicated from the source. Further investigations, if any, are done only if the scientific content appears to justify it.

SUMMARY

Two thousand years of observations and thirty years of rather intensive collection (15,000 reports in the USAF Project Bluebook and 1500 in Canada) and examination of reports have not yielded any positive sighting or artifact of extra-terrestrial origin. However, the data collection process continues for its scientific merits to aid in meteor research and the recording of rare atmospheric phenomena. If and when some new phenomenon is observed, the data will be available for interpretation. An improved awareness by observers of the errors and biases inherent in the human senses will help to produce more useful data. More precise notation of time, location, azimuth and elevation of the object, weather conditions, and the presence or absence of sun, moon, and stars would also be helpful in reporting observations.

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