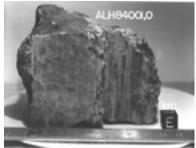
IS THERE INTELLIGENT LIFE IN OUTER SPACE



Ken Ham & Dr Don Batten

IS THERE INTELLIGENT LIFE IN OUTER SPACE?

For decades, speculation about extraterrestrial life¹ has been boosted by tales of flying saucers and encounters with aliens. Some have even claimed that the 'sons of God' and/or the *nephilim* of Genesis 6:4 were aliens.



The meteorite that was falsely claimed to show that life was once on Mars

In 1996 this was fueled from another source. NASA (the National Aeronautics and Space Administration) and its researchers claimed to have found evidence for simple life-forms in a meteorite, allegedly from Mars, found in Antarctica.

Since then, this 'proof' of life in the 'Mars rock' has very much lost favor among the scientific community.² The supposed 'nanofossils' were probably no more than magnetite whiskers plus artifacts of the experimental process.³

Despite this, the 2 kg rock ignited a new surge of 'Mars fever.' In the next 20 years, the Americans, Europeans, Japanese and Russians plan several new projects to explore our neighboring planet, which is some 48 million miles away at its closest approach to us.

Meanwhile, belief in extraterrestrial intelligence continues to grow with an almost religious fervor.

The UFO wave

Harvard University psychiatry professor Dr John E. Mack recently attracted worldwide attention with his collection of cases of people claiming they were 'abducted by aliens.'

There was also the release of a film of an alleged autopsy on an alien from a crash in New Mexico close to the US Air Force Base at Roswell. The blurry footage, which most have dismissed as an obvious and crude forgery, was nevertheless the main attraction at the 1995 UFO World Congress in Düsseldorf, Germany.

Then of course there was the 'alien invasion' film *Independence Day*, which grossed more in its opening week than any previous film.

What should Christians think about UFO accounts?





UFO or fake?

1. Scripture does not mention 'ET' visits

The Bible, the revealed written Word of God, teaches that life is only possible through a process of creation. Even if there were other galaxies with planets very similar to Earth, life could only be there if the Creator had fashioned it. If God had done that, and if these beings were going to visit us one day, then He would surely have enlightened us about this.

God *has* given us rather specific details of the future—for example, the return of Jesus, and some details about the end of the world. The universe will, at some future point, be rolled up like a scroll (Isaiah 34:4, Revelation 6:14). If God had created living beings



elsewhere, this would automatically destroy their dwelling place as well. Adam's sin caused all of creation to be affected by the Curse, so why would a race of beings, not of Adam's (sinful) seed, have their part of creation affected by the Curse, and then be part of the restoration brought about by Christ, the last Adam? All of this would seem exceedingly strange.⁴

Some have claimed that the *nephilim*, or the 'sons of God,' both mentioned in Genesis 6:2–4, were aliens. This is a wild extension of a common view that the 'sons of God' who married the 'daughters of men' were fallen angels, and that the *nephilim* were products of those 'marriages.'

'Sons of God' is clearly used of angels in Job

38:7. The Septuagint here translates 'sons of God' as 'angels of God.' This need not mean that evil angels, or demons, actually cohabited with women—Jesus made it clear that angels do not engage in sexual activities, at least not angels in Heaven (Matthew 22:30). Nevertheless, evil angels on Earth could have used the bodies of ungodly men, by demonic possession, to achieve their evil purpose of producing an evil generation of people (Genesis 6:12).⁵

There are other reasonable suggestions as to the identity of the 'sons of God' and the *nephilim*. Interestingly, the word *nephilim* is used only here and in Numbers 13:33, where it clearly refers to the descendants of Anak, who were big people, but still people. Furthermore, 'sons of God' is not used exclusively of angels—the children of Israel are called 'the sons of the living God' in Hosea 1:10 (see also Psalm 73:15; 80:17).

Bible scholars such as H.C. Leupold believe that the 'sons of God' were descendants of Seth, the godly line who are detailed in the preceding chapter (Genesis 4:25–5:32). Leupold wrote, 'But who were these "sons of God"? Without a shadow of a doubt, the Sethites.'⁶ In this view, the descendants of Seth became wayward and married the 'daughters of men' indiscriminately, basing their choice only on appearance, without concern for godliness, and the *nephilim* were their offspring.

Rulers in ancient Egypt and Mesopotamia often proclaimed themselves as 'sons of God' to enhance their power and prestige. So, another view with much support is that the 'sons of God' were powerhungry rulers and despots, who, in their hunger for power and influence, took many wives in polygamy. They, and their offspring, through tyranny, became 'mighty men.' (Nimrod was described as such a 'mighty one' in Genesis 10:8.)

So, there is no need to resort to fanciful suggestions involving aliens to understand this passage of Scripture.

2. The purpose of the stars

The reasons stars were made are given to us in several places in the Bible, not only in the well-known Psalm 19 but especially in the Creation account. In Genesis 1:14 we read: 'And God said, Let there be lights in the expanse of the heavens to divide between the day and the night. And let them be for signs, and for seasons, and for days and years.'

Thus, God made the stars for mankind on Earth, not for another alien race 'out there.' Add to this the sequence of Creation (on the first day, the Earth, and only on the fourth day, the stars), and it is easy to see the thrust of the Biblical testimony, that the purpose of the Creation is uniquely centered on this Earth.

WHAT DOES SCIENCE SAY?

1. Never a single contact with an 'ET'

In 1900, the French Academy of Science offered a prize of 100,000 francs for the first person to make contact with an alien civiliza-



tion—so long as the alien was not from Mars, because the academy was convinced that Martian civilization was an established fact!

Since then, not a trace of 'little green men,' or indeed any life, has been found on any of the planets that our probes have explored, including Mars.

Despite this, a great number of astronomers think that since life supposedly evolved here on Earth it must have evolved near one of the many stars out there. Around the world, SETI (Search for Extra Terrestrial Intelligence) researchers have scanned the sky, looking in vain for signals from intelligent beings. Despite all the listening, on thousands of frequencies over many years, nothing indicating intelligent alien life has ever been heard.

2. Conditions must be 'just right'

Life on any planet can only survive provided a great number of very stringent requirements are met. For example, the planet must be at the right distance from its sun, so as to be neither too hot nor too cold. In particular, it must be in a very narrow temperature range so that liquid water exists.

Even if recent 'findings' of planets around other stars are confirmed, it is extremely improbable that any of them would fulfill all the requirements needed for life. Just having liquid water is completely insufficient, despite the excitement created when such was possibly detected on the surface of Jupiter's moon, Europa.

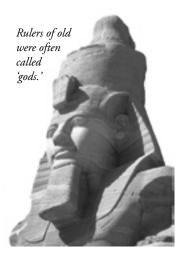
3. Life cannot form spontaneously anyway

Without intelligent, creative input, lifeless chemicals cannot form themselves into living things.⁷ The idea that they can is the theory of spontaneous generation, disproved by the great creationist founder of microbiology, Louis Pasteur. Without unfounded evolutionary speculation, UFOlogy would not have its present grip on the public imagination.

4. Vast distances

Even if we assumed life existed somewhere else in the universe, a visit by extraterrestrials to Earth, such as is claimed in UFO reports, seems completely impracticable, if not impossible. The distances (and therefore the likely travel times) are unimaginably vast.

The closest star to Earth, Proxima Centauri (Alpha Centauri C) is 40.7 million million kilometers (approximately 25 million million





miles) away. The Apollo flights took three days to get to the moon. At the same speed, one would need 870,000 years to get to this nearest star. Of course, one could accelerate (particularly unmanned) probes to a greater speed.

At the incredible speed of one-tenth of the speed of light, the trip, *one way*, would still take 43 years. However, one would need enormous amounts of energy for such an acceleration, roughly equivalent to the total energy generated in four days by the world's largest hydroelectric power station with all its 18 turbines operating (see the detailed discussion at the end of the booklet).

Furthermore, in every cubic kilometer of space, there are an estimated 100,000 dust particles (made up of silicates and ice) weighing only a tenth of a gram. At such a

velocity, colliding with even one of these tiny objects could destroy a spaceship.8

SO WHAT ABOUT UFOs?

How, then, should one understand the UFO phenomena and all the associated hype? In the German magazine *Focus*, it was stated, '90% of UFO reports turn out to be humbug, but there is a residual 10% which are not easy to dismiss.'9

The article quoted sociologist Gerald Eberlein as saying:

'Research has shown that people who are not affiliated with any church, but who claim that they are religious, are particularly susceptible to the possible existence of extraterrestrials. For them, UFOlogy is a substitute religion.'¹⁰

The Bible goes somewhat deeper in this matter, identifying a supplementary cause and effect:

'Whose coming is according to the working of Satan with all power and signs and lying wonders, and with all deceit of unrighteousness in those who perish, because they did not receive the love of the truth, so that they might be saved. And for this cause God shall send them strong delusion, that they should believe a lie' (2 Thessalonians 2:9–11).

The Bible gives a description of reality concerning all living things. The living God reveals Himself as the Triune One—Father, Son and Holy Spirit. In Heaven there are the angels, powerful created beings who also serve mankind on the Earth.

There is another kingdom—that of the devil and the demons.¹¹ Ephesians 2:2 talks about the 'prince of the power of the air,' whose reign is on Earth.

The devil has his own repertoire of deception in the form of various occult practices and a multitude of religious rites. It could be that behind those unexplainable UFO reports there is the work of the Arch-deceiver.¹²

UFO reports, by definition, remain nebulous and not identifiable. People who do not know Christ are easily fascinated by all sorts of phenomena that are difficult to explain. For Christians, there is Jesus' warning, in Matthew 24:4, to 'take heed that no man deceive you.' What is the best antidote to deception? Paul exhorts us, in 2 Timothy 2:15, to 'study' the Scripture, so we might 'accurately handle the word of truth.'

Secret bases? Government cover-ups?

Many UFO enthusiasts spread the 'urban myth' of secret US government experiments on aliens—an idea reinforced by the movie *Independence Day.* However, does a cover-up make sense when, under the inspiration of atheists like the late Carl Sagan, the US government has spent millions of taxpayers' dollars listening 'out there' for signs of intelligent extraterrestrial life? Many other evolutionary humanists, like Sagan, passionately believe that intelligent life has evolved 'out there' in addition to on Earth, and would pounce on any hard evidence for this idea. Consider the media frenzy about the 'life in Mars rock' fiasco. To imagine that a much more exciting discovery would be kept secret for decades defies credibility.

Why the ongoing search for little green men?

Pulse ... pulse ... pulse ... What could it be? It was so regular—flashing at one-and-a-third seconds—keeping exact time. Nothing like this had been seen before.

Jocelyn Bell-Burnell and her supervisor, Prof. Antony Hewish, were at Cambridge University when they discovered this peculiar phenomenon. Jocelyn said during an interview: 'One of the ideas we facetiously entertained was that it might be *little green men* [emphasis added]—a civilization outside in space somewhere trying to communicate with us. ... It did seem to be a little bit going off the deep end to say we had detected signals from another civilization. But the name stuck. We referred to this radio source as LGM-1.'¹³

And what had they found? It was a rapidly rotating neutron star, now called a pulsar,

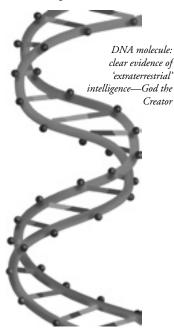
broadcasting without artificial aid. That briefly summarizes how the first pulsar ever discovered was named LGM-1.

Little green men, indeed! Would scientists really even contemplate such a possibility? Not only did they contemplate it, but millions of tax dollars are being spent by NASA to search for intelligent life in outer space. And why are they searching? Is it because there is evidence that there are beings on other planets? Not at all. It is solely because NASA is so committed to accepting evolution as fact.

Just as Jocelyn Bell-Burnell contemplated 'little green men' when she discovered the regular pulses from what we now know is a pulsar, so many scientists today get very excited with each new scrap of 'evidence' for life on other planets. In their opinion, this evidence bolsters their understanding of how the universe—and life on Earth—evolved.

A double standard

Do you see what is so illogical about the search for non-human intelligence? If these same scientists would exchange their telescopes for microscopes, look down into the cells of every living creature and observe the DNA making up the chromosomes, they would see



the most complex code, the most complex information system, the most complex language in the entire universe. They would look at this and say, 'Chance!' Yet if they receive the simplest ordered sequences possible from outer space, they are prepared to say, 'Intelligence!'

Nobody has ever seen a complex language like DNA evolve by chance. Scientists know it takes information to get information, yet they refuse to consider that an intelligence is responsible for life here on Earth. They refuse to accept the possibility that the God of creation, as spoken of in the Holy Scriptures, *is* that intelligence—the infinitely intelligent God of creation. Yet they refuse. Why? It would mean that this Creator, the Lord Jesus Christ, is Lord over them. They would have to kneel and worship Him and accept responsibility for their sinfulness and their need for salvation.

As these scientists look into outer space, it is as if they are shaking their fists at Jesus Christ, defiantly saying: 'We refuse to accept you as Lord over us!'

Well, they don't need to waste millions of tax dollars searching for an intelligence somewhere out there. Without the aid of even a telescope, look up at the night sky and what do we see? 'The heavens declare the glory of God; and the firmament sheweth his handiwork. Day unto day uttereth speech, and night unto night sheweth knowledge. There is no speech nor language, where their voice is not heard' (Psalm 19:1–2).

Take a microscope and look at our DNA. And what do we see? 'For the invisible things of him from the creation of the world are clearly seen, being understood by the things that are made, even

his eternal power and Godhead; so that they are without excuse' (Romans 1:20).

Man *knows* there is a higher intelligence—he realizes there is something more. The knowledge that there is an infinite God is written on man's heart and is obvious from everything around us. Scientists need neither telescopes nor electronic microscopes to see what God has already revealed about Himself and the world.

Secrets of the universe—revealed!

When the US Congress shut down funding for NASA's SETI project in the 1990s, calls rang out for private funding to continue the search for civilizations around other stars. A major newspaper explained this yearning for answers: 'Some speculate that alien intelligence might beam vast streams of coded information, a virtual encyclopedia galactica, with insights into the origin of the universe or immortality.'¹⁴ Man is crying out for some intelligence to tell him where he came from and how to find immortality.

Carl Sagan was one of the leading proponents of SETI. His book *The Cosmic Connection*¹⁵ summarized his dream for finding a secret message from the stars: 'At this very moment the messages from another civilization may be wafting across space, driven by unimaginably advanced devices, there for us to detect them—if only we knew how. ... Or perhaps the messages are already here, present in some everyday experience that we have not made the right mental effort to recognize. The power of such an advanced civilization is very great. Their messages may lie in quite familiar circumstances. ... The message from the stars may be here already. But where?'

Carl Sagan seemed prepared to accept there must be a much higher intelligence than man. He seemed prepared to accept that this intelligence would also communicate with man. He even seemed prepared to accept that the 'messages' may already be here. But Sagan also admitted he may not have 'made the right mental effort to recognize' the messages. Sadly, he was right. As Romans 1:21 states, 'When they knew God, they glorified him not as God, neither were thankful; but became vain in their imaginations, and their foolish heart was darkened.'

An infinite intelligence has already 'streamed' in information, a virtual 'encyclopedia galactica', about where we came from, who we are, what is wrong with us, and insights into immortality—and it's not coded! It's been translated into nearly every language in the world. It's in written form, revealed from the infinite Intelligence who made everything. It's the Holy Bible.

Man has rejected the heavenly message

Man is crying out for purpose and meaning in life. But he is not listening to God. In fact, he doesn't *want* to listen. As we read in Ephesians 4:18: 'Having their understanding darkened, being alienated from the life of God through the ignorance that is in them, because of the blindness of their heart.' In 2 Peter 3:5, the Apostle tells us that man is 'willingly ignorant'—he deliberately rejects the truth about creation.

This great, infinite Intelligence—the Lord God of the Bible—sent His prophets, and man stoned them. God sent His Son, and man nailed Him to a cross. God gave us His Word, and man has burned it and its preachers at the stake. Man cries out on one hand for there to be something more, but then shakes his fist at God. Why? Because man really wants to make his own god—he doesn't want to acknowledge that he is in rebellion against his Creator.

Voyager 1 and 2 send a mistaken message to the heavens



Voyager 1 spacecraft

The Bible tells us that man will accept a lie rather than admit to the truth that God created all things, that man is a sinner and must bow down and accept his Creator as Lord of his life. To avoid the truth, man has 'changed the glory of the uncorruptible God into an image made like to corruptible man, and to birds, and four-footed beasts, and creeping things' (Romans 1:23).

What better way to show how man has done this than to look at the two *Voyager* spacecraft, launched in 1977 and sent barreling towards the outer reaches of the solar system. On each ship is a gold-coated phonograph record, offering a message to extraterrestrial civilizations.

This message includes pictures of the 'evolution of man' from molecules, via fish, reptiles, ape-like creatures, to humans. It also presents the 'evolution of man' in sound—a series of sounds in an evolutionary progression: music of the spheres, volcanoes, earthquakes, mud pots, wind, rain, crickets, frogs, birds, hyenas, elephants, chimpanzees, wild dogs, footsteps, heartbeats and laughter. There is also the sound of fire and speech, of stone tools, a tame dog, Morse code, ships, a train, the F-111 aircraft and so on.

The *Voyager* craft also offer greetings from representatives of nations around the world. These messages bring greetings from Earth, calls for help, offers of friendship, pleas for peace and promises that man is thinking about them (the extraterrestrial intelligent beings), calling these supposed beings out there 'great ones'.

And just to make sure they were communicating, scientists included a greeting from some whales! In the book *Murmurs of Earth: The Voyager Interstellar Record*, by Carl Sagan and others, we read about the 'whale greeting': 'We listened to it [the whale greeting] many times and always with a feeling of irony that our imagined extraterrestrials of a billion years hence might grasp a message from fellow earthlings that had been incomprehensible to us.'¹⁶

United Nations delegate Wallace R.T. Macaulay of Nigeria made an impassioned plea in his message carried by *Voyager*: 'To extraterrestrial intelligent beings: We are supposed to inhabit this planet alone but we know this is not quite so. In Africa, we want to believe that we have you and you are all-knowing, and perhaps possess high intelligence and therefore can help us solve the many problems of our world here.'

Why don't they listen to the message from God? Psalm 121:2 tells us where to look for solutions: 'My help comes from the Lord, who made heaven and earth.'

Don't miss the message from Heaven!

God has sent mankind a clear message of hope and terror. There is coming a time when sorrow will cease, a time of eternal peace, a future Edenic state, but *only* for those who have obeyed Romans 10:13: 'For whosoever shall call upon the name of the Lord shall be saved.'

For those who continue to worship the created world instead of the Creator, God warns that they 'shall have their part in the lake which burneth with fire and brimstone: which is the second death' (Revelation 21:8).

This is God's message from Heaven. Each of us has a choice. We need to heed His warning and flee to His Refuge, Jesus Christ!

See p. 29 for more of this good news.

APPENDIX

Feasibility of interstellar travel

The following calculations are given for the benefit of the more technically minded.

1. For a spacecraft to acquire a speed of c/10, the kinetic energy needed is given accurately enough by the non-relativistic formula of $\frac{1}{2}$ mv². For a very small unmanned spacecraft of 10 kg, this is $\frac{1}{2} \times 10$ kg x $(3 \times 10^7 \text{ m/s})^2 = 4.5 \times 10^{15}$ J. The largest hydroelectric power station in the world, Itaipu, jointly run by Brazil and Paraguay, has an output of 12.6 million kilowatts. The total energy generated by the 18 turbines in four days equals the kinetic energy of a 10 kg spacecraft moving with a speed of c/10.

For a manned spacecraft weighing several tonnes (a metric ton), the energy requirements would greatly exceed the world's daily electricity consumption. For the city-sized spacecraft in the film *Independence Day*, the energy requirements would be staggering. And when the spacecraft slowed again, it would need to use up almost this amount of energy in braking.

If the spacecraft had to accelerate to c/10, slow down and speed up many times, the energy needed would be many times greater.

It would probably be impossible for enough fuel to be carried without some sort of antimatter drive. If perfect annihilation—complete conversion of matter to energy ($E = mc^2$)—were possible, 1 tonne of antimatter could annihilate 1 tonne of ordinary matter to produce 2000 kg x (3 x 10⁸ m/s)², or 1.8 x 10²⁰ J. And this is the absolute maximum amount of energy that could be produced from a given mass of fuel. A real spacecraft could be nowhere near this efficient.

2. The kinetic energy of a speck of dust with a mass of just 0.1 g impacting at a tenth of the speed of light, calculated from the spacecraft's reference frame, is ¹/₂ mv², or

 $\frac{1}{2} \ge 10^{-4} \text{ kg x} (3 \ge 10^7 \text{ m/s})^2 = 4.5 \ge 10^{10} \text{ J}.$

The combustion energy of TNT is 4,520 kJ/kg, or 4.52×10^9 J/tonne. So 4.5×10^{10} J is equivalent to 9.95 tonnes of TNT. Therefore, the impact energy of a 0.1 g object hitting a spacecraft traveling at c/10 would be the equivalent to an explosion of about 10 tonnes of TNT.

HERE'S THE GOOD NEWS

Answers in Genesis seeks to give glory and honor to God as Creator, and to affirm the truth of the Biblical record of the real origin and history of the world and mankind.

Part of this real history is the bad news that the rebellion of the first man, Adam, against God's command brought death, suffering and separation from God into this world. We see the results all around us. All of Adam's descendants are sinful from conception (Psalm 51:5) and have themselves entered into this rebellion (sin). They therefore cannot live with a holy God, but are condemned to separation from God. The Bible says that 'all have sinned, and come short of the glory of God' (Romans 3:23) and that all are therefore subject to 'everlasting destruction from the presence of the Lord and from the glory of His power' (2 Thessalonians 1:9).

But the good news is that God has done something about it. 'For God so loved the world, that He gave his only begotten Son, that whoever believes in Him should not perish, but have everlasting life' (John 3:16).

Jesus Christ the Creator, though totally sinless, suffered, on behalf of mankind, the penalty of mankind's sin, which is death and separation from God. He did this to satisfy the righteous demands of the holiness and justice of God, His Father. Jesus was the perfect sacrifice; He died on a cross, but on the third day, He rose again, conquering death, so that all who truly believe in Him, repent of their sin and trust in Him (rather than their own merit) are able to come back to God and live for eternity with their Creator.

Therefore: 'He who believes on him is not condemned, but he who does not believe is condemned already, because he has not believed in the name of the only begotten Son of God' (John 3:18).

What a wonderful Savior-and what a wonderful salvation in Christ our Creator!

(If you want to know more of what the Bible says about how you can receive eternal life, please write or call the *Answers in Genesis* office nearest you—see inside front cover.)

- 1. Much of the Biblical and scientific evidence against extraterrestrial life, discussed in this booklet, is based on an article by Dr Werner Gitt, published in *Creation* 19(4):46–48, 1997.
- 2. Sarfati, J., Life on Mars? Creation 19(1):18-20, 1996.
 - Sarfati, J., Life from Mars? CEN Technical Journal 10(3):293-296, 1996.
 - Holmes, B., Death knell for Martian life, New Scientist 152(2061/2):4, 1996.
- 3. See Anon., Another blow to Mars 'life' claim, *Creation* **20**(2):8, 1998.
- 4. Furthermore, Jesus dying for alien beings makes no sense, since Jesus took on *human* nature and remains the God-man forever as our Savior. If He were to atone for Vulcans, say, He would need to become a Vulcan. The whole purpose of creation is focused on the race on Earth, of which some will be Christ's 'bride' throughout eternity. Christ will not have multiple 'brides.'
- 5. Morris, H., The Genesis Record, Baker Book House, Grand Rapids, Michigan, p. 169, 1976.
- 6. Leupold, H., Exposition of Genesis, Vol. 1, Wartburg Press, Ann Arbor, Michigan, p. 250, 1942.
- Some creationist critiques of evolutionary origin of life theories are: Aw, S., The origin of life: a critique of current scientific models, CEN Technical Journal 10(3):300–314, 1996; Sarfati, J., Self-replicating enzymes, CEN Technical Journal 11(1):4–6, 1997; Thaxton, C., Bradley, W. and Olsen, R. The Mystery of Life's Origin, Philosophical Library, New York, 1984.
- 8. This means there is a very small chance of hitting one in each linear kilometer traveled, but over such vast distances, a hit is almost certain. The discussion in the appendix of this booklet gives calculations of the damaging effects of dust at such high speeds.
- 9. Erdling, H., Ufologie, Focus 45:254, 1995.
- 10. Erdling, Ref. 9, p. 252.
- 11. The Devil and his evil angels are fallen created beings. Satan's kingdom will exist only as long as God permits.
- 12. William Alnor, cult expert and award-winning journalist, has studied the UFO phenomenon for many years. His book, UFOs in the New Age, Baker Book House, Grand Rapids, Michigan, 1992, documents his investigations that lead to the conclusion that some UFO phenomena have an occult source.
- 13. Ham, K., Calling little green men, Acts & Facts 21(11):a, Institute for Creation Research, San Diego, California, 1992.
- 14. Union-Tribune, San Diego, California, 5 November 1993.
- 15. Sagan, C., The Cosmic Connection, Doubleday, New York, 1973.
- 16. Sagan, C., Drake, F., Druyan, A. et al., Murmurs of Earth: The Voyager Interstellar Record, Random House, New York, p. 151, 1978.