

1

00:00:00,000 --> 00:00:20,400

It is the night before Halloween, 1938.

2

00:00:20,400 --> 00:00:24,960

Millions of people across the country are tuning in to CBS expecting to hear a weekly

3

00:00:24,960 --> 00:00:25,960

music program.

4

00:00:25,960 --> 00:00:33,520

A bulletin has handed me, margin cylinders are falling all over the country.

5

00:00:33,520 --> 00:00:38,400

It is a radio drama unlike anything that has ever been broadcast before.

6

00:00:38,400 --> 00:00:43,720

Today we know this is Orson Welles and the actors of his Mercury Theatre Company dramatizing

7

00:00:43,720 --> 00:00:49,440

War of the Worlds, a work of science fiction by H.G. Wells.

8

00:00:49,440 --> 00:00:55,360

But in 1938, the possibility that invaders from Mars are actually attacking the Earth

9

00:00:55,360 --> 00:01:03,360

is demonstration of our willingness to embrace the possibility of life on other planets.

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00:01:03,360 --> 00:01:15,040

It is a desire that resonates deep in the human psyche.

11

00:01:15,040 --> 00:01:20,120

Because for as long as humankind has looked at the night sky we have wondered, is anyone

12

00:01:20,120 --> 00:01:25,440

out there?

13

00:01:25,440 --> 00:01:31,000

The Earthly landscape may have changed dramatically since the dawn of man, but one thing has never

14

00:01:31,000 --> 00:01:32,200

changed.

15

00:01:32,200 --> 00:01:38,520

We see the same sky, the same stars as our most ancient ancestors and from the very beginning

16

00:01:38,520 --> 00:01:42,600

we have tried to put a superhuman face on the cosmos.

17

00:01:42,600 --> 00:01:46,280

Everybody's curious about whether we're alone and I mean everybody stood out late at night

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00:01:46,280 --> 00:01:49,160

looking at the stars and sort of wonder, well is there somebody up there looking back this

19

00:01:49,160 --> 00:01:53,600

way?

20

00:01:53,600 --> 00:01:57,120

In ancient Egypt it is Ra, the sun god.

21

00:01:57,120 --> 00:02:02,000

The ancient Greeks populate the sky with hundreds of gods and goddesses whom they describe in

22

00:02:02,000 --> 00:02:07,960

their literature as beings beyond Earth and they give the constellations names and human

23

00:02:07,960 --> 00:02:09,600

forms.

24

00:02:09,600 --> 00:02:15,320

It's Sagittarius the archer, Orion the hunter, Hercules the hero.

25

00:02:15,320 --> 00:02:21,720

Then there is that enormous white ball in the sky which seems to be exerting a powerful

26

00:02:21,720 --> 00:02:23,600

force on Earth.

27

00:02:23,600 --> 00:02:27,800

It affects the tides, crop planting and even our emotions.

28

00:02:27,800 --> 00:02:29,880

This too we anthropomorphize.

29

00:02:29,880 --> 00:02:35,920

It is the man in the moon and there are indications that as early as 2,000 years ago we are trying

30

00:02:35,920 --> 00:02:41,760

to communicate with them.

31

00:02:41,760 --> 00:02:47,560

High atop the Peruvian plains are enormous pictographs some more than two miles across

32

00:02:47,560 --> 00:02:53,800

that can only be seen from the air and yet the Nazca lines as they are called are created

33

00:02:53,800 --> 00:02:58,760

by an ancient people for whom the possibility of human flight does not exist even as an

34

00:02:58,760 --> 00:03:00,280

idea.

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00:03:00,280 --> 00:03:05,440

Could this be Earth's first greeting card to extraterrestrials?

36

00:03:05,440 --> 00:03:12,800

Then in the 16th century the invention of the telescope changes everything and nothing.

37

00:03:12,800 --> 00:03:18,160

Fact is merging with myth and superstition but the infant science of astronomy only deepens

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00:03:18,160 --> 00:03:24,960

the belief that we are not alone and leading the charge is Polish astronomer Nicholas Copernicus.

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00:03:24,960 --> 00:03:29,720

Copernicus way back in the 16th century is the one who put the sun in the center instead

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00:03:29,720 --> 00:03:35,240

of the earth so instead of having the geocentric worldview you have the heliocentric worldview.

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00:03:35,240 --> 00:03:40,720

What that means in terms of the extraterrestrial life concept is that the earth now becomes

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00:03:40,720 --> 00:03:46,600

just another planet and the planets potentially become earths and so the question is how much

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00:03:46,600 --> 00:03:51,760

are those other planets like the earth?

44

00:03:51,760 --> 00:03:55,520

The question is answered first in literature and painting.

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00:03:55,520 --> 00:04:00,440

These are the earliest works of what will one day be called science fiction and as the

46

00:04:00,440 --> 00:04:05,400

dreamers interpret the cosmos through their art scientists are searching the skies with

47

00:04:05,400 --> 00:04:09,120

bigger lenses and better calculations.

48

00:04:09,120 --> 00:04:18,280

By 1850 we have found five planets, observed sunspots and found a moon orbiting Mars.

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00:04:18,280 --> 00:04:25,240

Then in 1877 Italian astronomer Giovanni Ciapparelli peers through his looking glass and observes

50

00:04:25,240 --> 00:04:29,240

something that will astonish and inspire the world.

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00:04:29,240 --> 00:04:33,200

And he played there with these straight lines lacing the surface of Mars which he called

52

00:04:33,200 --> 00:04:37,920

canale which was translated into English as canal, it's not a perfect translation but

53

00:04:37,920 --> 00:04:41,880

in any case stimulated a lot of thought that there might not only be cosmic company but

54

00:04:41,880 --> 00:04:49,560

it might be very nearby just 35 million miles away on the red planet.

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00:04:49,560 --> 00:04:55,040

But even the mere possibility is enough to spark the imaginations of scientists and dreamers

56

00:04:55,040 --> 00:04:56,640

around the world.

57

00:04:56,640 --> 00:05:02,800

In 1865 Frenchman Jules Verne publishes *From the Earth to the Moon* foreshadowing what will

58

00:05:02,800 --> 00:05:06,760

become a reality a century later.

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00:05:06,760 --> 00:05:11,600

Verne's early space travelers are shot into space from a large cannon on the Florida

60

00:05:11,600 --> 00:05:17,880

coast and at the turn of the 20th century H.G. Wells writes his novel First Men in the

61

00:05:17,880 --> 00:05:24,440

Moon about early astronauts who meet up with a sophisticated race of insect like creatures.

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00:05:25,440 --> 00:05:32,440

In 1902 French director Georges Milliez inaugurates the genre of science fiction movie making

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00:05:32,440 --> 00:05:36,560

with a 16 minute film The Voyage de la Lume.

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00:05:36,560 --> 00:05:44,280

His space creatures are approximately humanoid with chicken like heads and lobster like claws.

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00:05:44,280 --> 00:05:49,200

And while writers and movie directors are imagining life on other planets an astronomer

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00:05:49,200 --> 00:05:52,880

in the United States thinks he is close to proving it.

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00:05:52,880 --> 00:05:55,040

His name is Percival Lowell.

68

00:05:55,040 --> 00:06:01,640

A lot of astronomers doubted his findings because he wasn't trained in astronomy at a university

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00:06:01,640 --> 00:06:02,920

he was trained in mathematics.

70

00:06:02,920 --> 00:06:08,080

I think what he probably thought was you haven't seen what I've seen I have the evidence come

71

00:06:08,080 --> 00:06:10,200

and look through my telescope.

72

00:06:10,200 --> 00:06:14,840

Percival Lowell had been fascinated with astronomy since boyhood but it was never more than a

73

00:06:14,840 --> 00:06:16,240

hobby.

74

00:06:16,280 --> 00:06:21,800

By 1893 he is a wealthy entrepreneur in Boston Massachusetts.

75

00:06:21,800 --> 00:06:28,120

Then Lowell reads an article about Chaperrelli's so called Martian canals and his life changes

76

00:06:28,120 --> 00:06:31,080

forever.

77

00:06:31,080 --> 00:06:36,320

He puts his business interests on hold to devote himself full time to astronomy.

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00:06:36,320 --> 00:06:43,040

He begins to study the red planet and then in 1895 Lowell publishes his earliest findings

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00:06:43,040 --> 00:06:47,320

in Mars a book that becomes very popular.

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00:06:47,320 --> 00:06:52,000

Certainly we see hints of the existence of beings who are in advance of us not behind

81

00:06:52,000 --> 00:06:54,280

us in the journey of life.

82

00:06:54,280 --> 00:06:58,400

Startling is the outcome of these observations may appear at first in truth there is nothing

83

00:06:58,400 --> 00:07:02,640

startling about it.

84

00:07:02,640 --> 00:07:08,200

In 1896 Lowell builds his own observatory in the highest darkest place he can drag a

85

00:07:08,200 --> 00:07:12,520

26 inch telescope flagstaff Arizona.

86

00:07:12,520 --> 00:07:17,600

While cowboys are riding the range in the wild west Percival Lowell is looking for life

87

00:07:17,600 --> 00:07:20,600

on Mars.

88

00:07:20,600 --> 00:07:28,040

When we continue what Percival Lowell finds on Mars will inspire others to try and make

89

00:07:28,040 --> 00:07:35,320

contact and in at least one case it seems they may have.

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00:07:35,320 --> 00:07:41,240

In the late 19th century Mogul turned astronomer Percival Lowell is nationally known because

91

00:07:41,240 --> 00:07:46,400

of his startling revelations that he has observed artificial structures on the planet

92

00:07:46,400 --> 00:07:47,400

Mars.

93

00:07:47,400 --> 00:07:52,720

Not everybody can see these delicate features at first sight and to perceive their more minute

94

00:07:52,720 --> 00:07:56,800

details takes a trained as well as an acute eye.

95

00:07:56,800 --> 00:08:00,200

These are the Martian canals.

96

00:08:00,200 --> 00:08:05,040

Lowell speculates that the canals were built by Martians to carry water from the melting

97

00:08:05,040 --> 00:08:07,960

polar ice caps to the Martian equator.

98

00:08:07,960 --> 00:08:13,720

The theory of the canals being made by intelligent beings was not accepted by most of the scientific

99

00:08:13,720 --> 00:08:18,760

community and for many years he was in fact ridiculed.

100

00:08:18,760 --> 00:08:24,280

So Lowell spends thousands of hours in his observatory painstakingly drawing sketches

101

00:08:24,280 --> 00:08:26,800

of what he sees in his telescope.

102

00:08:26,800 --> 00:08:31,560

He transfers those sketches onto maps and then Martian globes.

103

00:08:31,560 --> 00:08:32,960

There are several things in the archives.

104

00:08:32,960 --> 00:08:37,080

So there are all of his working papers and all of his manuscripts.

105

00:08:37,080 --> 00:08:40,680

The maps, the globes, those kinds of things that we have.

106

00:08:40,680 --> 00:08:45,000

They're a true treasure as this observatory is a treasure and I think we have to treat

107

00:08:45,000 --> 00:08:47,000

it as that.

108

00:08:47,000 --> 00:08:51,720

And it is during the Lowell era that other scientists are inspired to take alien hunting

109

00:08:51,720 --> 00:08:54,400

in a whole new direction.

110

00:08:54,400 --> 00:08:59,480

If we can see them, the scientists' news, maybe they can see us.

111

00:08:59,480 --> 00:09:05,280

At the turn of the 19th century mathematician Carl Friedrich Gauss proposes planting broad

112

00:09:05,280 --> 00:09:11,720

bands of wheat in the Siberian forest to form a vast right-angled triangle as an unmistakable

113

00:09:11,720 --> 00:09:15,480

sign of earthly intelligence that could be seen from space.

114

00:09:15,480 --> 00:09:22,160

Austrian astronomer Joseph von Mütrow suggests a scheme to dig a series of mile-long canals

115

00:09:22,160 --> 00:09:27,840

in the Sahara Desert and then set them on fire to signal to our Martian cousins.

116

00:09:27,840 --> 00:09:33,680

In France, scientist Charles Crowe urges his government to build a gigantic mirror to reflect

117

00:09:33,680 --> 00:09:35,960

sunlight towards Mars.

118

00:09:35,960 --> 00:09:42,160

But the biggest ideas are still coming out of America.

119

00:09:42,160 --> 00:09:48,520

The recent discovery of radio waves in 1887 was transforming all branches of science and

120

00:09:48,520 --> 00:09:53,440

the idea that something or someone out there could receive our messages or send one of

121

00:09:53,440 --> 00:10:00,400

their own meant we now had the possibility of communicating with other worlds.

122

00:10:00,400 --> 00:10:06,320

This was the dream of Nikola Tesla, a Serbian-born American physicist and engineer.

123

00:10:06,320 --> 00:10:11,480

Tesla was doing experiments out in Colorado Springs around 1899 and it was in the course

124

00:10:11,480 --> 00:10:15,520

of those experiments that he believed that he had actually detected a signal.

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00:10:15,520 --> 00:10:21,520

He didn't publish anything on this until 1901 because he realized it would be very controversial.

126

00:10:21,520 --> 00:10:27,640

But he did publish a little article in 1901 called Talking with the Planets and he predicted

127

00:10:27,640 --> 00:10:31,120

in there that this would be one of the major themes of the 20th century.

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00:10:31,120 --> 00:10:34,240

In 1901, Tesla writes,

129

00:10:34,240 --> 00:10:38,800

The disturbances I'd observed might be due to an intelligent control.

130

00:10:38,800 --> 00:10:43,280

The feeling is constantly growing on me that I had been the first to hear the greeting

131

00:10:43,280 --> 00:10:47,560

of one planet to another.

132

00:10:47,560 --> 00:10:53,160

Tesla's announcement is widely reported but in academic circles the idea of radio communication

133

00:10:53,160 --> 00:10:58,440

without her space is greeted with almost unanimous skepticism, even ridiculed.

134

00:10:58,440 --> 00:11:04,040

It would be another two decades before the idea of interplanetary communication is revived

135

00:11:04,040 --> 00:11:07,760

by another radio pioneer, Gurye Moum-Marconi.

136

00:11:07,760 --> 00:11:14,920

Marconi as early as 1919 believed that he had made a detection again by radio from Mars

137

00:11:14,920 --> 00:11:21,560

and this was played out in the pages of the New York Times during 1919 and the early 1920s.

138

00:11:21,560 --> 00:11:24,600

We have not the slightest proof of their origin.

139

00:11:24,600 --> 00:11:25,800

They are sounds.

140

00:11:25,800 --> 00:11:27,240

They may be signals.

141

00:11:27,240 --> 00:11:28,440

We do not know.

142

00:11:28,440 --> 00:11:33,240

Marconi himself eventually lost interest in that and it sort of remained a mystery what

143

00:11:33,240 --> 00:11:37,200

these dots and dashes were that were received by Marconi.

144

00:11:37,200 --> 00:11:43,280

Others carried forward with the idea that there might be something to it.

145

00:11:43,280 --> 00:11:45,960

One of those others is astronomer David Todd.

146

00:11:45,960 --> 00:11:51,760

His specialty had been solar eclipses but in the 1920s Todd also becomes fascinated

147

00:11:51,760 --> 00:11:57,320

with the possibility that Martians might be communicating with Earth via radio waves.

148

00:11:57,320 --> 00:12:02,640

Todd already in 1909 had the idea that you might take a balloon flight up above some

149

00:12:02,640 --> 00:12:10,120

of the atmosphere and use radio apparatus there to try to detect a signal from Mars.

150

00:12:10,120 --> 00:12:15,040

David Todd thought that by putting sensitive wireless telegraph receivers aloft and away

151

00:12:15,040 --> 00:12:20,680

from any obstructions in the atmosphere signals to and from Mars would come in a whole lot

152

00:12:20,680 --> 00:12:23,280

better.

153

00:12:23,280 --> 00:12:30,240

On August 29th and 30th 1924 Mars is at its closest point to Earth optimal conditions

154

00:12:30,240 --> 00:12:33,680

for communicating with the red planet Todd believes.

155

00:12:33,680 --> 00:12:38,760

He asks the U.S. military to shut down all radio transmissions in the Washington, D.C.

156

00:12:38,760 --> 00:12:41,240

area for a short amount of time.

157

00:12:41,240 --> 00:12:44,160

Amazingly they comply.

158

00:12:44,160 --> 00:12:49,560

The chief of naval operation sends a dispatch to the radio facilities under his command

159

00:12:49,560 --> 00:12:59,680

telling them to avoid any unnecessary communications and to listen for any unusual signals.

160

00:12:59,680 --> 00:13:05,080

After Todd switches on his radio gear several strange signals are in fact detected at several

161

00:13:05,080 --> 00:13:07,560

sites.

162

00:13:07,560 --> 00:13:12,720

But the most unusual phenomenon occurs because of an invention by another scientist who is

163

00:13:12,720 --> 00:13:16,680

with Todd.

164

00:13:16,680 --> 00:13:22,280

C. Francis Jenkins had invented an early version of television called the radio photo message

165

00:13:22,280 --> 00:13:25,400

continuous transmission machine.

166

00:13:25,400 --> 00:13:30,760

During Todd's experiment Jenkins records what is described as a curious picturization of

167

00:13:30,760 --> 00:13:33,320

radio phenomenon.

168

00:13:33,320 --> 00:13:38,160

What came out in the picture was something that looked like a face and Jenkins was more

169

00:13:38,160 --> 00:13:39,160

conservative than Todd.

170

00:13:39,160 --> 00:13:42,960

Todd Jenkins said that he really believed that this was not something related to Mars

171

00:13:42,960 --> 00:13:48,560

but Todd always pressing forward sort of in a lowellium kind of a way said that maybe

172

00:13:48,560 --> 00:13:49,560

it could be.

173

00:13:49,560 --> 00:13:54,920

We now have a permanent record which can be studied and who knows until we've studied

174

00:13:54,920 --> 00:14:01,280

it just what the signals may have been but the important thing is to have a record.

175

00:14:01,280 --> 00:14:06,120

The picturization is 30 feet long and 6 inches wide.

176

00:14:06,120 --> 00:14:12,640

Some see the profile of a man others the possibility that this is a Martian code that the aliens

177

00:14:12,640 --> 00:14:15,760

are hoping we earthlings can decipher.

178

00:14:15,760 --> 00:14:20,600

Half the film is turned over for analysis to William Friedman the U.S. Army's chief

179

00:14:20,600 --> 00:14:25,840

of cryptography who was world renowned for cracking a number of German codes during World

180

00:14:25,840 --> 00:14:29,760

War One.

181

00:14:29,760 --> 00:14:34,080

If there was a message in the signal Friedman died without deciphering it.

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00:14:34,080 --> 00:14:37,800

The film was found in his private papers following his death.

183

00:14:37,800 --> 00:14:42,760

The man who had solved so many code riddles apparently never stopped puzzling over this

184

00:14:42,760 --> 00:14:48,960

one.

185

00:14:48,960 --> 00:14:53,840

When we continue some Americans start to believe that Martians aren't going to wait around

186

00:14:53,840 --> 00:14:56,360

for us to figure out their messages.

187

00:14:56,360 --> 00:14:58,000

It's time to invade.

188

00:14:58,000 --> 00:15:00,840

If we were on the verge of building rockets that could go into space maybe the aliens

189

00:15:00,840 --> 00:15:04,120

were able to build rockets that had come here.

190

00:15:04,120 --> 00:15:10,440

In the 1930s and 40s scientists were discovering strange new worlds all the time holding out

191

00:15:10,440 --> 00:15:16,200

the possibility that one of them might be inhabited.

192

00:15:16,200 --> 00:15:25,760

And it was Hollywood's job to show us what they would look like when they got here.

193

00:15:25,760 --> 00:15:30,120

American fiction had its own versions with aliens that seemed to take on the personality

194

00:15:30,120 --> 00:15:33,040

of the times.

195

00:15:33,040 --> 00:15:39,160

Then in 1947 a U.S. Forest Service pilot named Kenneth Arnold is flying over Washington

196

00:15:39,160 --> 00:15:43,840

state when he sees what he describes as flying discs.

197

00:15:43,840 --> 00:15:49,200

A few days later the U.S. Army appears to confirm the possibility of alien invaders with

198

00:15:49,200 --> 00:15:50,520

a press release.

199

00:15:50,520 --> 00:15:54,960

Dateline Roswell, New Mexico.

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00:15:54,960 --> 00:16:00,960

It is the birth of the UFO era and soon thousands of sightings of UFOs are being reported to

201

00:16:00,960 --> 00:16:04,040

civilian and military authorities.

202

00:16:04,040 --> 00:16:09,040

Movies and television fan the flames of a burning enthusiasm for the idea that beings

203

00:16:09,040 --> 00:16:16,920

from another planet have visited Earth and continue to do so.

204

00:16:16,920 --> 00:16:21,000

The Cold War had set in and people were afraid of things in the sky because things in the

205

00:16:21,000 --> 00:16:23,600

sky could after all be Soviet bombers headed your way.

206

00:16:24,240 --> 00:16:27,160

If we were on the verge of building rockets that could go into space maybe the aliens were

207

00:16:27,160 --> 00:16:29,240

able to build rockets that had come here.

208

00:16:29,240 --> 00:16:33,960

So I think there was sort of a conflation of all these sorts of factors that operated

209

00:16:33,960 --> 00:16:37,440

in the public mind to cause them to interpret what they were seeing in the sky as something

210

00:16:37,440 --> 00:16:42,160

alien and probably unfriendly.

211

00:16:42,160 --> 00:16:45,560

Early on the U.S. military buys into the fervor.

212

00:16:45,560 --> 00:16:53,080

In 1947 the Air Force is officially and covertly investigating UFOs through its project Bluebook.

213

00:16:53,080 --> 00:16:58,840

Eventually the project will go public and then in 1969 be terminated when the Air Force

214

00:16:58,840 --> 00:17:04,920

concludes that there is no tangible evidence that UFOs pose a threat to national security.

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00:17:04,920 --> 00:17:12,080

We've been able to explain them as a hope, as erroneously identified friendly aircraft,

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00:17:12,080 --> 00:17:15,920

as meteorological or electronic phenomena.

217

00:17:15,920 --> 00:17:23,720

It does not contain any pattern of purpose or of consistency that we can relate to any

218

00:17:23,720 --> 00:17:28,000

conceivable threat to the United States.

219

00:17:28,000 --> 00:17:34,120

But among astronomers the possibility of communication with other worlds is alive and well, fueled

220

00:17:34,120 --> 00:17:39,040

not by UFO mania but by hard science.

221

00:17:39,040 --> 00:17:44,000

Pioneering astronomer Edwin Hubbell has proven that there are galaxies beyond the Milky Way

222

00:17:44,080 --> 00:17:49,560

and that the universe is constantly expanding, opening up infinite possibilities for intelligence

223

00:17:49,560 --> 00:17:52,320

on other planets.

224

00:17:52,320 --> 00:17:59,040

In 1948 Hubbell is installed at the world's largest telescope on Mount Palomar in California.

225

00:17:59,040 --> 00:18:06,800

Hubbell believes in his words, many of these planets must be suitable for supporting life.

226

00:18:06,800 --> 00:18:11,720

New questions are being asked about how we can determine scientifically the existence

227

00:18:11,760 --> 00:18:15,120

of intelligent life elsewhere in the galaxy.

228

00:18:15,120 --> 00:18:20,240

One of those questions is being raised by what is called the Fermi Paradox.

229

00:18:20,240 --> 00:18:26,240

The Fermi Paradox was first raised in about 1950 by the Italian physicist Enrico Fermi

230

00:18:26,240 --> 00:18:29,040

and he simply asked the question, where are they?

231

00:18:29,040 --> 00:18:32,680

In other words, if there are so many intelligent civilizations out there in outer space, why

232

00:18:32,680 --> 00:18:35,320

do we not see them here on the earth?

233

00:18:35,320 --> 00:18:39,320

If you consider the time scales involved in the universe, you know you have a universe

234

00:18:39,320 --> 00:18:44,320

that is 12 to 15 billion years old that they would have populated the galaxy by now.

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00:18:44,320 --> 00:18:46,320

We should have seen them by now.

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00:18:46,320 --> 00:18:52,320

So perhaps some Maverick astronomers begin to wonder, it's not a big eye in the sky that

237

00:18:52,320 --> 00:18:54,320

we need but a big ear.

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00:18:54,320 --> 00:19:01,320

It is called new astronomy, the belief that celestial objects radiate energy in many ways

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00:19:01,320 --> 00:19:05,320

along the electromagnetic spectrum, not just optically.

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00:19:05,320 --> 00:19:10,320

And new astronomers like Frank Drake step forward to study that theory.

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00:19:10,320 --> 00:19:15,320

They are pioneers in what will become known as CETI, the U.S. government's search for

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00:19:15,320 --> 00:19:17,320

extraterrestrial intelligence.

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00:19:17,320 --> 00:19:22,320

I first became fascinated with discovering life in space when I was very young, perhaps

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00:19:22,320 --> 00:19:28,320

eight years old, when my parents told me that there were other planets, which was to me

245

00:19:28,320 --> 00:19:33,320

a bombshell, and it excited me to think that there might be other worlds like the earth.

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00:19:33,320 --> 00:19:38,320

And I wondered if there were, were there creatures living on them like us, what were their histories.

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00:19:38,320 --> 00:19:42,320

Surely it would be a great adventure to discover those creatures.

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00:19:42,320 --> 00:19:50,320

In 1960, with a Ph.D. from Harvard, Drake accepts a staff position at the National Radio Astronomy

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00:19:50,320 --> 00:19:53,320

Observatory in Green Bank, West Virginia.

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00:19:53,320 --> 00:19:55,320

I am sure we're not alone.

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00:19:55,320 --> 00:19:57,320

Of course, that's a very daring statement.

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00:19:57,320 --> 00:19:59,320

People will say, well, how can you say that?

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00:19:59,320 --> 00:20:04,320

Well, you can say it, because first there are 400 billion stars in our galaxy.

254

00:20:04,320 --> 00:20:08,320

A substantial fraction are like our sun.

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00:20:08,320 --> 00:20:15,320

The circumstances that brought all that about were very normal circumstances.

256

00:20:15,320 --> 00:20:19,320

So what happened here must have happened to other places.

257

00:20:19,320 --> 00:20:23,320

And if even then you're doobies, well, there are another 100 billion galaxies.

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00:20:23,320 --> 00:20:28,320

So there is no doubt there is life elsewhere in the universe,

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00:20:28,320 --> 00:20:32,320

including intelligent life.

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00:20:32,320 --> 00:20:36,320

Drake sets out to test that theory during his work at Green Bank.

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00:20:36,320 --> 00:20:43,320

He and others begin using the 85-foot radio telescope to listen for signals at 1420 megahertz,

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00:20:43,320 --> 00:20:48,320

what's called a marker frequency or a meeting place of the hydrogen atom.

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00:20:48,320 --> 00:20:52,320

Drake gives his project an unusual name.

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00:20:52,320 --> 00:20:57,320

It occurred to me that Osmo was a good name because the place we were trying to find

265

00:20:57,320 --> 00:21:04,320

was a land far away, very difficult to reach, and populated by strange and exotic beings.

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00:21:04,320 --> 00:21:09,320

In the spring of 1960, the Osmo receivers are switched on.

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00:21:09,320 --> 00:21:13,320

Amazingly, Drake's team gets immediate results.

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00:21:13,320 --> 00:21:15,320

It was the first day of Osmo.

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00:21:15,320 --> 00:21:21,320

When we, in fact, having observed for many hours our first target star, Tosetti,

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00:21:21,320 --> 00:21:26,320

turned the telescope to Epsilon Erydini, the second target star.

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00:21:26,320 --> 00:21:30,320

Immediately we heard something we'd never heard before in years and years of radio astronomy,

272

00:21:30,320 --> 00:21:34,320

which was a signal which sounded like...

273

00:21:34,320 --> 00:21:40,320

And as the type of signal that some people predicted we'd get from another world.

274

00:21:40,320 --> 00:21:43,320

My first thought was, is it this easy?

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00:21:43,320 --> 00:21:47,320

All you do is go to the first star and turn it on. There it is.

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00:21:47,320 --> 00:21:51,320

It was really amazing. We didn't quite know what to do.

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00:21:51,320 --> 00:21:55,320

The telescope is moved away from the star and then refocused on it,

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00:21:55,320 --> 00:21:57,320

but the signal can't be located again.

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00:21:57,320 --> 00:22:05,320

A similar signal was found several weeks later, then ruled out as radio interference from another transmitter on Earth.

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00:22:05,320 --> 00:22:11,320

But Osmo prompted serious attention and in 1961 the National Academy of Sciences

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00:22:11,320 --> 00:22:17,320

hosts a conference at Green Bank to assess the possibility of communicating with other worlds.

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00:22:17,320 --> 00:22:25,320

It is then that Frank Drake unveils an equation that will forever put alien hunting into the scientific mainstream.

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00:22:25,320 --> 00:22:32,320

To this day, tells us what we need to know if we're to predict the number of civilizations in space.

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00:22:32,320 --> 00:22:38,320

The equation is a way of determining N , the number of civilizations in our galaxy

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00:22:38,320 --> 00:22:41,320

that have the potential for radio communication.

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00:22:41,320 --> 00:22:46,320

It is a way of quantifying how likely we are to get a message from deep space

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00:22:46,320 --> 00:22:52,320

and says Drake, the chances mathematically speaking are very good.

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00:22:52,320 --> 00:22:58,320

The Drake equation is a bold formula that turns the staid world of astronomy on its head.

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00:22:58,320 --> 00:23:02,320

It will greatly influence the work of a young astronomer Carl Sagan.

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00:23:02,320 --> 00:23:09,320

But the public is completely unaware of it. They want their alien hunters in shiny silver suits.

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00:23:09,320 --> 00:23:13,320

It's got speed, John Glenn.

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00:23:13,320 --> 00:23:21,320

In 1961, John Glenn becomes the first American to orbit the Earth, seeing it from an extraterrestrial point of view.

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00:23:21,320 --> 00:23:29,320

It is now the space age and for the first time in history, the public sees science catching up with science fiction.

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00:23:29,320 --> 00:23:37,320

Five, four, three, two, one, zero, ignition.

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00:23:37,320 --> 00:23:39,320

The lift off.

296

00:23:39,320 --> 00:23:41,320

The lift off.

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00:23:41,320 --> 00:23:53,320

The space race is on and just like our ancient ancestors, the object of our desire is the moon.

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00:23:53,320 --> 00:23:59,320

On July 21st, 1969, we make it.

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00:23:59,320 --> 00:24:02,320

Go ahead, Mr. President. This is Houston out.

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00:24:02,320 --> 00:24:09,320

Because of what you have done, the heavens have become a part of man's world.

301

00:24:09,320 --> 00:24:14,320

But Neil Armstrong, Buzz Aldrin and Michael Collins aren't alone up there.

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00:24:14,320 --> 00:24:19,320

The alien hunters have launched a number of unmanned probes into space.

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00:24:19,320 --> 00:24:27,320

They are set to take pictures and gather data, but some of them also contain a special message intended for ET,

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00:24:27,320 --> 00:24:32,320

a message not far removed from those Peruvian drawings created so long ago.

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00:24:32,320 --> 00:24:39,320

It is now okay to talk about all the articles where, whereas a decade or two ago, it wasn't okay.

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00:24:39,320 --> 00:24:44,320

It was considered too speculative to be worth the investment of time.

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00:24:44,320 --> 00:24:51,320

We may never know if Sagan's message has found an intergalactic recipient.

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00:24:52,320 --> 00:25:01,320

When we continue, in 1974, a cosmic greeting card of another kind comes out, and this one gets a response.

309

00:25:01,320 --> 00:25:07,320

Scientists can only say, wow.

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00:25:07,320 --> 00:25:12,320

The year is 1974.

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00:25:12,320 --> 00:25:22,320

Fringe UFO researchers announced that they have evidence that the Air Force is holding 12 alien bodies at Wright-Patterson Air Force Base in Dayton, Ohio.

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00:25:22,320 --> 00:25:26,320

It sets off a debate that will continue for many years to come.

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00:25:26,320 --> 00:25:33,320

Science fiction images of alien life created in the 50s are reinforced in TV shows and movies,

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00:25:33,320 --> 00:25:37,320

and the sale of sci-fi books keeps pace with classic literature.

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00:25:37,320 --> 00:25:47,320

Unbeknownst to nearly everyone, a real scientist, Frank Drake, is sitting in his new observatory in Puerto Rico trying to make contact.

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00:25:47,320 --> 00:25:54,320

In 1974, we sent a three-minute message from the Arecibo Observatory. It consists of 1,679 characters.

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00:25:54,320 --> 00:26:01,320

It's a kind of cosmic music that will one day become part of pop culture, influencing the movie classic,

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00:26:01,320 --> 00:26:06,320

close encounters of the third kind. But in 1974, it's cutting edge.

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00:26:06,320 --> 00:26:13,320

And what it does when properly decoded is create a picture which starts with a number system,

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00:26:13,320 --> 00:26:20,320

and it then shows the chemistry of the DNA molecule, the basic molecule of life on Earth.

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00:26:20,320 --> 00:26:26,320

There's a crude sketch of a human being to show what we look like, or a primate, that's about all you can tell.

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00:26:26,320 --> 00:26:31,320

And then below that, there's a sketch of a telescope focused and raised to a point with its size given,

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00:26:31,320 --> 00:26:36,320

and it's the size of the telescope that sent the message, the Air Civil Telescope,

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00:26:36,320 --> 00:26:43,320

which not only tells what telescope sent the message, but it gives a measure of how advanced our technology is,

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00:26:43,320 --> 00:26:46,320

because it is our largest telescope.

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00:26:47,320 --> 00:26:51,320

Three years after the message is sent into space, there is a response.

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00:26:51,320 --> 00:27:00,320

At the Ohio State University Radio Observatory, Jerry Eamon is at the controls of a radio receiver called the Big Ear,

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00:27:00,320 --> 00:27:04,320

one of the listening devices in the government's SETI network.

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00:27:04,320 --> 00:27:10,320

I had the task to look at the computer printouts to see if there was anything interesting.

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00:27:10,320 --> 00:27:15,320

Anything for or above was definitely unusual.

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00:27:15,320 --> 00:27:24,320

Well, this was the equivalent of 30, and so it was so strong, five to six times stronger than I had seen any signal in the past,

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00:27:24,320 --> 00:27:31,320

that I was astonished and immediately wrote the word, wow, exclamation point in the margin of the computer printout.

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00:27:31,320 --> 00:27:37,320

Within a series of random numbers, the computer had kicked out a strange series of letters.

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00:27:37,320 --> 00:27:42,320

What did 6EQUJ5 mean?

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00:27:43,320 --> 00:27:50,320

It was probably interference of one sort or another, but it was the kind of interference that

mimics a real signal.

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00:27:50,320 --> 00:27:55,320

I mean, nobody knows what it was. You have to admit that, but seeing a signal once is not good enough.

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00:27:55,320 --> 00:28:00,320

It would be like my neighbor seeing a ghost in his attic once, and every time we went back to his attic, it was never a ghost again.

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00:28:00,320 --> 00:28:03,320

Well, unfortunately, that just doesn't prove the existence of ghosts.

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00:28:06,320 --> 00:28:11,320

SETI keeps looking, and through the 1980s, scientists are on a roll.

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00:28:11,320 --> 00:28:18,320

The search for extraterrestrial intelligence has gradually encouraged a worldwide web of scientific interest and support.

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00:28:21,320 --> 00:28:29,320

SETI becomes a line item in the NASA budget, and its federal funding rises from just a few hundred thousand dollars in the early 1970s

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00:28:29,320 --> 00:28:32,320

to over ten million dollars in the early 1990s.

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00:28:33,320 --> 00:28:40,320

Then, on October 12, 1992, ironically the 500th anniversary of Columbus' discovery of the New World,

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00:28:40,320 --> 00:28:46,320

Congress downsizes the SETI program, and within a year pulls the plug.

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00:28:48,320 --> 00:28:55,320

After more than 15 years and 60 million dollars in research and development, SETI is dead.

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00:28:56,320 --> 00:29:04,320

All these resources potentially wasted, because it was a great embarrassment to the American Congress, and in fact to our country.

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00:29:04,320 --> 00:29:08,320

And indeed, in the rest of the world, people shake their heads every time they hear about it.

348

00:29:08,320 --> 00:29:14,320

How could the Americans, who are so sophisticated in science and technology, have done something so dumb?

349

00:29:14,320 --> 00:29:16,320

This was not a good thing for the government to do.

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00:29:16,320 --> 00:29:22,320

I think that the American people were behind such a search, and still are behind such a search,

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00:29:22,320 --> 00:29:28,320

and that the amount of money that was being spent on that was, for such a grave question, for such an important question,

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00:29:28,320 --> 00:29:34,320

for a question that bears on our place in the universe, really was worthwhile.

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00:29:35,320 --> 00:29:38,320

So SETI goes private, and goes begging.

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00:29:38,320 --> 00:29:44,320

In 1993, it becomes the non-profit SETI Institute in Mountain View, California.

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00:29:45,320 --> 00:29:49,320

Bill Hewlett and David Packard of Computer fame provide the seed money.

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00:29:49,320 --> 00:29:56,320

Gordon Moore, a co-founder of Intel, and Paul Allen, a co-founder of Microsoft, each write million dollar checks.

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00:30:01,320 --> 00:30:07,320

The Institute launches Project Phoenix, because SETI has indeed risen from the ashes.

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00:30:08,320 --> 00:30:17,320

I think the knowledge that we share the universe with other intelligent creatures will change our view profoundly,

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00:30:17,320 --> 00:30:19,320

but it may not happen overnight.

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00:30:19,320 --> 00:30:29,320

We're definitely trying to pursue the search for extraterrestrial intelligence, the way that you would pursue any other scientific exploration,

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00:30:29,320 --> 00:30:31,320

and to do it credibly.

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00:30:31,320 --> 00:30:33,320

And where is science fiction?

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00:30:33,320 --> 00:30:42,320

Carl Sagan uses Dr. Tartar as a model for the astronomer in his book, Contact, which later inspires a movie that stars Jody Foster.

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00:30:43,320 --> 00:30:50,320

In the movie, astronomers receive and decode a signal from an extraterrestrial intelligence far beyond our galaxy.

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00:30:51,320 --> 00:30:55,320

Real life may not be far behind at SETI's new listening post.

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00:30:56,320 --> 00:31:00,320

Frank Drake's old stomping ground, the Arecibo radio telescope.

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00:31:01,320 --> 00:31:05,320

The most fun part of my job is actually when I get to go to the observatory.

368

00:31:05,320 --> 00:31:09,320

Arecibo is a very special and unique observatory.

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00:31:10,320 --> 00:31:17,320

The scale of the facility is something that's really hard to appreciate from videos or seen in the distance.

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00:31:17,320 --> 00:31:27,320

You have to stand there, you have to be underneath a thing, or 500 feet up in the air on top of it to understand how big an amethyst is.

371

00:31:28,320 --> 00:31:36,320

And then when you're there, and this piece of listening equipment is there, nothing else matters.

372

00:31:38,320 --> 00:31:47,320

Computers at Arecibo continuously scan millions of radio frequencies looking for that peripatetic signal emanating from deep space.

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00:31:48,320 --> 00:31:58,320

Tartar was at a computer terminal there one night in 1998 with SETI astronomer Seth Shostak when they think they may have found it.

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00:31:58,320 --> 00:32:03,320

We got a signal that for a while looked quite interesting, both Joe Tartar and I.

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00:32:03,320 --> 00:32:07,320

We weren't saying much, but we were paying very, very close attention to what was happening.

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00:32:08,320 --> 00:32:12,320

When you pass the first layer of filtering, oh well, that's happened before.

377

00:32:12,320 --> 00:32:17,320

But by the time you pass the second layer of filtering, that hasn't happened very often.

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00:32:17,320 --> 00:32:21,320

And you really do get intrigued.

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00:32:21,320 --> 00:32:24,320

It certainly occurs to you that, well, what if this is the big one?

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00:32:24,320 --> 00:32:28,320

You know, because you're not expecting the big one at that particular moment.

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00:32:28,320 --> 00:32:31,320

You'll never be expecting the big one when it happens, of course.

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00:32:31,320 --> 00:32:33,320

And that gives you a certain amount of pause.

383

00:32:33,320 --> 00:32:34,320

You know, how am I going to react to this?

384

00:32:34,320 --> 00:32:37,320

I mean, what if this is it? What am I going to do next?

385

00:32:37,320 --> 00:32:38,320

It's a little unsettling.

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00:32:39,320 --> 00:32:50,320

I don't know if I have so much of the, my God, it's me feeling as a reconfirmation that it really could happen.

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00:32:53,320 --> 00:33:01,320

Unfortunately, in each case, it's turned out to be something particularly complex about our own technology that's foolless.

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00:33:02,320 --> 00:33:04,320

But no one's giving up yet.

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00:33:04,320 --> 00:33:10,320

SETI has optimistically established a series of protocols if ET ever phones home.

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00:33:10,320 --> 00:33:15,320

One is make really sure that the signal you've detected is extraterrestrial.

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00:33:15,320 --> 00:33:16,320

That's point one.

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00:33:16,320 --> 00:33:20,320

So it calls for confirmation, very careful confirmation.

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00:33:20,320 --> 00:33:23,320

And point to us, you release it immediately to the whole world.

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00:33:24,320 --> 00:33:38,320

In fact, the information about the existence of an extraterrestrial technology is really quite properly the property of all human kind, that we don't intend to keep it secret.

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00:33:41,320 --> 00:33:52,320

And as the search for signals from space continues into the 21st century, contact of another kind proves there is life out there, and the Percival Lowell was right all along.

396

00:33:54,320 --> 00:33:58,320

Was Genesis a one time event here on Earth, or is there a second Genesis out there?

397

00:34:02,320 --> 00:34:10,320

For centuries, astronomers have aimed their telescopes into the heavens and wondered about what was on on those far away stars and planets.

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00:34:12,320 --> 00:34:13,320

The universe is a big place.

399

00:34:13,320 --> 00:34:18,320

When you look at that small patch of sky and see all those galaxies, you see where we fit in the universe.

400

00:34:18,320 --> 00:34:21,320

But land based telescopes have their limitations.

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00:34:21,320 --> 00:34:30,320

So ever since 1964 and the first Mariner missions, we have tried to get closer to them instead of waiting for them to come to us.

402

00:34:30,320 --> 00:34:32,320

First stop, Mars.

403

00:34:36,320 --> 00:34:45,320

1965, an Atlas rocket sends the Mariner 4 probe on a 325 million mile seven month journey to Mars.

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00:34:46,320 --> 00:34:51,320

Mariner 4 sends back the first close up views of a planet other than our own.

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00:34:51,320 --> 00:34:57,320

Early in its history, we see evidence that it had water, that it had a thicker atmosphere, that it was very much like the Earth.

406

00:34:57,320 --> 00:34:59,320

So maybe it had life as well.

407

00:35:02,320 --> 00:35:07,320

Mariner 4 has given just a few brief and intoxicating glimpses of Mars.

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00:35:08,320 --> 00:35:15,320

The dual missions of Mariner 6 and 7 in 1969 train their cameras on the puzzling polar areas of the planet.

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00:35:15,320 --> 00:35:19,320

Those white polar caps are not water ice. They're carbon dioxide ice.

410

00:35:19,320 --> 00:35:24,320

The dark features are not vegetation. They're dust moving around by the wind.

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00:35:25,320 --> 00:35:32,320

In 1971, when Mariner 9 settles into a geosynchronous orbit around Mars,

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00:35:32,320 --> 00:35:37,320

it becomes the first American spacecraft to orbit around a planet other than Earth.

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00:35:37,320 --> 00:35:43,320

Within five years, we are strolling on the red planet, albeit by remote control.

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00:35:43,320 --> 00:35:49,320

The question of life on Mars or life on any other planet, in our solar system or outside of the solar system,

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00:35:49,320 --> 00:35:52,320

bears very much in what our place is in the universe.

416

00:35:52,320 --> 00:35:59,320

If we're the only ones, the only life in the universe, it's quite a different universe than if it's filled with life.

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00:35:59,320 --> 00:36:07,320

By 1976, Viking 1 and 2 transmit to Earth a series of images of the vast Martian landscape.

418

00:36:07,320 --> 00:36:12,320

The two probes also test the soil for signs of Martian life.

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00:36:12,320 --> 00:36:18,320

I was not one of those kids that read science fiction since day one, but the science of Viking has gotten me interested.

420

00:36:18,320 --> 00:36:23,320

Spacecraft lands on Mars, looks around for life, doesn't see anything, everybody's dead.

421

00:36:23,320 --> 00:36:27,320

There's nothing there, but all the elements needed for life are there.

422

00:36:27,320 --> 00:36:33,320

I thought, well, that's kind of odd. It's sort of lights are on, but nobody's home sort of message.

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00:36:36,320 --> 00:36:45,320

But somehow this real proof of life beyond Earth is eclipsed by the public's desire to make science and science fiction merge once more.

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00:36:46,320 --> 00:36:55,320

All eyes turn to this, a seemingly artificial structure on the surface of Mars that bears a striking resemblance to a human face.

425

00:36:58,320 --> 00:37:05,320

We want to believe and for a while we do, but it's just a pile of rocks photographed at Martian sunset.

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00:37:05,320 --> 00:37:12,320

Meanwhile, back on Earth, another discovery would literally rock the scientific community.

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00:37:15,320 --> 00:37:21,320

In 1984, government researchers in Antarctica discover a small meteorite.

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00:37:21,320 --> 00:37:25,320

It looks like a potato and it comes from Mars.

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00:37:25,320 --> 00:37:37,320

Tests on rock ALH84001 in 1995 reveal microscopic traces of organic material that might indicate the presence of a past life.

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00:37:38,320 --> 00:37:42,320

In that rock, the team from Johnson Space Center thinks they found fossils.

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00:37:42,320 --> 00:37:48,320

Now that discussion is still very much open. We don't know for sure if those are fossils, if they aren't.

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00:37:48,320 --> 00:37:53,320

This is one of the reasons why we think life could be carried from Mars to Earth and probably vice versa.

433

00:37:55,320 --> 00:38:02,320

July 4th, 1997, NASA's Pathfinder Mobile Surveyor lands on Mars.

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00:38:02,320 --> 00:38:10,320

As we get deeper and more profound in our understanding of Mars, we might be able to find evidence that there was once life there.

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00:38:10,320 --> 00:38:13,320

There's two possibilities when we look at the possibility of life on Mars.

436

00:38:13,320 --> 00:38:20,320

One is that we'll go to Mars, we'll find fossils, we'll find life and it will turn out to be the same as us.

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00:38:20,320 --> 00:38:25,320

A more interesting scenario would be if we go to Mars, we find fossils, we find evidence of life,

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00:38:25,320 --> 00:38:30,320

we find Martian biochemistry in the dead Martians and their organic material.

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We compare it to us and we realize these are truly alien. These are a different type of life.

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00:38:35,320 --> 00:38:37,320

This was the second genesis of life.

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00:38:37,320 --> 00:38:41,320

In the back of my mind, I always think we are too conservative.

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00:38:41,320 --> 00:38:54,320

My thought on that is that if you examine the biology of Earth, you'd realize one of life's prime characteristics is very opportunistic, very adaptive.

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00:38:54,320 --> 00:39:01,320

And so we in our conservative ways say life will only exist on planets much like the Earth.

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00:39:01,320 --> 00:39:08,320

And I'll bet you anything, we're going to find worlds where there's life, disobey, one or all of those things.

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00:39:08,320 --> 00:39:14,320

At what point do you throw in the towel? You know, if you've done this for another 10 or 20 years, are you going to say,

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00:39:14,320 --> 00:39:18,320

OK, we give up, they're not there? And of course the answer to that is no.

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00:39:18,320 --> 00:39:21,320

Just because you haven't found them, doesn't mean they're not there.

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00:39:23,320 --> 00:39:29,320

It has been more than 100 years since Percival Lowell theorized about life on Mars.

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And although it appears that the advanced civilization Lowell thought might exist was never there,

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00:39:34,320 --> 00:39:40,320

he has left an unwavering legacy in popular culture and in science that lives on.

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00:39:41,320 --> 00:39:46,320

Lowell was wrong in a detail, but he was right in the big question and he was right in the planet to go after.

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00:39:46,320 --> 00:39:53,320

He was right in asking the question that searching for life is the interesting thing we should do when we go looking at the stars and going to space.

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00:39:53,320 --> 00:39:58,320

And he was right in supposing that Mars was the first planet that's going to give us meaningful answers.

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00:39:58,320 --> 00:40:05,320

I think if Lowell's spirit is alive today, it's going to be alive in people like me and scientists like us who are searching for life

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00:40:05,320 --> 00:40:12,320

and who see Mars as being the most interesting planet other than the Earth in terms of the story of life.

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00:40:13,320 --> 00:40:22,320

Just before his untimely death in 1916, Percival Lowell observed what he thought was a ninth planet far out in the solar system.

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He was right. In 1930, astronomers at the Lowell Observatory verified his sightings of the so-called Planet X

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and honored his memory by naming the newly found planet Pluto, PL, being taken from the initials of Percival Lowell.

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00:40:40,320 --> 00:40:46,320

You can use his telescope, walk out the front door and within about ten yards is his mausoleum.

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00:40:46,320 --> 00:40:51,320

And so he's in spirit at least still watching over the telescope and keeping an eye on us,

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00:40:51,320 --> 00:40:56,320

making sure we look at things he wants to and takes care of his telescope.

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00:41:16,320 --> 00:41:18,320

See you.