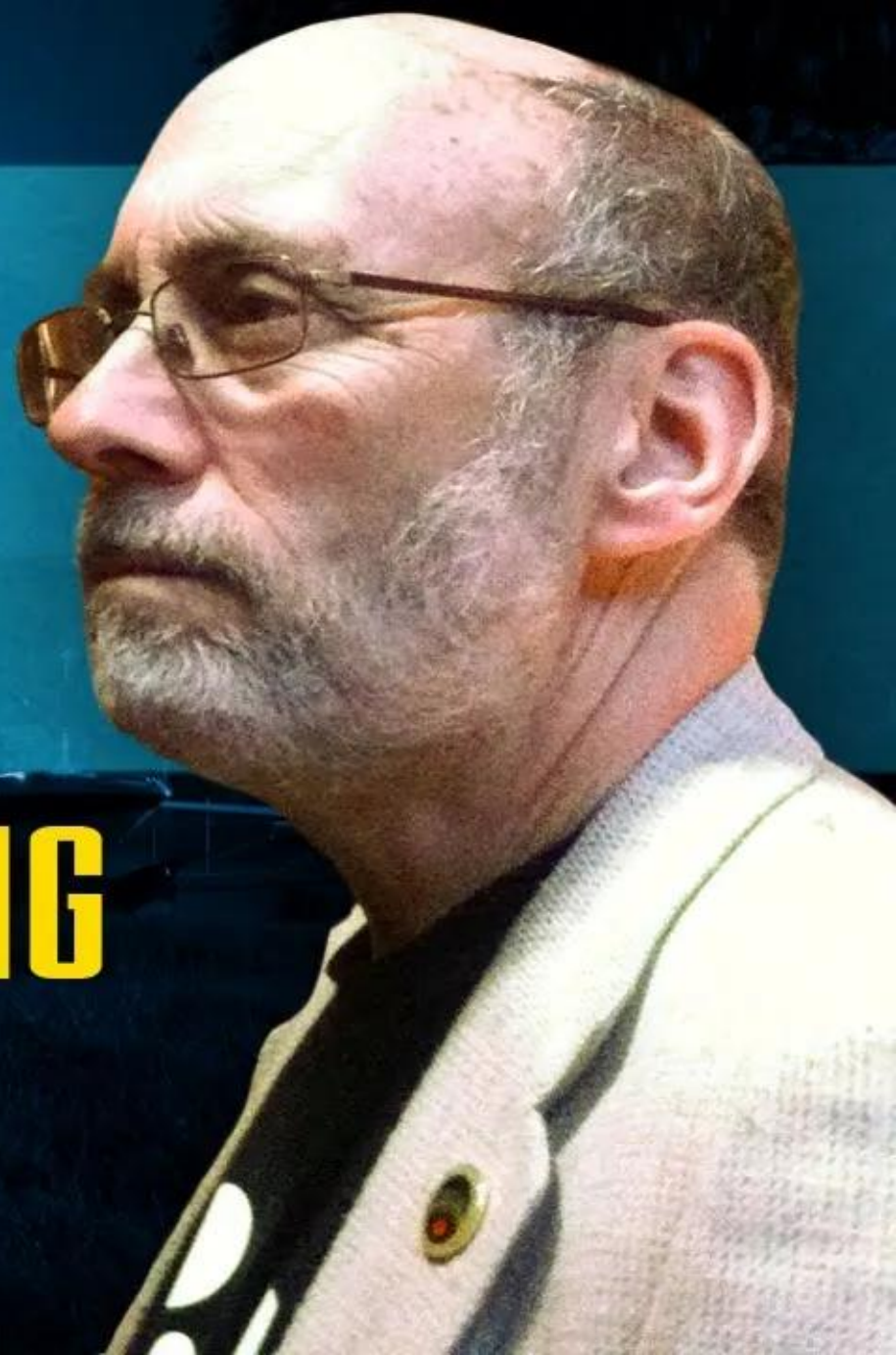


# DR. GREGORY MATLOFF

STELLAR ENGINEERING

#446



1  
00:00:28,830 --> 00:00:24,930  
[Music]

2  
00:00:28,840 --> 00:00:34,050  
so

3  
00:01:02,549 --> 00:00:41,000  
[Music]

4  
00:01:05,990 --> 00:01:04,710  
hello and welcome to the show i'm martin

5  
00:01:08,070 --> 00:01:06,000  
willis your host

6  
00:01:10,310 --> 00:01:08,080  
and i'm excited about another kind of

7  
00:01:13,830 --> 00:01:10,320  
sciency type show

8  
00:01:16,070 --> 00:01:13,840  
i have dr greg matloff on and he

9  
00:01:17,510 --> 00:01:16,080  
is going to be talking about his book

10  
00:01:19,350 --> 00:01:17,520  
which i got in the mail

11  
00:01:21,270 --> 00:01:19,360  
a month ago i thought for sure i'd have

12  
00:01:23,990 --> 00:01:21,280  
plenty of time to read it i've just been

13  
00:01:24,310 --> 00:01:24,000

very very busy i started reading it and

14

00:01:43,030 --> 00:01:24,320

i

15

00:01:46,389 --> 00:01:43,040

dyson uh swarm stapleton dyson swarm

16

00:01:48,710 --> 00:01:46,399

of alien space habitats within our

17

00:01:50,230 --> 00:01:48,720

solar system's kuiper belt that's way

18

00:01:50,789 --> 00:01:50,240

out there if you don't know but it's

19

00:01:56,230 --> 00:01:50,799

pretty far

20

00:01:58,069 --> 00:01:56,240

they have i forget exactly what it's

21

00:02:00,230 --> 00:01:58,079

called i'm going to ask him but

22

00:02:02,469 --> 00:02:00,240

it has to do with the distance between

23

00:02:04,789 --> 00:02:02,479

us and the sun which i know is something

24

00:02:08,070 --> 00:02:04,799

like 92 million miles

25

00:02:08,550 --> 00:02:08,080

and 100 some odd kilometers anyway

26

00:02:12,070 --> 00:02:08,560

that's

27

00:02:15,190 --> 00:02:12,080

uh the kuiper belt is i believe several

28

00:02:17,110 --> 00:02:15,200

several of those out there um

29

00:02:19,110 --> 00:02:17,120

and it takes a long time to get there

30

00:02:21,110 --> 00:02:19,120

but um

31

00:02:22,550 --> 00:02:21,120

it it really is a fascinating book i

32

00:02:25,990 --> 00:02:22,560

mean i learned so much in the

33

00:02:29,190 --> 00:02:26,000

beginning of what i was reading

34

00:02:32,309 --> 00:02:29,200

and he is a uh greg is a

35

00:02:35,270 --> 00:02:32,319

leading expert in the possibilities for

36

00:02:35,670 --> 00:02:35,280

interstellar propulsion especially the

37

00:02:38,790 --> 00:02:35,680

near

38

00:02:40,710 --> 00:02:38,800

sun solar sail trajectories and uh

39  
00:02:42,630 --> 00:02:40,720  
as you know a couple weeks ago we had dr

40  
00:02:45,270 --> 00:02:42,640  
avi loeb uh that

41  
00:02:46,869 --> 00:02:45,280  
talked a bit about the sailor i mean the

42  
00:02:49,110 --> 00:02:46,879  
uh solar sails in the

43  
00:02:50,150 --> 00:02:49,120  
well actually it's kind of sale

44  
00:02:52,790 --> 00:02:50,160  
technology with

45  
00:02:53,589 --> 00:02:52,800  
lasers and and things like that in this

46  
00:03:00,309 --> 00:02:53,599  
uh

47  
00:03:02,390 --> 00:03:00,319  
i hope you do get a chance to read his

48  
00:03:04,710 --> 00:03:02,400  
bio it's it's like a book

49  
00:03:05,670 --> 00:03:04,720  
and um that will be in our show notes

50  
00:03:07,030 --> 00:03:05,680  
and also

51

00:03:09,430 --> 00:03:07,040

i do believe that it is in the

52

00:03:13,589 --> 00:03:09,440

description in youtube

53

00:03:16,790 --> 00:03:13,599

um well uh as far as this week's blog

54

00:03:19,589 --> 00:03:16,800

it's uh ufos and astronauts and uh

55

00:03:20,869 --> 00:03:19,599

if you are part of the podcast feed

56

00:03:24,550 --> 00:03:20,879

you'll see that i

57

00:03:27,030 --> 00:03:24,560

i posted an old interview i did with

58

00:03:28,470 --> 00:03:27,040

um the fourth man on the moon um

59

00:03:31,270 --> 00:03:28,480

astronaut alan

60

00:03:32,869 --> 00:03:31,280

bean i did that back in 2009 but he's a

61

00:03:33,830 --> 00:03:32,879

wonderful man i hope you if you haven't

62

00:03:35,910 --> 00:03:33,840

listened to it

63

00:03:37,110 --> 00:03:35,920

it's in the podcast feed it's all also

64

00:03:40,149 --> 00:03:37,120

in youtube

65

00:03:41,350 --> 00:03:40,159

uh what a great attitude um that

66

00:03:43,670 --> 00:03:41,360

gentleman had

67

00:03:44,830 --> 00:03:43,680

uh especially when it comes to what

68

00:03:47,990 --> 00:03:44,840

people believe about

69

00:03:48,869 --> 00:03:48,000

conspiracies that no one landed on the

70

00:03:51,350 --> 00:03:48,879

moon

71

00:03:53,270 --> 00:03:51,360

and you know all that uh it's a fun

72

00:03:56,390 --> 00:03:53,280

podcast i hope you had a chance to

73

00:03:59,429 --> 00:03:56,400

to check that out so uh that

74

00:04:01,509 --> 00:03:59,439

that ufos and astronauts blog kind of

75

00:04:04,630 --> 00:04:01,519

goes with that now alan did

76

00:04:07,509 --> 00:04:04,640

was part of a very unusual sighting in

77

00:04:09,030 --> 00:04:07,519

skylab too i believe was 1973.

78

00:04:11,030 --> 00:04:09,040

can't find a lot of information about

79

00:04:13,030 --> 00:04:11,040

that but i did talk to him a little bit

80

00:04:15,350 --> 00:04:13,040

about that a few years ago and

81

00:04:16,789 --> 00:04:15,360

um he was not interested in coming on

82

00:04:20,069 --> 00:04:16,799

the show about that

83

00:04:22,710 --> 00:04:20,079

uh next week we have frank fischino

84

00:04:23,670 --> 00:04:22,720

i was coming on to talk about the

85

00:04:25,830 --> 00:04:23,680

unusual

86

00:04:26,790 --> 00:04:25,840

flatwoods monster case that happened way

87

00:04:28,870 --> 00:04:26,800

back

88

00:04:29,990 --> 00:04:28,880

he's written a book on that it's a very

89

00:04:33,030 --> 00:04:30,000

interesting and weird

90

00:04:35,670 --> 00:04:33,040

very strange case and so

91

00:04:37,430 --> 00:04:35,680

uh if you go on our website you'll see

92

00:04:37,830 --> 00:04:37,440

that i have some pictures from people

93

00:04:41,030 --> 00:04:37,840

all

94

00:04:43,990 --> 00:04:41,040

you listen to the show and you want to

95

00:04:46,870 --> 00:04:44,000

send a picture that represents yourself

96

00:04:48,790 --> 00:04:46,880

or uh the the area in which you live and

97

00:04:50,230 --> 00:04:48,800

just a first name and location

98

00:04:52,070 --> 00:04:50,240

i will post it on that page there's

99

00:04:55,189 --> 00:04:52,080

quite a few in there now from

100

00:04:57,270 --> 00:04:55,199

all the way from iraq to uh

101  
00:04:59,110 --> 00:04:57,280  
all over the world so anyway it's kind

102  
00:05:01,909 --> 00:04:59,120  
of fun to to check that out

103  
00:05:03,350 --> 00:05:01,919  
and uh the email address i have for that

104  
00:05:06,710 --> 00:05:03,360  
is gps

105  
00:05:09,189 --> 00:05:06,720  
at podcastufo.com and

106  
00:05:10,070 --> 00:05:09,199  
also it is on the website if you're over

107  
00:05:12,070 --> 00:05:10,080  
on the website

108  
00:05:13,510 --> 00:05:12,080  
also you can see how to support the show

109  
00:05:15,189 --> 00:05:13,520  
if you don't and

110  
00:05:16,550 --> 00:05:15,199  
you'd like to for as little as two

111  
00:05:18,790 --> 00:05:16,560  
dollars a month

112  
00:05:19,830 --> 00:05:18,800  
anything helps and i do appreciate every

113  
00:05:22,950 --> 00:05:19,840

single listener

114

00:05:25,830 --> 00:05:22,960

and i appreciate every single supporter

115

00:05:26,710 --> 00:05:25,840

so uh that's it for all my blabbing i'm

116

00:05:29,909 --> 00:05:26,720

going to bring in

117

00:05:32,070 --> 00:05:29,919

my guest now welcome to the show greg

118

00:05:33,270 --> 00:05:32,080

hello martin it's lovely to be here

119

00:05:35,749 --> 00:05:33,280

thank you so much

120

00:05:36,629 --> 00:05:35,759

for having me yes you're very welcome

121

00:05:40,230 --> 00:05:36,639

and um

122

00:05:42,790 --> 00:05:40,240

uh what uh i guess i'm i'm gonna ask you

123

00:05:44,390 --> 00:05:42,800

to start out with um in the beginning

124

00:05:46,150 --> 00:05:44,400

when you were young growing up was

125

00:05:48,629 --> 00:05:46,160

was astronomy and this this type of

126  
00:05:49,590 --> 00:05:48,639  
thing something you had a fascination

127  
00:05:53,029 --> 00:05:49,600  
with

128  
00:05:55,189 --> 00:05:53,039  
my parents made a bad mistake

129  
00:05:56,390 --> 00:05:55,199  
for my 13th birthday they gave me a

130  
00:05:59,510 --> 00:05:56,400  
telescope

131  
00:06:04,830 --> 00:05:59,520  
oh a three and a half inch or

132  
00:06:10,150 --> 00:06:08,390  
skye skyscope it was a newtonian

133  
00:06:12,790 --> 00:06:10,160  
reflector

134  
00:06:13,670 --> 00:06:12,800  
and i began to spend initially we were

135  
00:06:17,029 --> 00:06:13,680  
living in

136  
00:06:19,110 --> 00:06:17,039  
we had an apartment in lucky a house

137  
00:06:20,230 --> 00:06:19,120  
in williamsburg brooklyn later moved out

138  
00:06:22,390 --> 00:06:20,240

to queens

139

00:06:24,150 --> 00:06:22,400

but also had a country house in the

140

00:06:27,510 --> 00:06:24,160

hamptons

141

00:06:30,230 --> 00:06:27,520

and when i was an adolescent everybody

142

00:06:33,110 --> 00:06:30,240

else in the hamptons of my age was

143

00:06:35,029 --> 00:06:33,120

trying to get the first base with the

144

00:06:36,950 --> 00:06:35,039

local girls out there

145

00:06:38,469 --> 00:06:36,960

and i would spend my nights instead

146

00:06:41,909 --> 00:06:38,479

going out looking at things like

147

00:06:45,510 --> 00:06:41,919

m13 you know any planets in the sky

148

00:06:45,909 --> 00:06:45,520

the moon and really having a great time

149

00:06:55,990 --> 00:06:45,919

and

150

00:06:58,150 --> 00:06:56,000

wonder

151

00:06:59,990 --> 00:06:58,160

where are they which of those little

152

00:07:02,550 --> 00:07:00,000

dots in the sky

153

00:07:03,830 --> 00:07:02,560

has advanced civilizations they might

154

00:07:08,550 --> 00:07:03,840

teach or something

155

00:07:12,390 --> 00:07:10,790

yeah yeah i've always i've i've i you

156

00:07:15,189 --> 00:07:12,400

know i was contemplating this

157

00:07:16,070 --> 00:07:15,199

before i wonder what the equivalent of

158

00:07:23,990 --> 00:07:16,080

the

159

00:07:25,510 --> 00:07:24,000

mean it's it's fascinating when you

160

00:07:29,270 --> 00:07:25,520

really think of it all

161

00:07:31,189 --> 00:07:29,280

and uh and the distances are are just

162

00:07:33,589 --> 00:07:31,199

you know i i've said this before in the

163

00:07:34,629 --> 00:07:33,599

show because i had an astrophysicist

164

00:07:37,350 --> 00:07:34,639

that said

165

00:07:39,189 --> 00:07:37,360

basically if the earth was in maryland

166

00:07:40,790 --> 00:07:39,199

and it was the size of a ball and a

167

00:07:43,350 --> 00:07:40,800

ballpoint pen

168

00:07:46,390 --> 00:07:43,360

you know that little teeny teeny ball um

169

00:07:49,270 --> 00:07:46,400

the first star would be in california

170

00:07:51,189 --> 00:07:49,280

you know so which is uh which is amazing

171

00:07:54,230 --> 00:07:51,199

when you really think about the distance

172

00:07:56,830 --> 00:07:54,240

and um and your your book um

173

00:07:58,150 --> 00:07:56,840

stellar um engineering and you talk

174

00:08:00,309 --> 00:07:58,160

about

175

00:08:01,589 --> 00:08:00,319

you know the possibility that

176

00:08:05,110 --> 00:08:01,599

intelligent life might

177

00:08:07,189 --> 00:08:05,120

build you know something enormous

178

00:08:08,469 --> 00:08:07,199

and like the diceman sphere the tabby

179

00:08:11,029 --> 00:08:08,479

star would you know the

180

00:08:12,070 --> 00:08:11,039

thoughts on what that was but i don't

181

00:08:14,950 --> 00:08:12,080

want to jump ahead so

182

00:08:15,749 --> 00:08:14,960

quickly um if you want to just fill in a

183

00:08:18,629 --> 00:08:15,759

little bit about

184

00:08:20,390 --> 00:08:18,639

um you decided to study astronomy and is

185

00:08:22,390 --> 00:08:20,400

is that how that all started

186

00:08:24,230 --> 00:08:22,400

you know after high school and all that

187

00:08:26,150 --> 00:08:24,240

well i knew that i was going to do

188

00:08:28,869 --> 00:08:26,160

something in astronomy

189

00:08:29,830 --> 00:08:28,879

i want a great student in high school

190

00:08:32,469 --> 00:08:29,840

basically

191

00:08:33,269 --> 00:08:32,479

the the guidance advisors tell my

192

00:08:37,190 --> 00:08:33,279

parents

193

00:08:38,870 --> 00:08:37,200

get them into a trade okay

194

00:08:40,630 --> 00:08:38,880

you're not going to make it in physics

195

00:08:44,149 --> 00:08:40,640

well wow

196

00:08:45,590 --> 00:08:44,159

but okay so what i did is i majored in

197

00:08:48,070 --> 00:08:45,600

physics

198

00:08:49,030 --> 00:08:48,080

and uh it was at queen's college which

199

00:08:52,230 --> 00:08:49,040

is a division

200

00:08:54,630 --> 00:08:52,240

of the city university and that was a

201  
00:08:57,990 --> 00:08:54,640  
pretty mediocre student but i was

202  
00:09:01,190 --> 00:08:58,000  
also an amateur astronomer my

203  
00:09:02,070 --> 00:09:01,200  
parents had a friend who was a

204  
00:09:05,350 --> 00:09:02,080  
technician

205  
00:09:07,990 --> 00:09:05,360  
at a small optical company in queens

206  
00:09:08,949 --> 00:09:08,000  
that was called colesman instruments

207  
00:09:12,310 --> 00:09:08,959  
they had built

208  
00:09:15,670 --> 00:09:12,320  
uh sextants in world war

209  
00:09:17,750 --> 00:09:15,680  
ii and later on star trackers

210  
00:09:19,030 --> 00:09:17,760  
for more advanced aircraft and

211  
00:09:21,670 --> 00:09:19,040  
spacecraft

212  
00:09:22,710 --> 00:09:21,680  
and they needed somebody either a

213  
00:09:24,949 --> 00:09:22,720

bachelor

214

00:09:26,790 --> 00:09:24,959

degree person in physics with an

215

00:09:29,990 --> 00:09:26,800

interest in astronomy

216

00:09:33,509 --> 00:09:30,000

or a phd

217

00:09:35,190 --> 00:09:33,519

co-star and of course at that point

218

00:09:37,269 --> 00:09:35,200

i was i would have been paid six

219

00:09:39,030 --> 00:09:37,279

thousand dollars which was abortion back

220

00:09:42,790 --> 00:09:39,040

in 1965

221

00:09:45,110 --> 00:09:42,800

and the um astrophysicist's phd would

222

00:09:48,150 --> 00:09:45,120

have gotten paid about 20 000.

223

00:09:49,990 --> 00:09:48,160

so they decided to be um

224

00:09:53,110 --> 00:09:50,000

to read the bottom line and they hired

225

00:09:53,509 --> 00:09:53,120

me and i was able to get my first papers

226

00:09:57,990 --> 00:09:53,519

out

227

00:10:01,750 --> 00:09:58,000

in applied optics oh before i was 22.

228

00:10:03,910 --> 00:10:01,760

before you're 22 well i was 22. and

229

00:10:05,829 --> 00:10:03,920

what i did because it was the peak of

230

00:10:08,630 --> 00:10:05,839

the space program then it was very

231

00:10:11,430 --> 00:10:08,640

very advantageous for the companies to

232

00:10:15,829 --> 00:10:11,440

put you through for a master's degree

233

00:10:17,829 --> 00:10:15,839

so what i did is i went to nyu

234

00:10:19,750 --> 00:10:17,839

uptown new york university which had a

235

00:10:21,110 --> 00:10:19,760

bronx campus then

236

00:10:23,030 --> 00:10:21,120

to the engineering school the

237

00:10:25,269 --> 00:10:23,040

aeronautics department

238

00:10:26,790 --> 00:10:25,279

and they initially didn't want to take

239

00:10:28,310 --> 00:10:26,800

me in because

240

00:10:30,389 --> 00:10:28,320

i didn't have great grades as an

241

00:10:33,030 --> 00:10:30,399

undergraduate and then they showed them

242

00:10:36,069 --> 00:10:33,040

my early papers and immediately

243

00:10:39,190 --> 00:10:36,079

they hired me wow and

244

00:10:41,670 --> 00:10:39,200

what i did you know i studied wonderful

245

00:10:44,870 --> 00:10:41,680

things uh planetary atmospheres

246

00:10:45,269 --> 00:10:44,880

solar system astrophysics a little bit

247

00:10:49,269 --> 00:10:45,279

of

248

00:10:52,470 --> 00:10:49,279

astro dynamics but i realized

249

00:10:55,829 --> 00:10:52,480

that i would rather

250

00:10:57,829 --> 00:10:55,839

do research than sit and take courses

251  
00:11:00,710 --> 00:10:57,839  
so i spoke to my advisor about he said

252  
00:11:02,630 --> 00:11:00,720  
oh i've come up with a research topic

253  
00:11:04,630 --> 00:11:02,640  
and i've read a book by a british

254  
00:11:07,190 --> 00:11:04,640  
physicist a guy named james strong the

255  
00:11:09,750 --> 00:11:07,200  
book is called flight to the stars

256  
00:11:10,630 --> 00:11:09,760  
and what he said is okay the best way we

257  
00:11:13,750 --> 00:11:10,640  
could do it now

258  
00:11:14,710 --> 00:11:13,760  
is with nuclear explosions fusion

259  
00:11:17,190 --> 00:11:14,720  
explosions

260  
00:11:17,990 --> 00:11:17,200  
that was freeman dyson uh and ted

261  
00:11:20,230 --> 00:11:18,000  
taylor's

262  
00:11:22,550 --> 00:11:20,240  
project orion and that's the best we

263  
00:11:25,670 --> 00:11:22,560

could do at the present time

264

00:11:28,150 --> 00:11:25,680

so what we do is uh

265

00:11:29,590 --> 00:11:28,160

we know a certain fraction of the energy

266

00:11:32,790 --> 00:11:29,600

is going to come out

267

00:11:35,190 --> 00:11:32,800

in fusion particles of your exhaust

268

00:11:36,069 --> 00:11:35,200

but there's a lot of lost energy in

269

00:11:39,430 --> 00:11:36,079

gamma rays

270

00:11:41,110 --> 00:11:39,440

neutrons x-rays and he said you simply

271

00:11:44,470 --> 00:11:41,120

reflect this

272

00:11:47,829 --> 00:11:44,480

as photons and i looked at that and said

273

00:11:48,470 --> 00:11:47,839

no you don't that's not going to get you

274

00:11:50,069 --> 00:11:48,480

very much

275

00:11:52,870 --> 00:11:50,079

but you have to because photons have a

276

00:11:56,150 --> 00:11:52,880

low momentum instead you absorb it

277

00:11:59,350 --> 00:11:56,160

as heat you convert that heat to

278

00:12:00,629 --> 00:11:59,360

a to subsidiary ion propulsion and you

279

00:12:03,910 --> 00:12:00,639

can add a lot

280

00:12:07,350 --> 00:12:03,920

to your spacecraft speed so

281

00:12:09,110 --> 00:12:07,360

that was my thesis and my advisor loved

282

00:12:10,310 --> 00:12:09,120

it and he said by the way submit this to

283

00:12:13,670 --> 00:12:10,320

a journal

284

00:12:16,629 --> 00:12:13,680

and remember why i'm your thesis advisor

285

00:12:18,150 --> 00:12:16,639

i'm your co-author a little bit about

286

00:12:21,670 --> 00:12:18,160

how academia works

287

00:12:23,190 --> 00:12:21,680

right there the paper got out i'm very

288

00:12:24,790 --> 00:12:23,200

happy about it and i didn't think

289

00:12:28,230 --> 00:12:24,800

anything else about it

290

00:12:30,790 --> 00:12:28,240

and along come the night the early 1970s

291

00:12:32,150 --> 00:12:30,800

i'm living communally and a woman in the

292

00:12:35,110 --> 00:12:32,160

group comes up and says gee

293

00:12:38,150 --> 00:12:35,120

i have a friend who is a congressional

294

00:12:39,670 --> 00:12:38,160

aide in washington dc

295

00:12:42,069 --> 00:12:39,680

and are you aware that you've been

296

00:12:45,509 --> 00:12:42,079

written into the congressional record

297

00:12:48,150 --> 00:12:45,519

i said what i mean but never that

298

00:12:51,190 --> 00:12:48,160

radical what did i do

299

00:12:53,350 --> 00:12:51,200

it's good check this out

300

00:12:55,269 --> 00:12:53,360

and i went to this and i saw that a guy

301  
00:12:58,069 --> 00:12:55,279  
named bob forward

302  
00:13:00,949 --> 00:12:58,079  
who was a wonderful space scientist

303  
00:13:03,750 --> 00:13:00,959  
unfortunately he died in the year 2000

304  
00:13:05,350 --> 00:13:03,760  
but what he had done was he had been

305  
00:13:08,870 --> 00:13:05,360  
asked to

306  
00:13:11,190 --> 00:13:08,880  
write about what we could do

307  
00:13:12,389 --> 00:13:11,200  
given an infinite budget with the space

308  
00:13:13,829 --> 00:13:12,399  
shuttle when he talked about it

309  
00:13:15,829 --> 00:13:13,839  
distiller travel

310  
00:13:17,269 --> 00:13:15,839  
and he basically cited me and put one of

311  
00:13:20,629 --> 00:13:17,279  
my figures in

312  
00:13:24,550 --> 00:13:20,639  
so i became an expert without even

313  
00:13:30,629 --> 00:13:27,670

that's amazing yep that's wow

314

00:13:32,230 --> 00:13:30,639

good for you to do all that and um as

315

00:13:33,910 --> 00:13:32,240

far as

316

00:13:36,069 --> 00:13:33,920

you know this you you have written

317

00:13:38,069 --> 00:13:36,079

another book i saw that as well

318

00:13:41,910 --> 00:13:38,079

and and how many books have you written

319

00:13:45,509 --> 00:13:41,920

so far i believe there's 13.

320

00:13:47,910 --> 00:13:45,519

okay counting the two books the artist

321

00:13:48,790 --> 00:13:47,920

scientist books i did with my wife c

322

00:13:50,949 --> 00:13:48,800

bangs

323

00:13:53,189 --> 00:13:50,959

i think it's 13 and i don't i'm not

324

00:13:56,790 --> 00:13:53,199

planning on writing anymore

325

00:14:02,310 --> 00:13:56,800

are you done but 13 is an unlucky number

326

00:14:07,110 --> 00:14:02,320

you have to write one more yeah

327

00:14:10,230 --> 00:14:07,120

uh wow uh 13 that's amazing and um

328

00:14:10,790 --> 00:14:10,240

and so this one in particular um i

329

00:14:14,230 --> 00:14:10,800

remember

330

00:14:15,990 --> 00:14:14,240

somewhere reading in about um

331

00:14:17,350 --> 00:14:16,000

there's a type of because i always

332

00:14:18,710 --> 00:14:17,360

thought if there's something like

333

00:14:21,910 --> 00:14:18,720

massive

334

00:14:24,710 --> 00:14:21,920

in the uh anywhere built out there

335

00:14:26,230 --> 00:14:24,720

i always think of materials where in on

336

00:14:28,870 --> 00:14:26,240

earth

337

00:14:30,710 --> 00:14:28,880

could they get the amount of materials

338

00:14:33,509 --> 00:14:30,720

to build something as

339

00:14:34,710 --> 00:14:33,519

you know that surrounds like a a solar

340

00:14:36,389 --> 00:14:34,720

system type of thing

341

00:14:37,990 --> 00:14:36,399

how is that even possible does it have

342

00:14:41,350 --> 00:14:38,000

to do with very thin

343

00:14:43,829 --> 00:14:41,360

molecule thick technology or something

344

00:14:44,629 --> 00:14:43,839

okay well the people who really started

345

00:14:47,590 --> 00:14:44,639

this off

346

00:14:50,150 --> 00:14:47,600

was a british philosopher and science

347

00:14:54,389 --> 00:14:50,160

fiction writer olaf stapleton

348

00:14:56,629 --> 00:14:54,399

in his epic novel star maker in 1937

349

00:14:57,509 --> 00:14:56,639

and then it was picked up by british

350

00:15:01,750 --> 00:14:57,519

american

351  
00:15:04,470 --> 00:15:01,760  
physicist freeman dyson in the year 1960

352  
00:15:06,069 --> 00:15:04,480  
and dyson was interested in seti

353  
00:15:07,110 --> 00:15:06,079  
searching for extraterrestrial

354  
00:15:08,790 --> 00:15:07,120  
intelligence

355  
00:15:10,310 --> 00:15:08,800  
but he wanted to look at it from a new

356  
00:15:12,710 --> 00:15:10,320  
point of view he wanted to look at it

357  
00:15:15,910 --> 00:15:12,720  
not from people beaming people

358  
00:15:21,189 --> 00:15:15,920  
aliens beaming signals to us

359  
00:15:26,230 --> 00:15:24,310  
rather than a radio beam something

360  
00:15:27,590 --> 00:15:26,240  
called a techno signature

361  
00:15:30,069 --> 00:15:27,600  
in other words you're looking at a

362  
00:15:33,430 --> 00:15:30,079  
signature of an alien technology

363  
00:15:36,470 --> 00:15:33,440

and he said okay if somebody took apart

364

00:15:39,350 --> 00:15:36,480

their big planets their equivalent

365

00:15:40,069 --> 00:15:39,360

of jupiter and saturn put them together

366

00:15:44,629 --> 00:15:40,079

in a

367

00:15:47,110 --> 00:15:44,639

large basically a spherical shell

368

00:15:49,590 --> 00:15:47,120

and had that spinning at the right speed

369

00:15:52,230 --> 00:15:49,600

they could have one gravity on it

370

00:15:53,509 --> 00:15:52,240

and um basically it could give them

371

00:15:56,310 --> 00:15:53,519

tremendous amounts

372

00:15:57,990 --> 00:15:56,320

of living space he realized there was

373

00:16:00,470 --> 00:15:58,000

problems with this

374

00:16:01,990 --> 00:16:00,480

and he realized that to do a complete

375

00:16:04,629 --> 00:16:02,000

enclosure like that

376

00:16:07,189 --> 00:16:04,639

probably wouldn't work because of the

377

00:16:08,790 --> 00:16:07,199

different dynamics

378

00:16:10,790 --> 00:16:08,800

i don't want to get technical in this

379

00:16:12,230 --> 00:16:10,800

but there are two forces that balance in

380

00:16:14,629 --> 00:16:12,240

this thing

381

00:16:16,629 --> 00:16:14,639

one is centripetal force centrifugal

382

00:16:18,710 --> 00:16:16,639

force and one is gravity

383

00:16:19,990 --> 00:16:18,720

and they're going to balance very nicely

384

00:16:23,189 --> 00:16:20,000

at the

385

00:16:25,189 --> 00:16:23,199

equator so there's a poles you're not

386

00:16:27,350 --> 00:16:25,199

going to have much centrifugal force

387

00:16:28,710 --> 00:16:27,360

so basically your thing is going to get

388

00:16:32,629 --> 00:16:28,720

squashed down

389

00:16:36,389 --> 00:16:32,639

unless it has enormous tensile strength

390

00:16:38,629 --> 00:16:36,399

so probably you can't build a real shell

391

00:16:40,629 --> 00:16:38,639

around the star unless you can have the

392

00:16:41,590 --> 00:16:40,639

type of tensile strength material that

393

00:16:45,509 --> 00:16:41,600

exists

394

00:16:47,910 --> 00:16:45,519

inside atomic nuclei so along came

395

00:16:50,389 --> 00:16:47,920

science fiction writers to look at this

396

00:16:52,550 --> 00:16:50,399

larry niven and

397

00:16:55,189 --> 00:16:52,560

i'm sure many of you people have read

398

00:16:57,030 --> 00:16:55,199

him he's a very interesting guy also

399

00:16:59,269 --> 00:16:57,040

what larry did is he came up with a

400

00:17:02,389 --> 00:16:59,279

concept called ring world

401  
00:17:05,909 --> 00:17:02,399  
and he said okay you don't have

402  
00:17:11,590 --> 00:17:08,870  
solid sphere but you have a ring around

403  
00:17:14,150 --> 00:17:11,600  
the stars this is the star over here

404  
00:17:16,069 --> 00:17:14,160  
the ring might go like this way around

405  
00:17:19,110 --> 00:17:16,079  
near its equator

406  
00:17:21,829 --> 00:17:19,120  
and if you design that right maybe life

407  
00:17:24,309 --> 00:17:21,839  
could actually live in that fit vicinity

408  
00:17:26,309 --> 00:17:24,319  
for billions of years

409  
00:17:28,390 --> 00:17:26,319  
we had ringworld i believe he did it

410  
00:17:30,870 --> 00:17:28,400  
with jerry cornell some of them but i'm

411  
00:17:33,190 --> 00:17:30,880  
trying to remember i'll have to go back

412  
00:17:34,710 --> 00:17:33,200  
and dig dig it out of my library which i

413  
00:17:38,070 --> 00:17:34,720

don't want to do right now

414

00:17:41,430 --> 00:17:38,080

but people could check that wow um

415

00:17:44,390 --> 00:17:41,440

yeah go ahead and the idea

416

00:17:44,870 --> 00:17:44,400

laid sort of dormant for a while there

417

00:17:48,230 --> 00:17:44,880

was

418

00:17:49,110 --> 00:17:48,240

a guy i cite him in the book i knew him

419

00:17:51,350 --> 00:17:49,120

for the

420

00:17:53,110 --> 00:17:51,360

from the city groups at the

421

00:17:56,549 --> 00:17:53,120

international astronomical

422

00:17:56,950 --> 00:17:56,559

conferences and radio astronomer and he

423

00:17:59,990 --> 00:17:56,960

looked

424

00:18:03,830 --> 00:18:00,000

for infrared signatures from

425

00:18:06,230 --> 00:18:03,840

stapled in dyson spheres in

426

00:18:08,150 --> 00:18:06,240

basically our galactic vicinity he

427

00:18:10,390 --> 00:18:08,160

didn't find any but

428

00:18:12,549 --> 00:18:10,400

probably just because such things are

429

00:18:14,710 --> 00:18:12,559

dynamically impossible

430

00:18:17,669 --> 00:18:14,720

but he did make the the effort and i i

431

00:18:21,190 --> 00:18:17,679

cite him and describe his work

432

00:18:25,350 --> 00:18:21,200

it stayed pretty dormant until 1960.

433

00:18:29,590 --> 00:18:25,360

i'm sorry until 2015

434

00:18:33,590 --> 00:18:29,600

or 2016 17 i forget the exact date

435

00:18:36,310 --> 00:18:33,600

when a young woman named tabby

436

00:18:37,350 --> 00:18:36,320

boy boy hanyan are mispronouncing her

437

00:18:39,510 --> 00:18:37,360

name

438

00:18:42,710 --> 00:18:39,520

which is why the star is called happy

439

00:18:45,990 --> 00:18:42,720

star and not the way hanyan

440

00:18:48,150 --> 00:18:46,000

and the special properties of this star

441

00:18:49,909 --> 00:18:48,160

were very intriguing and people have

442

00:18:53,190 --> 00:18:49,919

seriously considered

443

00:18:55,909 --> 00:18:53,200

that maybe it is a partial

444

00:18:58,070 --> 00:18:55,919

stapled in dyson sphere and we can talk

445

00:19:00,150 --> 00:18:58,080

about that as we go along

446

00:19:02,070 --> 00:19:00,160

right i remember when that happened and

447

00:19:04,710 --> 00:19:02,080

all the speculation and

448

00:19:06,470 --> 00:19:04,720

the blowback of that speculation and all

449

00:19:09,909 --> 00:19:06,480

that

450

00:19:11,110 --> 00:19:09,919

one of the things i uh i couldn't

451  
00:19:13,510 --> 00:19:11,120  
believe like in the first

452  
00:19:14,870 --> 00:19:13,520  
few pages in your book you know you

453  
00:19:17,510 --> 00:19:14,880  
think of the earth

454  
00:19:18,070 --> 00:19:17,520  
as you know we get everything that

455  
00:19:19,909 --> 00:19:18,080  
exists

456  
00:19:21,270 --> 00:19:19,919  
has to do you know of course we have to

457  
00:19:21,909 --> 00:19:21,280  
have water and everything else but the

458  
00:19:26,950 --> 00:19:21,919  
sun

459  
00:19:29,430 --> 00:19:26,960  
chop down a tree or burn wood

460  
00:19:29,990 --> 00:19:29,440  
that is indeed the captured energy of

461  
00:19:32,310 --> 00:19:30,000  
the sun

462  
00:19:33,350 --> 00:19:32,320  
you know we all everything food you name

463  
00:19:36,390 --> 00:19:33,360

it everything

464

00:19:37,830 --> 00:19:36,400

but to now i don't know the statistics

465

00:19:40,470 --> 00:19:37,840

of what was in your book but it's

466

00:19:42,310 --> 00:19:40,480

something like a fraction of a billionth

467

00:19:45,830 --> 00:19:42,320

of the sun's energy

468

00:19:49,510 --> 00:19:45,840

is what powers our earth yeah once again

469

00:19:50,870 --> 00:19:49,520

the earth is 93 million miles or 150

470

00:19:54,310 --> 00:19:50,880

million kilometers

471

00:19:57,669 --> 00:19:54,320

from the sun it's one astronomical unit

472

00:19:58,470 --> 00:19:57,679

the earth's radius is four thousand

473

00:20:01,350 --> 00:19:58,480

miles

474

00:20:02,070 --> 00:20:01,360

it's around six thousand uh kilometers

475

00:20:03,990 --> 00:20:02,080

you mean forty

476  
00:20:06,230 --> 00:20:04,000  
forty thousand forty thousand miles four

477  
00:20:09,830 --> 00:20:06,240  
thousand miles

478  
00:20:12,870 --> 00:20:09,840  
so the diameter is around 8 000.

479  
00:20:16,310 --> 00:20:12,880  
so you can think that it takes up a very

480  
00:20:17,669 --> 00:20:16,320  
very very tiny fraction of its loop

481  
00:20:20,230 --> 00:20:17,679  
around the sun

482  
00:20:21,270 --> 00:20:20,240  
so so much of the of energy doesn't

483  
00:20:23,110 --> 00:20:21,280  
strike us

484  
00:20:24,950 --> 00:20:23,120  
and this is really what got that stapled

485  
00:20:27,990 --> 00:20:24,960  
in and dyson later on

486  
00:20:29,669 --> 00:20:28,000  
that it truly advanced civilization

487  
00:20:32,070 --> 00:20:29,679  
might want to tap into more of that

488  
00:20:34,710 --> 00:20:32,080

energy

489

00:20:35,350 --> 00:20:34,720

wow that just is that fascinates me

490

00:20:37,430 --> 00:20:35,360

here's a

491

00:20:39,190 --> 00:20:37,440

we do get questions in the chat and i

492

00:20:40,470 --> 00:20:39,200

ask that if someone has a question for

493

00:20:43,510 --> 00:20:40,480

you that they put it

494

00:20:46,390 --> 00:20:43,520

in caps which uh this person did this

495

00:20:49,430 --> 00:20:46,400

anonymous rex uh his question is can a

496

00:20:52,549 --> 00:20:49,440

dyson sphere occur in nature

497

00:20:54,470 --> 00:20:52,559

i don't think so i would hate to rule

498

00:20:56,630 --> 00:20:54,480

anything out but i've never heard of any

499

00:21:00,310 --> 00:20:56,640

way that it could be produced

500

00:21:02,710 --> 00:21:00,320

naturally um but nature

501  
00:21:04,950 --> 00:21:02,720  
is strange you can have all types of

502  
00:21:08,070 --> 00:21:04,960  
things that we don't know about

503  
00:21:09,029 --> 00:21:08,080  
that's right yeah like the um that came

504  
00:21:12,070 --> 00:21:09,039  
through

505  
00:21:15,350 --> 00:21:12,080  
that's a good example right there um

506  
00:21:17,990 --> 00:21:15,360  
so if um if this

507  
00:21:18,870 --> 00:21:18,000  
uh you know you talked earlier about

508  
00:21:21,669 --> 00:21:18,880  
seti and the ra

509  
00:21:22,870 --> 00:21:21,679  
radio signals and i've had uh dr seth

510  
00:21:25,590 --> 00:21:22,880  
shaw stack on

511  
00:21:26,549 --> 00:21:25,600  
i think three three times on this show

512  
00:21:29,990 --> 00:21:26,559  
um

513  
00:21:32,789 --> 00:21:30,000

and you know uh at least they're

514

00:21:33,350 --> 00:21:32,799

looking for something but i i think the

515

00:21:36,310 --> 00:21:33,360

techno

516

00:21:38,789 --> 00:21:36,320

signatures you know when we have the

517

00:21:41,430 --> 00:21:38,799

ability to actually look for them

518

00:21:42,710 --> 00:21:41,440

that's gonna be a lot more interesting

519

00:21:44,390 --> 00:21:42,720

that's what i think i mean what do you

520

00:21:47,669 --> 00:21:44,400

think about that i agree

521

00:21:50,789 --> 00:21:47,679

we do have the ability now to look for

522

00:21:52,710 --> 00:21:50,799

partial dyson stapled in spheres or

523

00:21:53,669 --> 00:21:52,720

should we call them dyson stapled in

524

00:21:56,789 --> 00:21:53,679

swarms

525

00:21:58,870 --> 00:21:56,799

that might be better um

526  
00:21:59,909 --> 00:21:58,880  
can you explain what that i'm sorry do

527  
00:22:02,230 --> 00:21:59,919  
you mind explaining what

528  
00:22:03,750 --> 00:22:02,240  
the swarm the difference is okay and

529  
00:22:04,630 --> 00:22:03,760  
this is something that dyson brought

530  
00:22:08,789 --> 00:22:04,640  
about

531  
00:22:12,070 --> 00:22:08,799  
the concept further

532  
00:22:15,590 --> 00:22:12,080  
what it is is people realize building

533  
00:22:18,549 --> 00:22:15,600  
a spherical shell around the star

534  
00:22:19,190 --> 00:22:18,559  
might really not work but instead

535  
00:22:22,310 --> 00:22:19,200  
there's

536  
00:22:24,230 --> 00:22:22,320  
plenty of material around that star

537  
00:22:27,830 --> 00:22:24,240  
and what you could do is you could

538  
00:22:30,149 --> 00:22:27,840

create a whole swarm of space habitats

539

00:22:31,990 --> 00:22:30,159

now the space habitat idea goes back to

540

00:22:34,149 --> 00:22:32,000

the early 1970s

541

00:22:35,190 --> 00:22:34,159

a guy named jerry o'neal at princeton

542

00:22:38,070 --> 00:22:35,200

university

543

00:22:40,070 --> 00:22:38,080

and later on people at stanford nasa

544

00:22:42,549 --> 00:22:40,080

ames and elsewhere

545

00:22:43,590 --> 00:22:42,559

continued this and it was basically did

546

00:22:47,830 --> 00:22:43,600

that demonstrate

547

00:22:50,710 --> 00:22:47,840

that you could build artificial

548

00:22:51,190 --> 00:22:50,720

little world lifts in space which we now

549

00:22:53,590 --> 00:22:51,200

call

550

00:22:54,789 --> 00:22:53,600

space habitats if it has an engine it's

551

00:22:57,270 --> 00:22:54,799

a world ship

552

00:22:59,029 --> 00:22:57,280

something like that it would be small

553

00:23:01,190 --> 00:22:59,039

because you could duplicate

554

00:23:02,230 --> 00:23:01,200

uh terrestrial ecology to a certain

555

00:23:04,710 --> 00:23:02,240

extent

556

00:23:06,549 --> 00:23:04,720

if you watch the ruby interstellar the

557

00:23:09,190 --> 00:23:06,559

popular movie interstellar

558

00:23:10,230 --> 00:23:09,200

towards the end of that there is a

559

00:23:13,830 --> 00:23:10,240

people are living

560

00:23:17,510 --> 00:23:13,840

4 000 people or so are living in a

561

00:23:20,789 --> 00:23:17,520

meal type space habitat which is located

562

00:23:22,630 --> 00:23:20,799

between between i believe near the orbit

563

00:23:24,870 --> 00:23:22,640

of saturn because they want to

564

00:23:28,870 --> 00:23:24,880

ultimately get into the black hole

565

00:23:31,110 --> 00:23:28,880

and fly to their destination but

566

00:23:32,070 --> 00:23:31,120

it does demonstrate that the idea has

567

00:23:35,350 --> 00:23:32,080

caught on

568

00:23:37,990 --> 00:23:35,360

also there was a tv

569

00:23:39,190 --> 00:23:38,000

science fiction series i believe babylon

570

00:23:44,070 --> 00:23:39,200

5

571

00:23:48,070 --> 00:23:44,080

space colonies

572

00:23:50,149 --> 00:23:48,080

and or free-flying space habitats we

573

00:23:52,470 --> 00:23:50,159

should call them

574

00:23:53,269 --> 00:23:52,480

um you know a lot of times you'll see on

575

00:23:55,430 --> 00:23:53,279

some of these

576

00:23:57,350 --> 00:23:55,440

you know i love science fiction and i

577

00:23:58,789 --> 00:23:57,360

think a lot of great ideas come from

578

00:24:02,630 --> 00:23:58,799

science fiction

579

00:24:04,230 --> 00:24:02,640

and maybe vice versa i'm not sure but um

580

00:24:05,669 --> 00:24:04,240

when you see some of these space

581

00:24:09,269 --> 00:24:05,679

habitats

582

00:24:11,190 --> 00:24:09,279

they are orbiting to maintain like a

583

00:24:12,710 --> 00:24:11,200

natural gravity and sign is that

584

00:24:15,269 --> 00:24:12,720

inside is that something that would

585

00:24:16,630 --> 00:24:15,279

actually work like if it orbits would it

586

00:24:19,510 --> 00:24:16,640

create a gravity

587

00:24:20,870 --> 00:24:19,520

oh yeah in fact there was an experiment

588

00:24:24,789 --> 00:24:20,880

on one of the

589

00:24:28,310 --> 00:24:24,799

early gemini flights in which the gemini

590

00:24:30,710 --> 00:24:28,320

had rendezvoused with an aegina and

591

00:24:32,070 --> 00:24:30,720

an astronaut did a spacewalk might have

592

00:24:34,630 --> 00:24:32,080

been buzz aldrin actually

593

00:24:35,669 --> 00:24:34,640

who did this attached to tether to the

594

00:24:37,990 --> 00:24:35,679

agena

595

00:24:39,029 --> 00:24:38,000

and then they decoupled and they spun

596

00:24:42,549 --> 00:24:39,039

for a bit at a

597

00:24:44,710 --> 00:24:42,559

slow rate but they were able to get

598

00:24:46,070 --> 00:24:44,720

a low level of partial gravity and

599

00:24:49,510 --> 00:24:46,080

demonstrate that the concept

600

00:24:51,110 --> 00:24:49,520

works i believe i believe you might have

601  
00:24:52,630 --> 00:24:51,120  
your mail open or something if you

602  
00:24:53,750 --> 00:24:52,640  
wouldn't mind closing that unfortunately

603  
00:24:57,669 --> 00:24:53,760  
the noise is

604  
00:24:59,350 --> 00:24:57,679  
popping across the screen

605  
00:25:01,510 --> 00:24:59,360  
you want to just uh you want to go to

606  
00:25:04,710 --> 00:25:01,520  
your mail application on the top

607  
00:25:05,510 --> 00:25:04,720  
and uh and then just do close if you

608  
00:25:08,549 --> 00:25:05,520  
would

609  
00:25:12,070 --> 00:25:08,559  
yeah the mail i

610  
00:25:14,710 --> 00:25:12,080  
i do see i i see aol mail i just will

611  
00:25:15,269 --> 00:25:14,720  
i do a close i hit the x on that right

612  
00:25:18,149 --> 00:25:15,279  
yeah yeah

613  
00:25:18,950 --> 00:25:18,159

anything yeah okay look it went out good

614

00:25:22,149 --> 00:25:18,960

okay

615

00:25:25,750 --> 00:25:22,159

that

616

00:25:27,590 --> 00:25:25,760

um i can't remember what i asked you

617

00:25:29,029 --> 00:25:27,600

i just asked you a question right i

618

00:25:32,149 --> 00:25:29,039

think we were talking about

619

00:25:34,710 --> 00:25:32,159

space habitats yes and so they could

620

00:25:35,909 --> 00:25:34,720

create some type they created a low

621

00:25:38,390 --> 00:25:35,919

level gravity

622

00:25:40,390 --> 00:25:38,400

so in theory that means that they could

623

00:25:43,830 --> 00:25:40,400

indeed create a natural

624

00:25:46,149 --> 00:25:43,840

like earth gravity yeah

625

00:25:49,350 --> 00:25:46,159

yeah go ahead if you remember also in

626

00:25:52,630 --> 00:25:49,360

the movie 2001 a space odyssey

627

00:25:54,149 --> 00:25:52,640

the space station does spin and it has

628

00:25:55,590 --> 00:25:54,159

i don't know if it's earth gravity or

629

00:25:57,750 --> 00:25:55,600

lunar gravity but it's certainly at

630

00:26:00,789 --> 00:25:57,760

least a partial gravity

631

00:26:02,149 --> 00:26:00,799

yeah i know at uh you know i remember uh

632

00:26:04,470 --> 00:26:02,159

i can't remember his first name but his

633

00:26:07,750 --> 00:26:04,480

last name was scott you know the

634

00:26:10,549 --> 00:26:07,760

longest uh living person on uh

635

00:26:12,710 --> 00:26:10,559

you know in the space station and he has

636

00:26:15,430 --> 00:26:12,720

he's a twin brother when he came back

637

00:26:17,029 --> 00:26:15,440

you know there something changed a

638

00:26:20,870 --> 00:26:17,039

little bit between the twins

639

00:26:23,830 --> 00:26:20,880

yeah and and but also being

640

00:26:24,789 --> 00:26:23,840

in a weightless environment really plays

641

00:26:26,950 --> 00:26:24,799

havoc

642

00:26:28,230 --> 00:26:26,960

and in your book you talk about some of

643

00:26:29,510 --> 00:26:28,240

the lengths of time that there would

644

00:26:30,710 --> 00:26:29,520

have to be travel

645

00:26:33,510 --> 00:26:30,720

so that would really have to be

646

00:26:36,549 --> 00:26:33,520

addressed um if that type of travel

647

00:26:37,510 --> 00:26:36,559

does happen you know if we are going to

648

00:26:40,390 --> 00:26:37,520

miles

649

00:26:41,350 --> 00:26:40,400

by either chemical propulsion nuclear

650

00:26:45,830 --> 00:26:41,360

propulsion

651

00:26:47,350 --> 00:26:45,840

today the iron drive

652

00:26:49,190 --> 00:26:47,360

basically you're going to be away from

653

00:26:50,549 --> 00:26:49,200

home for something like upwards of two

654

00:26:53,430 --> 00:26:50,559

years

655

00:26:54,149 --> 00:26:53,440

either each one-way flight takes nine

656

00:26:56,230 --> 00:26:54,159

months

657

00:26:58,230 --> 00:26:56,240

then you have to wait for the planets to

658

00:27:01,110 --> 00:26:58,240

come back into configuration

659

00:27:03,350 --> 00:27:01,120

so you could come home so you have to

660

00:27:07,590 --> 00:27:03,360

feel that people are going to be

661

00:27:10,310 --> 00:27:07,600

exposed to weightlessness and um

662

00:27:11,269 --> 00:27:10,320

galactic cosmic radiation for upwards of

663

00:27:14,230 --> 00:27:11,279

a year

664

00:27:15,990 --> 00:27:14,240

and that's not good yeah yeah that's

665

00:27:19,029 --> 00:27:16,000

that's another thing i mean how

666

00:27:22,389 --> 00:27:19,039

how can they shield i mean

667

00:27:24,310 --> 00:27:22,399

for an effective way to shield

668

00:27:25,909 --> 00:27:24,320

how do you do that is it only lead i

669

00:27:27,029 --> 00:27:25,919

mean i've heard of something about

670

00:27:30,710 --> 00:27:27,039

circulating

671

00:27:34,389 --> 00:27:30,720

fluids of some kind through yeah a

672

00:27:36,630 --> 00:27:34,399

a self-shielded spacecraft they

673

00:27:38,789 --> 00:27:36,640

basically something which shields itself

674

00:27:41,269 --> 00:27:38,799

it doesn't have any extra shielding

675

00:27:42,630 --> 00:27:41,279

the maximum amount of time that an

676  
00:27:45,430 --> 00:27:42,640  
astronaut

677  
00:27:45,990 --> 00:27:45,440  
could spend in it without having a five

678  
00:27:48,230 --> 00:27:46,000  
i believe

679  
00:27:49,590 --> 00:27:48,240  
a five percent chance of dying of cancer

680  
00:27:52,710 --> 00:27:49,600  
later on

681  
00:27:55,269 --> 00:27:52,720  
um over his normal you know

682  
00:27:57,110 --> 00:27:55,279  
probabilities of that happening about

683  
00:28:00,149 --> 00:27:57,120  
300 days

684  
00:28:02,149 --> 00:28:00,159  
something like that basically

685  
00:28:04,950 --> 00:28:02,159  
if we're going to do a round trip to

686  
00:28:06,950 --> 00:28:04,960  
mars we either have to have a very very

687  
00:28:09,510 --> 00:28:06,960  
energetic spacecraft

688  
00:28:11,830 --> 00:28:09,520

or we have to carry additional shielding

689

00:28:14,470 --> 00:28:11,840

there's a number of ways of doing this

690

00:28:15,830 --> 00:28:14,480

one way is to just have a lot of mass

691

00:28:18,149 --> 00:28:15,840

mass shielding

692

00:28:19,110 --> 00:28:18,159

another possibility is to have a

693

00:28:22,149 --> 00:28:19,120

magnetic

694

00:28:23,110 --> 00:28:22,159

field that shields you now the problem

695

00:28:27,350 --> 00:28:23,120

with magnetic

696

00:28:30,630 --> 00:28:27,360

fields today is to have something

697

00:28:35,190 --> 00:28:30,640

most of our superconducting material

698

00:28:37,750 --> 00:28:35,200

um works best at low temperatures

699

00:28:39,269 --> 00:28:37,760

and what you have to do is shield it so

700

00:28:42,549 --> 00:28:39,279

that it doesn't

701  
00:28:44,070 --> 00:28:42,559  
um become a regular conductor and the

702  
00:28:46,789 --> 00:28:44,080  
shielding itself

703  
00:28:48,470 --> 00:28:46,799  
and the circulating cooling or warming

704  
00:28:52,789 --> 00:28:48,480  
fluids whatever you're using

705  
00:28:54,870 --> 00:28:52,799  
are expensive and cumbersome and heavy

706  
00:28:57,110 --> 00:28:54,880  
another possibility that people have

707  
00:28:59,990 --> 00:28:57,120  
talked about is medicine

708  
00:29:01,830 --> 00:29:00,000  
there are certain creatures the famous

709  
00:29:06,389 --> 00:29:01,840  
party brad

710  
00:29:13,190 --> 00:29:09,830  
radiation damage there also is a variety

711  
00:29:16,470 --> 00:29:13,200  
of bacteria that likes to live inside

712  
00:29:19,590 --> 00:29:16,480  
the core of nuclear reactors

713  
00:29:21,590 --> 00:29:19,600

so maybe we can see how they do it and

714

00:29:24,389 --> 00:29:21,600

we can do little genetic

715

00:29:25,990 --> 00:29:24,399

work inside the astronauts something of

716

00:29:27,830 --> 00:29:26,000

that nature

717

00:29:30,230 --> 00:29:27,840

another possibility people have talked

718

00:29:34,149 --> 00:29:30,240

about is hibernation

719

00:29:37,190 --> 00:29:34,159

if you have a clue say of

720

00:29:38,630 --> 00:29:37,200

six people but only two have to be awake

721

00:29:41,669 --> 00:29:38,640

at any one time

722

00:29:43,990 --> 00:29:41,679

the others can basically be in the stack

723

00:29:46,070 --> 00:29:44,000

and the other two can have a very small

724

00:29:48,950 --> 00:29:46,080

habitat they don't need as much room

725

00:29:50,230 --> 00:29:48,960

so you have less shielding and that is

726

00:29:52,269 --> 00:29:50,240

another possibility

727

00:29:53,669 --> 00:29:52,279

that was the one that was used also in

728

00:29:55,430 --> 00:29:53,679

2001

729

00:29:59,110 --> 00:29:55,440

which was a flight if you remember

730

00:30:04,470 --> 00:30:02,470

yep wow uh by the way it was mark and

731

00:30:09,430 --> 00:30:04,480

scott kelly thank you jenny for that

732

00:30:11,669 --> 00:30:09,440

um mark i believe is the

733

00:30:14,389 --> 00:30:11,679

senator and scott of the astronaut i

734

00:30:17,430 --> 00:30:14,399

think is that right

735

00:30:17,830 --> 00:30:17,440

all right oh i i i don't know you got me

736

00:30:21,110 --> 00:30:17,840

there

737

00:30:24,230 --> 00:30:21,120

yeah i had the names backwards but

738

00:30:26,549 --> 00:30:24,240

but anyway um now here is a uh

739

00:30:27,350 --> 00:30:26,559

another question that popped up here

740

00:30:30,630 --> 00:30:27,360

could

741

00:30:33,190 --> 00:30:30,640

small alien space habitat habitats exist

742

00:30:36,710 --> 00:30:33,200

nearby in our vicinity without

743

00:30:40,230 --> 00:30:36,720

our detecting them excellent question

744

00:30:44,149 --> 00:30:40,240

and i started thinking about this

745

00:30:46,630 --> 00:30:44,159

in the late 80s early 90s

746

00:30:47,909 --> 00:30:46,640

what happened is there was the guy mike

747

00:30:49,669 --> 00:30:47,919

um

748

00:30:51,350 --> 00:30:49,679

his last name forget his last name a

749

00:30:54,789 --> 00:30:51,360

radio astronomer

750

00:30:58,630 --> 00:30:54,799

at maryland university and

751

00:31:01,750 --> 00:30:58,640

what mike did is he basically said

752

00:31:03,750 --> 00:31:01,760

if there are aliens in the solar system

753

00:31:05,350 --> 00:31:03,760

a good place to look for them is in the

754

00:31:08,549 --> 00:31:05,360

asteroid belt

755

00:31:10,870 --> 00:31:08,559

so he looked at infrared signatures of

756

00:31:13,909 --> 00:31:10,880

medium size and small asteroids

757

00:31:19,029 --> 00:31:13,919

from the infrared explorer satellite

758

00:31:22,470 --> 00:31:19,039

and nothing was discovered but

759

00:31:25,350 --> 00:31:22,480

i think you want to go further afield

760

00:31:26,630 --> 00:31:25,360

there is a region called the kuiper belt

761

00:31:28,789 --> 00:31:26,640

actually it's not exactly to

762

00:31:29,509 --> 00:31:28,799

mispronounce it because kuiper was dutch

763

00:31:31,990 --> 00:31:29,519

it's

764

00:31:32,950 --> 00:31:32,000

hypothetic something like that would

765

00:31:36,470 --> 00:31:32,960

prevent best

766

00:31:40,389 --> 00:31:36,480

most of us can do in the united states

767

00:31:42,630 --> 00:31:40,399

it is a region between 30 and 50 or 60

768

00:31:44,870 --> 00:31:42,640

astronomical units from the sun

769

00:31:46,549 --> 00:31:44,880

and one astronomical unit once again is

770

00:31:50,149 --> 00:31:46,559

93 million miles

771

00:31:53,110 --> 00:31:50,159

or 150 million kilometers

772

00:31:54,630 --> 00:31:53,120

this is the region where pluto is charon

773

00:31:55,669 --> 00:31:54,640

its large satellite it's other

774

00:31:57,669 --> 00:31:55,679

satellites

775

00:31:59,590 --> 00:31:57,679

the other kuiper belt objects we've

776  
00:32:02,310 --> 00:31:59,600  
begun exploring

777  
00:32:04,310 --> 00:32:02,320  
these are ice bodies they have all the

778  
00:32:11,190 --> 00:32:04,320  
materials

779  
00:32:15,509 --> 00:32:11,200  
that an alien civilization would need

780  
00:32:18,549 --> 00:32:15,519  
to set up suspects

781  
00:32:23,750 --> 00:32:18,559  
so in there was a

782  
00:32:25,830 --> 00:32:23,760  
um contest i believe in 1996

783  
00:32:27,110 --> 00:32:25,840  
held by a group called the discovery

784  
00:32:30,310 --> 00:32:27,120  
institute

785  
00:32:33,029 --> 00:32:30,320  
and they wanted new versions of

786  
00:32:34,789 --> 00:32:33,039  
seti new things to do and study and i

787  
00:32:35,430 --> 00:32:34,799  
wanted to win because i wanted what to

788  
00:32:38,220 --> 00:32:35,440

do buy

789

00:32:39,669 --> 00:32:38,230

an upgraded mac not this one

790

00:32:42,070 --> 00:32:39,679

[Music]

791

00:32:43,830 --> 00:32:42,080

better than the one i had so i really

792

00:32:46,230 --> 00:32:43,840

wanted that three or five thousand

793

00:32:49,430 --> 00:32:46,240

dollars i forgot how much

794

00:32:52,070 --> 00:32:49,440

so i basically titled this essay the

795

00:32:54,149 --> 00:32:52,080

re-enchantment of the solar system

796

00:32:55,750 --> 00:32:54,159

and i basically went through the numbers

797

00:32:58,630 --> 00:32:55,760

and i said look

798

00:33:00,710 --> 00:32:58,640

there could be objects sitting out there

799

00:33:03,509 --> 00:33:00,720

in the kuiper belt

800

00:33:05,110 --> 00:33:03,519

and even if you wonder if there are

801  
00:33:07,909 --> 00:33:05,120  
substantial sides

802  
00:33:10,230 --> 00:33:07,919  
20 or 30 miles across they're too small

803  
00:33:12,950 --> 00:33:10,240  
for us to see

804  
00:33:14,149 --> 00:33:12,960  
and i won the prize which i was very

805  
00:33:17,509 --> 00:33:14,159  
happy about

806  
00:33:20,870 --> 00:33:17,519  
nice and okay it was great to do that

807  
00:33:25,029 --> 00:33:20,880  
and later on in

808  
00:33:26,470 --> 00:33:25,039  
2004 2005 i did a couple of papers

809  
00:33:28,549 --> 00:33:26,480  
at the british and the general of the

810  
00:33:31,509 --> 00:33:28,559  
british interplanetary society

811  
00:33:33,509 --> 00:33:31,519  
one was co-authored with tony martin who

812  
00:33:37,190 --> 00:33:33,519  
at the time was the editor of it

813  
00:33:38,789 --> 00:33:37,200

and we basically looked at the infrared

814

00:33:42,310 --> 00:33:38,799

signatures

815

00:33:43,190 --> 00:33:42,320

of artificial habitats in the kuiper

816

00:33:45,029 --> 00:33:43,200

belt

817

00:33:47,029 --> 00:33:45,039

and then we tried to see if any of the

818

00:33:49,509 --> 00:33:47,039

large hyperbaric bodies

819

00:33:51,990 --> 00:33:49,519

indicated anything quite that red and of

820

00:33:54,470 --> 00:33:52,000

course nothing else did at this point

821

00:33:56,149 --> 00:33:54,480

but has really scratched the surface of

822

00:33:59,750 --> 00:33:56,159

the kuiper belt

823

00:34:02,710 --> 00:33:59,760

there was only one effort to find

824

00:34:04,710 --> 00:34:02,720

a object in the kuiper belt of the

825

00:34:08,470 --> 00:34:04,720

appropriate size

826

00:34:11,510 --> 00:34:08,480

of a space habitat and this was after

827

00:34:14,790 --> 00:34:11,520

the new horizons flew by

828

00:34:15,750 --> 00:34:14,800

um pluto and satellites they wanted to

829

00:34:18,950 --> 00:34:15,760

go through another

830

00:34:22,389 --> 00:34:18,960

destination which is called mu69

831

00:34:24,950 --> 00:34:22,399

or ultima toulet and

832

00:34:26,230 --> 00:34:24,960

they wanted to find another destination

833

00:34:28,950 --> 00:34:26,240

how were they going to do it

834

00:34:29,750 --> 00:34:28,960

they even had the hubble space telescope

835

00:34:32,629 --> 00:34:29,760

at their

836

00:34:34,950 --> 00:34:32,639

disposal they said the only way to do it

837

00:34:38,230 --> 00:34:34,960

they were going to have to look at stars

838

00:34:39,430 --> 00:34:38,240

along the equatorial belt of the solar

839

00:34:43,030 --> 00:34:39,440

system

840

00:34:46,550 --> 00:34:43,040

or the what's called the uh uh

841

00:34:48,629 --> 00:34:46,560

ecliptic and try to see if there are any

842

00:34:49,669 --> 00:34:48,639

stars that are eclipsed if there are

843

00:34:51,349 --> 00:34:49,679

clips

844

00:34:52,710 --> 00:34:51,359

if something's moving in front of them a

845

00:34:57,750 --> 00:34:52,720

transit

846

00:35:00,870 --> 00:34:57,760

maybe there's a big a 20 mile

847

00:35:04,470 --> 00:35:00,880

sized space object near there and

848

00:35:08,710 --> 00:35:04,480

after months of studying they found one

849

00:35:12,150 --> 00:35:08,720

but a lot of effort to do this

850

00:35:15,030 --> 00:35:12,160

uh could you you know

851  
00:35:16,230 --> 00:35:15,040  
we estimated that other people estimated

852  
00:35:17,750 --> 00:35:16,240  
that they do in the book

853  
00:35:21,430 --> 00:35:17,760  
that the magnitude of one of these

854  
00:35:23,990 --> 00:35:21,440  
things visual magnitude is about 26.

855  
00:35:25,829 --> 00:35:24,000  
the best that the hubble has done is

856  
00:35:27,510 --> 00:35:25,839  
magnitude 29

857  
00:35:29,030 --> 00:35:27,520  
and that had to be looking at a

858  
00:35:31,589 --> 00:35:29,040  
particular star field

859  
00:35:33,030 --> 00:35:31,599  
for something like 90 hours or 90 days i

860  
00:35:36,470 --> 00:35:33,040  
forget how long

861  
00:35:38,150 --> 00:35:36,480  
so you know these things there could be

862  
00:35:40,870 --> 00:35:38,160  
thousands of them out there there could

863  
00:35:42,230 --> 00:35:40,880

be millions or billions of aliens in our

864

00:35:44,870 --> 00:35:42,240

solar system

865

00:35:46,710 --> 00:35:44,880

now other people have looked at this in

866

00:35:49,910 --> 00:35:46,720

a circumspect fashion

867

00:35:52,710 --> 00:35:49,920

i know you had avi loeb on a while ago

868

00:35:53,109 --> 00:35:52,720

he did a paper with ed towns and they

869

00:35:55,510 --> 00:35:53,119

both

870

00:35:56,790 --> 00:35:55,520

loved the city of tokyo and they said

871

00:36:00,310 --> 00:35:56,800

okay

872

00:36:01,349 --> 00:36:00,320

let's see what tokyo the lights of tokyo

873

00:36:03,990 --> 00:36:01,359

would look like

874

00:36:05,270 --> 00:36:04,000

in the kaipava and they published a

875

00:36:08,310 --> 00:36:05,280

paper about this

876

00:36:09,829 --> 00:36:08,320

protecting the lights of the space city

877

00:36:11,510 --> 00:36:09,839

and they get pretty much the results

878

00:36:15,589 --> 00:36:11,520

that i do we could do it

879

00:36:17,990 --> 00:36:15,599

but it'll be very very difficult now

880

00:36:21,030 --> 00:36:18,000

other people have started to come on

881

00:36:22,950 --> 00:36:21,040

board in a strange way

882

00:36:26,470 --> 00:36:22,960

not everybody wants to say that there's

883

00:36:29,430 --> 00:36:26,480

a possibility of there being um

884

00:36:31,430 --> 00:36:29,440

aliens in the solar system right now but

885

00:36:32,950 --> 00:36:31,440

maybe they have been in the past

886

00:36:36,390 --> 00:36:32,960

or maybe they've come through and left

887

00:36:39,190 --> 00:36:36,400

calling cars so maybe there are probes

888

00:36:41,270 --> 00:36:39,200

maybe there are abandoned habitats maybe

889

00:36:44,550 --> 00:36:41,280

there are other types of artifacts

890

00:36:46,069 --> 00:36:44,560

even on the moon or like my colleague

891

00:36:49,829 --> 00:36:46,079

jim benson thinks

892

00:36:52,950 --> 00:36:49,839

among objects this group of um

893

00:36:55,190 --> 00:36:52,960

asteroids that co-rotate co-revolve with

894

00:36:58,390 --> 00:36:55,200

the earth periodically

895

00:37:01,030 --> 00:36:58,400

so you know people are

896

00:37:01,990 --> 00:37:01,040

doing it but they're being being very

897

00:37:04,470 --> 00:37:02,000

very safe

898

00:37:05,750 --> 00:37:04,480

because they don't want in general to

899

00:37:08,069 --> 00:37:05,760

appear as if they're saying

900

00:37:08,870 --> 00:37:08,079

the aliens are here and i have no

901  
00:37:11,990 --> 00:37:08,880  
trouble with that

902  
00:37:13,430 --> 00:37:12,000  
the aliens might well be here but if

903  
00:37:17,910 --> 00:37:13,440  
they're here

904  
00:37:22,069 --> 00:37:17,920  
they are so far in advance of us that

905  
00:37:26,550 --> 00:37:22,079  
what our commonality might be very very

906  
00:37:28,310 --> 00:37:26,560  
limited the in 2013 as i talked about in

907  
00:37:29,990 --> 00:37:28,320  
the other book a lot the one on on

908  
00:37:32,950 --> 00:37:30,000  
consciousness

909  
00:37:34,230 --> 00:37:32,960  
upon psychism really the whole universe

910  
00:37:36,790 --> 00:37:34,240  
was conscious

911  
00:37:37,910 --> 00:37:36,800  
europeans launched an observatory called

912  
00:37:41,030 --> 00:37:37,920  
gaia

913  
00:37:43,190 --> 00:37:41,040

to map very accurately

914

00:37:45,430 --> 00:37:43,200

positions and motions of a billion stars

915

00:37:49,670 --> 00:37:45,440

in the milky way

916

00:37:52,630 --> 00:37:49,680

and um also very funny about this

917

00:37:53,030 --> 00:37:52,640

when they had the second data release

918

00:37:56,470 --> 00:37:53,040

they

919

00:37:58,390 --> 00:37:56,480

sent it to the hayden planetarium

920

00:38:00,310 --> 00:37:58,400

and some sort of aiden associate and i

921

00:38:03,030 --> 00:38:00,320

know neil degrasse tyson

922

00:38:05,510 --> 00:38:03,040

denton abel all other people there my

923

00:38:08,069 --> 00:38:05,520

wife and i were invited to this

924

00:38:09,589 --> 00:38:08,079

and we sat in the dome and they

925

00:38:12,630 --> 00:38:09,599

projected on the dome

926

00:38:15,750 --> 00:38:12,640

a billion stars from this

927

00:38:18,790 --> 00:38:15,760

and i asked i said what happens if

928

00:38:21,829 --> 00:38:18,800

they found another 10 stars and um

929

00:38:24,069 --> 00:38:21,839

dyson said the dome will collapse

930

00:38:24,950 --> 00:38:24,079

can't stand the weight of course it was

931

00:38:28,069 --> 00:38:24,960

all right

932

00:38:28,870 --> 00:38:28,079

but it was very funny but anyway one

933

00:38:31,349 --> 00:38:28,880

thing that

934

00:38:32,550 --> 00:38:31,359

it's two things that came out of this

935

00:38:34,870 --> 00:38:32,560

periodically

936

00:38:36,150 --> 00:38:34,880

at intervals of half a million to a

937

00:38:38,710 --> 00:38:36,160

million years

938

00:38:40,550 --> 00:38:38,720

a rather relatively massive star makes a

939

00:38:43,030 --> 00:38:40,560

close approach to the sun

940

00:38:44,470 --> 00:38:43,040

within a light year within 60 000

941

00:38:47,750 --> 00:38:44,480

astronomical units

942

00:38:51,349 --> 00:38:47,760

okay is that that's a fact that's that's

943

00:38:52,710 --> 00:38:51,359

yes and the next one i think is going to

944

00:38:56,230 --> 00:38:52,720

be

945

00:38:58,550 --> 00:38:56,240

i think i think it's in 70 000 years

946

00:39:01,190 --> 00:38:58,560

and i believe it either i forget that 70

947

00:39:03,030 --> 00:39:01,200

000 years in the future of the past

948

00:39:05,030 --> 00:39:03,040

but it came within a third of a light

949

00:39:08,150 --> 00:39:05,040

year so this happens

950

00:39:11,829 --> 00:39:08,160

periodically so aliens

951  
00:39:15,109 --> 00:39:11,839  
if they have advanced technologies

952  
00:39:17,430 --> 00:39:15,119  
they can hop over at one quarter

953  
00:39:18,950 --> 00:39:17,440  
the flight duration that would normally

954  
00:39:20,470 --> 00:39:18,960  
or nearly take

955  
00:39:22,390 --> 00:39:20,480  
people say when they get to the nearest

956  
00:39:24,550 --> 00:39:22,400  
star takes a thousand years

957  
00:39:26,310 --> 00:39:24,560  
if the nearest star is a lot closer it

958  
00:39:29,510 --> 00:39:26,320  
only takes 200 years

959  
00:39:32,310 --> 00:39:29,520  
so it's not as daunting another thing

960  
00:39:33,349 --> 00:39:32,320  
another thing is people have come to

961  
00:39:36,710 --> 00:39:33,359  
realize

962  
00:39:40,150 --> 00:39:36,720  
most from the also from gaia the

963  
00:39:42,230 --> 00:39:40,160

sun is a relatively young star very live

964

00:39:44,710 --> 00:39:42,240

in our vicinity of the milky way are

965

00:39:47,910 --> 00:39:44,720

more than a billion years older than us

966

00:39:49,750 --> 00:39:47,920

and that's amazing so

967

00:39:51,670 --> 00:39:49,760

you know you can do a very simple

968

00:39:53,670 --> 00:39:51,680

thought experiment let's say that

969

00:39:56,230 --> 00:39:53,680

there's a civilization

970

00:39:58,790 --> 00:39:56,240

that basically builds space habitats the

971

00:40:01,270 --> 00:39:58,800

solar system as we're starting to do

972

00:40:04,630 --> 00:40:01,280

and it decides it's going to migrate

973

00:40:08,150 --> 00:40:04,640

only once every half million years or so

974

00:40:11,190 --> 00:40:08,160

when another star is very close

975

00:40:13,270 --> 00:40:11,200

so then you say that it goes up by a

976

00:40:16,710 --> 00:40:13,280

fact the number of habitats you call

977

00:40:19,670 --> 00:40:16,720

you have go up by a factor of two

978

00:40:21,270 --> 00:40:19,680

every half million a million years well

979

00:40:24,950 --> 00:40:21,280

after 20 or 30 or

980

00:40:28,069 --> 00:40:24,960

35 million years one civilization

981

00:40:30,710 --> 00:40:28,079

has occupied the galaxy

982

00:40:32,230 --> 00:40:30,720

and it's very easy to do you just do 2

983

00:40:35,510 --> 00:40:32,240

against power and you put

984

00:40:36,309 --> 00:40:35,520

in your computer n is equal to 35 or so

985

00:40:39,510 --> 00:40:36,319

and you can see

986

00:40:40,230 --> 00:40:39,520

it's up in the billions so you then

987

00:40:43,589 --> 00:40:40,240

could say

988

00:40:46,069 --> 00:40:43,599

well you know how common

989

00:40:47,190 --> 00:40:46,079

are civilizations there's a group of

990

00:40:50,710 --> 00:40:47,200

physicists called

991

00:40:52,309 --> 00:40:50,720

the rare earth people they used to say

992

00:40:54,230 --> 00:40:52,319

well there aren't going to be many

993

00:40:57,270 --> 00:40:54,240

places like the earth because

994

00:40:59,190 --> 00:40:57,280

solar systems are rare wrong

995

00:41:01,030 --> 00:40:59,200

then he said well there aren't going to

996

00:41:04,550 --> 00:41:01,040

be many jupiters

997

00:41:07,829 --> 00:41:04,560

jupiter's protect terrestrial planets

998

00:41:10,069 --> 00:41:07,839

from asteroid and comet impacts yeah

999

00:41:11,829 --> 00:41:10,079

i thought they did yeah no but they're

1000

00:41:14,069 --> 00:41:11,839

wrong in that they said there weren't

1001

00:41:16,069 --> 00:41:14,079

going to be very many jupiters

1002

00:41:17,109 --> 00:41:16,079

wrong they're all over the place but

1003

00:41:19,589 --> 00:41:17,119

then they said

1004

00:41:22,470 --> 00:41:19,599

there are not going to be very many

1005

00:41:25,510 --> 00:41:22,480

rocky planets within the habitable zone

1006

00:41:29,030 --> 00:41:25,520

of stars wrong

1007

00:41:32,230 --> 00:41:29,040

again even the volume of a star

1008

00:41:33,990 --> 00:41:32,240

a red dwarf called proxima centauri in

1009

00:41:36,630 --> 00:41:34,000

the mirror star stars one of the three

1010

00:41:39,829 --> 00:41:36,640

stars in the alpha centauri system

1011

00:41:41,829 --> 00:41:39,839

has a habitable planet or a planet

1012

00:41:45,510 --> 00:41:41,839

within the habitable zone

1013

00:41:48,150 --> 00:41:45,520

um and it's even suspected now

1014

00:41:50,309 --> 00:41:48,160

that the brightest star in the system

1015

00:41:52,230 --> 00:41:50,319

alpha centauri a which is a bit brighter

1016

00:41:55,829 --> 00:41:52,240

and older than the sun

1017

00:41:58,150 --> 00:41:55,839

may well have a hover have a planet

1018

00:42:00,309 --> 00:41:58,160

in the habitable zone it still has to be

1019

00:42:03,190 --> 00:42:00,319

confirmed

1020

00:42:05,270 --> 00:42:03,200

so then they they could say well okay

1021

00:42:06,550 --> 00:42:05,280

you can have horrible habitable planets

1022

00:42:09,750 --> 00:42:06,560

all over the place

1023

00:42:11,750 --> 00:42:09,760

but if life forms you have to expect

1024

00:42:14,150 --> 00:42:11,760

that life will form physically

1025

00:42:15,190 --> 00:42:14,160

it's going to stay very simple how are

1026

00:42:18,870 --> 00:42:15,200

you going to make the

1027

00:42:21,510 --> 00:42:18,880

jump from unicel to multi-cell

1028

00:42:22,550 --> 00:42:21,520

life going to be very very difficult

1029

00:42:26,309 --> 00:42:22,560

billion years

1030

00:42:28,390 --> 00:42:26,319

maybe it will never happen long again

1031

00:42:30,230 --> 00:42:28,400

a few years ago there was a group that

1032

00:42:34,069 --> 00:42:30,240

took a very simple

1033

00:42:36,470 --> 00:42:34,079

number of one-thousand microorganisms

1034

00:42:38,150 --> 00:42:36,480

yeast and they stressed them with an

1035

00:42:40,870 --> 00:42:38,160

environmental point of view

1036

00:42:42,230 --> 00:42:40,880

i forget what they did but they formed a

1037

00:42:45,430 --> 00:42:42,240

colony organism

1038

00:42:49,030 --> 00:42:45,440

they form multi-cellular yeast

1039

00:42:51,270 --> 00:42:49,040

so i think you know you can come out and

1040

00:42:53,510 --> 00:42:51,280

have great filters that's another thing

1041

00:42:54,790 --> 00:42:53,520

you can say that okay you're going to

1042

00:42:57,910 --> 00:42:54,800

reach a point

1043

00:43:00,470 --> 00:42:57,920

where a number of things can happen to

1044

00:43:02,790 --> 00:43:00,480

damage or destroy your ecosystem

1045

00:43:04,069 --> 00:43:02,800

maybe an asteroid hits i took out the

1046

00:43:06,069 --> 00:43:04,079

dinosaurs 60

1047

00:43:08,150 --> 00:43:06,079

not all of them nothing not the avian

1048

00:43:09,109 --> 00:43:08,160

dinosaurs but the ones that didn't have

1049

00:43:12,470 --> 00:43:09,119

feathers

1050

00:43:14,630 --> 00:43:12,480

and wings 65 million years ago

1051  
00:43:16,230 --> 00:43:14,640  
the dinosaurs unfortunately no matter

1052  
00:43:18,550 --> 00:43:16,240  
how intelligent they were

1053  
00:43:19,829 --> 00:43:18,560  
didn't have a space program but if you

1054  
00:43:22,710 --> 00:43:19,839  
disagree with me

1055  
00:43:23,430 --> 00:43:22,720  
read one of the latest novels by greg

1056  
00:43:27,270 --> 00:43:23,440  
benford

1057  
00:43:30,550 --> 00:43:27,280  
and larry niven bowl of heaven

1058  
00:43:31,270 --> 00:43:30,560  
and ship star and you can see maybe then

1059  
00:43:32,950 --> 00:43:31,280  
you know

1060  
00:43:35,510 --> 00:43:32,960  
maybe i'm being a little pessimistic

1061  
00:43:39,990 --> 00:43:35,520  
about the dinos i don't know

1062  
00:43:42,309 --> 00:43:40,000  
but anyway um

1063  
00:43:44,870 --> 00:43:42,319

you are left with the possibility unless

1064

00:43:47,589 --> 00:43:44,880

you can't say everybody blows themselves

1065

00:43:49,510 --> 00:43:47,599

up with nuclear war we have had nuclear

1066

00:43:51,750 --> 00:43:49,520

the capability to do that

1067

00:43:52,870 --> 00:43:51,760

for about 80 years now we haven't blown

1068

00:43:55,510 --> 00:43:52,880

ourselves up

1069

00:43:57,190 --> 00:43:55,520

if we survive another 80 years we almost

1070

00:43:59,270 --> 00:43:57,200

certainly will have

1071

00:44:00,230 --> 00:43:59,280

at least one space habitat that can be

1072

00:44:02,309 --> 00:44:00,240

modestly

1073

00:44:03,990 --> 00:44:02,319

independent of the earth and we will

1074

00:44:05,990 --> 00:44:04,000

survive

1075

00:44:07,430 --> 00:44:06,000

then you can say okay there's climate

1076

00:44:10,150 --> 00:44:07,440

change well

1077

00:44:10,950 --> 00:44:10,160

yeah there is climate change that is a

1078

00:44:13,109 --> 00:44:10,960

problem

1079

00:44:15,190 --> 00:44:13,119

but we're starting to deal with it and

1080

00:44:15,910 --> 00:44:15,200

most people in the united states at

1081

00:44:17,829 --> 00:44:15,920

least

1082

00:44:19,510 --> 00:44:17,839

and i think over most of the world

1083

00:44:20,230 --> 00:44:19,520

except that this is a major problem

1084

00:44:22,630 --> 00:44:20,240

today

1085

00:44:23,589 --> 00:44:22,640

particularly i don't have children but

1086

00:44:25,750 --> 00:44:23,599

if you have children

1087

00:44:28,710 --> 00:44:25,760

you have to look at this very seriously

1088

00:44:31,109 --> 00:44:28,720

and i think we're starting to do that

1089

00:44:32,150 --> 00:44:31,119

so we might get through this filter as

1090

00:44:35,190 --> 00:44:32,160

well

1091

00:44:36,470 --> 00:44:35,200

yeah so since you need only a few

1092

00:44:39,829 --> 00:44:36,480

civilizations

1093

00:44:41,670 --> 00:44:39,839

to populate the galaxy in far

1094

00:44:43,750 --> 00:44:41,680

less than a billion years and you

1095

00:44:45,910 --> 00:44:43,760

certainly have the time to do it

1096

00:44:48,069 --> 00:44:45,920

you basically have to say if they are

1097

00:44:50,950 --> 00:44:48,079

not in the kuiper belt

1098

00:44:53,190 --> 00:44:50,960

somebody's thought processes have to be

1099

00:44:56,230 --> 00:44:53,200

changed

1100

00:45:00,069 --> 00:44:56,240

amazing well that's really great

1101  
00:45:02,710 --> 00:45:00,079  
um it really is uh

1102  
00:45:03,190 --> 00:45:02,720  
you know just something to think about

1103  
00:45:04,390 --> 00:45:03,200  
you know

1104  
00:45:07,349 --> 00:45:04,400  
when you're thinking about the

1105  
00:45:08,710 --> 00:45:07,359  
possibility of these

1106  
00:45:10,950 --> 00:45:08,720  
you know some of these planets that have

1107  
00:45:13,270 --> 00:45:10,960  
been around much longer than we have

1108  
00:45:14,150 --> 00:45:13,280  
and but again like you just said the

1109  
00:45:16,630 --> 00:45:14,160  
filter

1110  
00:45:17,990 --> 00:45:16,640  
you know were societies did they wipe

1111  
00:45:21,109 --> 00:45:18,000  
themselves out like we could

1112  
00:45:22,710 --> 00:45:21,119  
very well do and start over again you

1113  
00:45:24,069 --> 00:45:22,720

know i mean

1114

00:45:26,710 --> 00:45:24,079

would they have they would have enough

1115

00:45:28,950 --> 00:45:26,720

time to actually do that and go beyond

1116

00:45:30,870 --> 00:45:28,960

our technology a couple of times

1117

00:45:32,630 --> 00:45:30,880

if that's if that's what happened

1118

00:45:35,829 --> 00:45:32,640

there's also another filter

1119

00:45:39,750 --> 00:45:35,839

that i didn't mention and this

1120

00:45:43,589 --> 00:45:39,760

is basically the psychosis

1121

00:45:47,030 --> 00:45:43,599

cybernetic filter according to people

1122

00:45:49,670 --> 00:45:47,040

like wolfram and others at the

1123

00:45:51,910 --> 00:45:49,680

more french mathematical and others

1124

00:45:54,790 --> 00:45:51,920

computers will have the capability

1125

00:45:55,670 --> 00:45:54,800

to have human consciousness uploaded to

1126

00:45:58,069 --> 00:45:55,680

them

1127

00:45:58,950 --> 00:45:58,079

within the next few decades that's

1128

00:46:02,550 --> 00:45:58,960

amazing

1129

00:46:05,589 --> 00:46:02,560

now you know basically a civilization

1130

00:46:08,710 --> 00:46:05,599

people in it are going to make a choice

1131

00:46:11,910 --> 00:46:08,720

and the choice is do we go and live

1132

00:46:15,109 --> 00:46:11,920

immortally in a virtual world

1133

00:46:16,470 --> 00:46:15,119

basically play video games for the next

1134

00:46:20,150 --> 00:46:16,480

1 million years

1135

00:46:21,430 --> 00:46:20,160

very people completely stay from any

1136

00:46:24,470 --> 00:46:21,440

major catastrophe

1137

00:46:27,510 --> 00:46:24,480

okay how do we do that or

1138

00:46:28,150 --> 00:46:27,520

do we expand in space maybe we can do

1139

00:46:30,950 --> 00:46:28,160

both

1140

00:46:31,430 --> 00:46:30,960

or maybe a society makes a choice one

1141

00:46:33,829 --> 00:46:31,440

way

1142

00:46:35,270 --> 00:46:33,839

or the other to be inward looking or

1143

00:46:38,470 --> 00:46:35,280

outward looking

1144

00:46:40,150 --> 00:46:38,480

i don't know nobody knows are you saying

1145

00:46:42,069 --> 00:46:40,160

along the lines like if your

1146

00:46:45,109 --> 00:46:42,079

consciousness i mean your

1147

00:46:47,829 --> 00:46:45,119

your whatever it is is uploaded to a

1148

00:46:49,990 --> 00:46:47,839

machine that that machine could travel

1149

00:46:51,829 --> 00:46:50,000

um in space and play video games while

1150

00:46:53,829 --> 00:46:51,839

they're traveling

1151  
00:46:57,270 --> 00:46:53,839  
for a million years we could certainly

1152  
00:47:00,550 --> 00:46:57,280  
do that and people have suggested that

1153  
00:47:05,270 --> 00:47:03,589  
oh i have to look at i'm not going to

1154  
00:47:08,069 --> 00:47:05,280  
find this book right now

1155  
00:47:09,829 --> 00:47:08,079  
there is a famous physicist who

1156  
00:47:11,109 --> 00:47:09,839  
basically talked about the physics of

1157  
00:47:13,349 --> 00:47:11,119  
immortality

1158  
00:47:14,950 --> 00:47:13,359  
and he says in this that there's not

1159  
00:47:17,750 --> 00:47:14,960  
going to be

1160  
00:47:19,990 --> 00:47:17,760  
natural humans who travel to the stars

1161  
00:47:24,230 --> 00:47:20,000  
there's going to be virtual humans

1162  
00:47:27,750 --> 00:47:24,240  
uploaded souls inside computer ships

1163  
00:47:31,109 --> 00:47:27,760

inside starships well that's

1164

00:47:33,910 --> 00:47:31,119

maybe so yeah you know

1165

00:47:35,829 --> 00:47:33,920

the other thing though uh i'll just

1166

00:47:38,870 --> 00:47:35,839

throw this at you too

1167

00:47:41,589 --> 00:47:38,880

is there perhaps a chance that we

1168

00:47:44,630 --> 00:47:41,599

haven't figured out something in physics

1169

00:47:46,870 --> 00:47:44,640

that another alien technology has

1170

00:47:51,030 --> 00:47:46,880

figured out as far as travel

1171

00:47:52,470 --> 00:47:51,040

yeah what i do is i concentrate on known

1172

00:47:54,870 --> 00:47:52,480

physics basically

1173

00:47:56,950 --> 00:47:54,880

most of the ships into stellar ships and

1174

00:47:59,190 --> 00:47:56,960

interplanetary ships i've talked about

1175

00:48:00,309 --> 00:47:59,200

have used the pressure of light solar

1176

00:48:02,549 --> 00:48:00,319

sailing

1177

00:48:03,990 --> 00:48:02,559

and that's also i do some of this work

1178

00:48:06,950 --> 00:48:04,000

that's why i know alvi loeb

1179

00:48:07,430 --> 00:48:06,960

with the breakthrough scholarship people

1180

00:48:12,309 --> 00:48:07,440

that was

1181

00:48:16,870 --> 00:48:16,309

in 1990 the early 90s i forget when it

1182

00:48:21,349 --> 00:48:16,880

was

1183

00:48:23,109 --> 00:48:21,359

on a science fiction novel

1184

00:48:25,109 --> 00:48:23,119

and people said why was i going to be an

1185

00:48:28,150 --> 00:48:25,119

unpaid why did i accept this

1186

00:48:31,430 --> 00:48:28,160

the author was buzz aldrin oh

1187

00:48:34,150 --> 00:48:31,440

i have one book called encounter with

1188

00:48:34,870 --> 00:48:34,160

timer he did it with john bonds and what

1189

00:48:36,870 --> 00:48:34,880

buzz did

1190

00:48:39,190 --> 00:48:36,880

is he said okay her first ship is going

1191

00:48:41,829 --> 00:48:39,200

to be a standard light sailor

1192

00:48:42,309 --> 00:48:41,839

designed for me solo sailing and then

1193

00:48:44,790 --> 00:48:42,319

using

1194

00:48:46,390 --> 00:48:44,800

laser push after that i had done it a

1195

00:48:48,309 --> 00:48:46,400

hundred times it was easy

1196

00:48:49,430 --> 00:48:48,319

he had another guy chelsea opposed who

1197

00:48:53,349 --> 00:48:49,440

did it also

1198

00:48:56,790 --> 00:48:53,359

they said all right greg for your next

1199

00:48:57,990 --> 00:48:56,800

challenge i want a spacecraft if you get

1200

00:49:02,110 --> 00:48:58,000

up to 99

1201  
00:49:03,829 --> 00:49:02,120  
the speed of light no anti-matter

1202  
00:49:06,870 --> 00:49:03,839  
[Music]

1203  
00:49:10,150 --> 00:49:06,880  
so i spoke with a few people in um

1204  
00:49:13,190 --> 00:49:10,160  
quantum mechanics and i realized that

1205  
00:49:15,190 --> 00:49:13,200  
in every little bit of vacuum there's a

1206  
00:49:16,390 --> 00:49:15,200  
tremendous amount of energy a giant

1207  
00:49:19,190 --> 00:49:16,400  
amount of energy

1208  
00:49:20,950 --> 00:49:19,200  
but it cancels itself out could we ever

1209  
00:49:22,309 --> 00:49:20,960  
stabilize it that's what happened to the

1210  
00:49:25,430 --> 00:49:22,319  
big bang

1211  
00:49:27,589 --> 00:49:25,440  
one little tiny thing a tiny tiny

1212  
00:49:30,309 --> 00:49:27,599  
fraction of a micron across

1213  
00:49:32,470 --> 00:49:30,319

stabilized that became our universe

1214

00:49:35,750 --> 00:49:32,480

could we ever tap into this

1215

00:49:38,549 --> 00:49:35,760

this is called the casimir effect we get

1216

00:49:40,630 --> 00:49:38,559

net energy from it now the casimir

1217

00:49:44,230 --> 00:49:40,640

effect works if i can use

1218

00:49:47,750 --> 00:49:44,240

two boxes trunks basically

1219

00:49:52,069 --> 00:49:47,760

you have two electrically charged

1220

00:49:54,549 --> 00:49:52,079

um objects metal plates

1221

00:49:55,750 --> 00:49:54,559

they're separated by maybe a micron

1222

00:49:57,510 --> 00:49:55,760

there is

1223

00:49:59,270 --> 00:49:57,520

two forces going on is the

1224

00:50:01,430 --> 00:49:59,280

electrodynamic force

1225

00:50:02,710 --> 00:50:01,440

that is also the customary effect that

1226  
00:50:05,190 --> 00:50:02,720  
is because

1227  
00:50:06,870 --> 00:50:05,200  
not all of the vacuum fluctuations can

1228  
00:50:09,829 --> 00:50:06,880  
get inside

1229  
00:50:10,710 --> 00:50:09,839  
so it tends to push this together

1230  
00:50:13,430 --> 00:50:10,720  
casimir

1231  
00:50:14,549 --> 00:50:13,440  
discovered this in 1948 when he was

1232  
00:50:17,030 --> 00:50:14,559  
looking at the way

1233  
00:50:18,309 --> 00:50:17,040  
a hydrogen molecule works i'm sorry the

1234  
00:50:19,829 --> 00:50:18,319  
water molecule

1235  
00:50:22,150 --> 00:50:19,839  
and he was able to demonstrate that

1236  
00:50:25,430 --> 00:50:22,160  
something like 30

1237  
00:50:28,230 --> 00:50:25,440  
of the force holding it together

1238  
00:50:29,910 --> 00:50:28,240

is that from the casimir effect this was

1239

00:50:31,030 --> 00:50:29,920

actually known to the romans they didn't

1240

00:50:33,349 --> 00:50:31,040

know what it was

1241

00:50:34,870 --> 00:50:33,359

they knew if you had two metallic plates

1242

00:50:36,549 --> 00:50:34,880

and you kept them together they were

1243

00:50:40,309 --> 00:50:36,559

hard to separate

1244

00:50:42,790 --> 00:50:40,319

the problem is you have the two plates

1245

00:50:43,670 --> 00:50:42,800

you let them come together you get force

1246

00:50:46,390 --> 00:50:43,680

out of it

1247

00:50:47,109 --> 00:50:46,400

but then you have to separate it nobody

1248

00:50:49,829 --> 00:50:47,119

knows

1249

00:50:50,710 --> 00:50:49,839

how to do this and get net force out

1250

00:50:52,549 --> 00:50:50,720

separating

1251  
00:50:54,870 --> 00:50:52,559  
you have to put exactly as much force

1252  
00:50:57,270 --> 00:50:54,880  
into it as you got out of it

1253  
00:50:59,670 --> 00:50:57,280  
maybe there's a way but anyway i came up

1254  
00:51:02,950 --> 00:50:59,680  
with a casimir effect space drive

1255  
00:51:04,950 --> 00:51:02,960  
and i had a casimir laser buzz loved it

1256  
00:51:06,390 --> 00:51:04,960  
and i later presented it at the

1257  
00:51:07,430 --> 00:51:06,400  
breakthrough first breakthrough

1258  
00:51:10,309 --> 00:51:07,440  
conference

1259  
00:51:11,190 --> 00:51:10,319  
at master glam as it's now called it was

1260  
00:51:13,430 --> 00:51:11,200  
in cleveland

1261  
00:51:15,990 --> 00:51:13,440  
that's the newest it was called then

1262  
00:51:19,030 --> 00:51:16,000  
mark millis put this on

1263  
00:51:23,109 --> 00:51:19,040

and uh okay it was a lot of fun

1264

00:51:26,230 --> 00:51:23,119

i didn't think much about it but

1265

00:51:29,349 --> 00:51:26,240

periodically people come up with

1266

00:51:30,630 --> 00:51:29,359

what might be space drives might require

1267

00:51:34,230 --> 00:51:30,640

new physics

1268

00:51:37,910 --> 00:51:34,240

one of these is by a guy named

1269

00:51:38,150 --> 00:51:37,920

um well sunny white is now considering

1270

00:51:44,790 --> 00:51:38,160

it

1271

00:51:47,990 --> 00:51:44,800

a microwave

1272

00:51:48,630 --> 00:51:48,000

tube configured like a rocket so he

1273

00:51:50,870 --> 00:51:48,640

figures

1274

00:51:52,710 --> 00:51:50,880

he's getting a thrust out because of the

1275

00:51:54,549 --> 00:51:52,720

nozzle

1276

00:51:57,430 --> 00:51:54,559

it shouldn't work according to

1277

00:51:59,349 --> 00:51:57,440

conventional physics

1278

00:52:01,510 --> 00:51:59,359

maybe it doesn't work there's all types

1279

00:52:04,790 --> 00:52:01,520

of possibilities because

1280

00:52:06,630 --> 00:52:04,800

the force that's coming out is so small

1281

00:52:08,390 --> 00:52:06,640

but it's still very much alive and it

1282

00:52:10,710 --> 00:52:08,400

has to be tested

1283

00:52:12,870 --> 00:52:10,720

and groups like nafta and the british

1284

00:52:15,270 --> 00:52:12,880

space agency and others

1285

00:52:17,589 --> 00:52:15,280

and maybe the chinese there's some talk

1286

00:52:20,630 --> 00:52:17,599

that the chinese have tested it in space

1287

00:52:22,630 --> 00:52:20,640

and it works perfectly

1288

00:52:23,829 --> 00:52:22,640

that just might be propaganda i have no

1289

00:52:26,470 --> 00:52:23,839

way of knowing

1290

00:52:26,870 --> 00:52:26,480

another group doing something similar is

1291

00:52:31,109 --> 00:52:26,880

with

1292

00:52:37,990 --> 00:52:35,030

what's the group john woodward and um

1293

00:52:39,030 --> 00:52:38,000

heidi fern and it's basically another

1294

00:52:43,670 --> 00:52:39,040

type of drive

1295

00:52:46,150 --> 00:52:43,680

which might also use um

1296

00:52:47,750 --> 00:52:46,160

the vacuum in one way or another and

1297

00:52:50,950 --> 00:52:47,760

it's possible

1298

00:52:51,750 --> 00:52:50,960

not impossible but these things actually

1299

00:52:55,030 --> 00:52:51,760

could give you

1300

00:52:57,670 --> 00:52:55,040

good thrust the problem is

1301

00:52:59,510 --> 00:52:57,680

it's very hard to prove and there's a

1302

00:53:02,230 --> 00:52:59,520

lot of skepticism

1303

00:53:03,750 --> 00:53:02,240

yeah i know um there's always

1304

00:53:05,430 --> 00:53:03,760

speculation of what's going on

1305

00:53:06,790 --> 00:53:05,440

and the skunk works whether what they're

1306

00:53:09,589 --> 00:53:06,800

trying to develop

1307

00:53:09,990 --> 00:53:09,599

there um we are going into break in

1308

00:53:12,710 --> 00:53:10,000

about

1309

00:53:13,270 --> 00:53:12,720

two minutes but uh getting back to space

1310

00:53:15,270 --> 00:53:13,280

travel

1311

00:53:16,790 --> 00:53:15,280

um this question was asked earlier i

1312

00:53:19,910 --> 00:53:16,800

wanted to make sure i got it up

1313

00:53:21,990 --> 00:53:19,920

from night stu um there oh has there

1314

00:53:23,670 --> 00:53:22,000

been a study to see

1315

00:53:25,430 --> 00:53:23,680

what the effects of prolonged space

1316

00:53:27,510 --> 00:53:25,440

travel have on epigenetics

1317

00:53:29,190 --> 00:53:27,520

and isn't that what they did with kelly

1318

00:53:30,710 --> 00:53:29,200

let's see oh that's the way they did it

1319

00:53:33,990 --> 00:53:30,720

with the two twins

1320

00:53:35,910 --> 00:53:34,000

one one became senator could the other

1321

00:53:41,109 --> 00:53:35,920

one could the astronaut kelly

1322

00:53:46,549 --> 00:53:44,870

you know uh i haven't heard

1323

00:53:48,950 --> 00:53:46,559

any of the results but i know that there

1324

00:53:51,190 --> 00:53:48,960

are now genetic differences

1325

00:53:53,030 --> 00:53:51,200

between these two like formerly

1326  
00:53:55,589 --> 00:53:53,040  
identical twins

1327  
00:53:56,150 --> 00:53:55,599  
one month a year in space so yes that's

1328  
00:53:58,549 --> 00:53:56,160  
a great

1329  
00:53:59,750 --> 00:53:58,559  
question that is the only study so far

1330  
00:54:01,910 --> 00:53:59,760  
on humans

1331  
00:54:04,230 --> 00:54:01,920  
it is possible they've been studies on

1332  
00:54:07,349 --> 00:54:04,240  
animals or plants or bacteria

1333  
00:54:09,829 --> 00:54:07,359  
that i don't know about yeah yeah

1334  
00:54:11,109 --> 00:54:09,839  
well uh well we're right at the point of

1335  
00:54:13,910 --> 00:54:11,119  
break so we might as well

1336  
00:54:15,829 --> 00:54:13,920  
jump into break now so uh for those of

1337  
00:54:17,910 --> 00:54:15,839  
you at kgra radio

1338  
00:54:19,270 --> 00:54:17,920

we'll be back right after these messages

1339

00:54:21,190 --> 00:54:19,280

from youtube i have a

1340

00:54:22,630 --> 00:54:21,200

short clip and then uh we're gonna have

1341

00:54:22,950 --> 00:54:22,640

a little dead air for about a minute or

1342

00:55:05,190 --> 00:54:22,960

so

1343

00:56:16,549 --> 00:55:32,720

[Music]

1344

00:56:20,549 --> 00:56:18,950

all right welcome back everyone uh my

1345

00:56:23,910 --> 00:56:20,559

guest tonight

1346

00:56:24,870 --> 00:56:23,920

um is greg matloff and uh i'm having a

1347

00:56:27,109 --> 00:56:24,880

great discussion

1348

00:56:28,950 --> 00:56:27,119

i hope you all are enjoying it and uh

1349

00:56:30,950 --> 00:56:28,960

here he is

1350

00:56:32,520 --> 00:56:30,960

uh wow we're on the wrong side here let

1351  
00:56:34,870 --> 00:56:32,530  
me bring you back over here

1352  
00:56:38,069 --> 00:56:34,880  
[Laughter]

1353  
00:56:39,910 --> 00:56:38,079  
so yeah a a fascinating uh uh

1354  
00:56:41,589 --> 00:56:39,920  
subject you know because you really have

1355  
00:56:43,589 --> 00:56:41,599  
to think of uh

1356  
00:56:44,870 --> 00:56:43,599  
you know if someone's not uploaded in a

1357  
00:56:47,750 --> 00:56:44,880  
machine

1358  
00:56:49,670 --> 00:56:47,760  
you know their body's gonna you know

1359  
00:56:51,829 --> 00:56:49,680  
suffer consequences and one of the

1360  
00:56:53,589 --> 00:56:51,839  
one of the things that that makes me

1361  
00:56:57,990 --> 00:56:53,599  
think of and just to throw at you

1362  
00:57:01,030 --> 00:56:58,000  
as well is uh as far as

1363  
00:57:02,230 --> 00:57:01,040

say an evolution on a planet i mean

1364

00:57:04,870 --> 00:57:02,240

there are so

1365

00:57:06,069 --> 00:57:04,880

you know i mean uh i i talked to an

1366

00:57:08,470 --> 00:57:06,079

astronomer friend

1367

00:57:09,349 --> 00:57:08,480

or he has brought this up that uh

1368

00:57:13,670 --> 00:57:09,359

obviously

1369

00:57:16,789 --> 00:57:13,680

you know bipedal and and uh bipedal and

1370

00:57:18,470 --> 00:57:16,799

binocular vision are something optimal

1371

00:57:20,549 --> 00:57:18,480

because of all the different species on

1372

00:57:24,069 --> 00:57:20,559

this planet that have that

1373

00:57:25,510 --> 00:57:24,079

you know i mean we might we might agree

1374

00:57:27,430 --> 00:57:25,520

that that's a possibility that they

1375

00:57:29,670 --> 00:57:27,440

would develop in that way but when

1376

00:57:30,470 --> 00:57:29,680

things come into play like different

1377

00:57:32,549 --> 00:57:30,480

gravities

1378

00:57:33,910 --> 00:57:32,559

i mean that's a major thing i mean

1379

00:57:36,150 --> 00:57:33,920

there's so many different major things

1380

00:57:38,069 --> 00:57:36,160

but gravity is a big thing

1381

00:57:40,870 --> 00:57:38,079

um and how do you think that would

1382

00:57:43,270 --> 00:57:40,880

affect the development of a species

1383

00:57:45,349 --> 00:57:43,280

well in different ways and also i'd like

1384

00:57:46,150 --> 00:57:45,359

to introduce you to my colleague back

1385

00:57:49,670 --> 00:57:46,160

there

1386

00:57:52,829 --> 00:57:49,680

his name is principium

1387

00:58:05,270 --> 00:57:52,839

wait a minute let's get a shot on that

1388

00:58:10,870 --> 00:58:07,910

so are you sure that's not a bear rug

1389

00:58:14,390 --> 00:58:10,880

any and he also

1390

00:58:19,829 --> 00:58:14,400

no that's a kitty i'm just here

1391

00:58:19,839 --> 00:58:24,309

oh that's funny okay i thought

1392

00:58:31,190 --> 00:58:27,910

any anyway i can let people look at it

1393

00:58:33,109 --> 00:58:31,200

um the question that you you

1394

00:58:34,829 --> 00:58:33,119

basically raise about gravity is very

1395

00:58:38,230 --> 00:58:34,839

interesting

1396

00:58:42,870 --> 00:58:38,240

um in the low gravity world let's say

1397

00:58:45,270 --> 00:58:42,880

if mars mars has about 40 percent

1398

00:58:46,069 --> 00:58:45,280

the gravity that the earth does if it

1399

00:58:48,710 --> 00:58:46,079

were a bit

1400

00:58:50,789 --> 00:58:48,720

warmer it might have been able to hold

1401

00:58:53,829 --> 00:58:50,799

on to its oceans

1402

00:58:57,190 --> 00:58:53,839

creatures there would tend to have

1403

00:59:00,549 --> 00:58:57,200

probably longer legs they would be

1404

00:59:02,870 --> 00:59:00,559

you know um more slender

1405

00:59:04,150 --> 00:59:02,880

than we are because of that low gravity

1406

00:59:07,190 --> 00:59:04,160

and it's very possible

1407

00:59:10,069 --> 00:59:07,200

that if ellen musk is correct and we

1408

00:59:11,430 --> 00:59:10,079

build a city on mars oh he's leaving

1409

00:59:14,390 --> 00:59:11,440

okay he's had enough

1410

00:59:15,750 --> 00:59:14,400

if you build a city on mars in the next

1411

00:59:19,349 --> 00:59:15,760

couple of decades

1412

00:59:21,670 --> 00:59:19,359

it's not beyond the range of possibility

1413

00:59:23,109 --> 00:59:21,680

that the whole epigenetics thing will

1414

00:59:25,750 --> 00:59:23,119

start working that people

1415

00:59:26,630 --> 00:59:25,760

will change to adapt to the new

1416

00:59:28,470 --> 00:59:26,640

environment

1417

00:59:31,030 --> 00:59:28,480

and so will the other life that we bring

1418

00:59:33,510 --> 00:59:31,040

with us trees for instance might be

1419

00:59:36,549 --> 00:59:33,520

taller and more slender

1420

00:59:38,309 --> 00:59:36,559

imagine a giraffe 30 feet tall you know

1421

00:59:40,710 --> 00:59:38,319

that would be interesting

1422

00:59:41,990 --> 00:59:40,720

all of this all of this could certainly

1423

00:59:44,950 --> 00:59:42,000

be the case

1424

00:59:47,430 --> 00:59:44,960

uh also in a high gravity world you

1425

00:59:49,510 --> 00:59:47,440

would tend to be squashed in

1426  
00:59:52,150 --> 00:59:49,520  
probably unless you maybe maybe you're

1427  
00:59:54,950 --> 00:59:52,160  
living in the seas

1428  
00:59:55,510 --> 00:59:54,960  
you could be in a higher gravity world

1429  
00:59:57,349 --> 00:59:55,520  
with

1430  
00:59:58,789 --> 00:59:57,359  
a dense atmosphere and this is something

1431  
01:00:01,829 --> 00:59:58,799  
that's called sagan

1432  
01:00:05,990 --> 01:00:01,839  
and and dry on talk about i believe

1433  
01:00:08,069 --> 01:00:06,000  
in cosmos

1434  
01:00:09,030 --> 01:00:08,079  
and they mentioned the fact that one

1435  
01:00:11,510 --> 01:00:09,040  
type of life

1436  
01:00:14,150 --> 01:00:11,520  
not a terrestrial life but a strange

1437  
01:00:15,829 --> 01:00:14,160  
alien life you might think about are

1438  
01:00:18,309 --> 01:00:15,839

blimp-like creatures

1439

01:00:20,309 --> 01:00:18,319

living in the atmospheres of gas giants

1440

01:00:23,349 --> 01:00:20,319

like jupiter

1441

01:00:26,870 --> 01:00:23,359

and fast-moving giant limbs

1442

01:00:31,030 --> 01:00:28,710

balloon fighters running in as the

1443

01:00:35,030 --> 01:00:31,040

predators to eat the blimps

1444

01:00:36,390 --> 01:00:35,040

so you know we can't rule out an ecology

1445

01:00:39,670 --> 01:00:36,400

like that

1446

01:00:41,190 --> 01:00:39,680

uh also not only do we have to deal with

1447

01:00:42,300 --> 01:00:41,200

gravity

1448

01:00:45,829 --> 01:00:42,310

to deal with um

1449

01:00:50,150 --> 01:00:48,150

local chemistry effects things like that

1450

01:00:53,910 --> 01:00:50,160

look at titan for instance

1451

01:00:55,670 --> 01:00:53,920

titan is very cold but in many ways from

1452

01:00:59,510 --> 01:00:55,680

a chemical point of view

1453

01:01:03,349 --> 01:00:59,520

its surface is not the smaller from that

1454

01:01:06,150 --> 01:01:03,359

of the earth say 4 billion years ago

1455

01:01:09,349 --> 01:01:06,160

when life was just getting started

1456

01:01:11,270 --> 01:01:09,359

so life might have begun there in fact

1457

01:01:14,630 --> 01:01:11,280

when life first starts on the earth it

1458

01:01:18,549 --> 01:01:14,640

is oxygen heating life

1459

01:01:20,870 --> 01:01:18,559

and it excretes oxygen

1460

01:01:22,309 --> 01:01:20,880

as a waste product and later on there's

1461

01:01:24,710 --> 01:01:22,319

a mutation

1462

01:01:26,069 --> 01:01:24,720

and creatures come along who can live

1463

01:01:28,710 --> 01:01:26,079

off this oxygen

1464

01:01:29,990 --> 01:01:28,720

and they love it and the oxygen the the

1465

01:01:33,270 --> 01:01:30,000

um

1466

01:01:36,710 --> 01:01:33,280

the aerophones i believe they're called

1467

01:01:39,750 --> 01:01:36,720

end up being exiled to the

1468

01:01:40,549 --> 01:01:39,760

uh ocean the deep ocean vents and places

1469

01:01:42,630 --> 01:01:40,559

like that

1470

01:01:44,630 --> 01:01:42,640

it's really the only time you see them

1471

01:01:47,750 --> 01:01:44,640

they came up they come up during

1472

01:01:51,670 --> 01:01:47,760

um el nino events

1473

01:01:54,390 --> 01:01:51,680

now you could have a whole ecology on

1474

01:01:57,190 --> 01:01:54,400

titan based upon this

1475

01:01:58,069 --> 01:01:57,200

so even the concept of the habitable

1476

01:02:01,670 --> 01:01:58,079

zone

1477

01:02:03,670 --> 01:02:01,680

has to be enlarged the talk about a

1478

01:02:08,870 --> 01:02:03,680

habitable zone

1479

01:02:12,230 --> 01:02:11,589

it's an idealization you say you take

1480

01:02:19,670 --> 01:02:12,240

the earth

1481

01:02:20,549 --> 01:02:19,680

you put it around the sun around another

1482

01:02:24,470 --> 01:02:20,559

star

1483

01:02:26,630 --> 01:02:24,480

the sun

1484

01:02:28,630 --> 01:02:26,640

until the ocean starts to boil that is

1485

01:02:32,870 --> 01:02:28,640

the inner

1486

01:02:35,430 --> 01:02:32,880

the habitable zone

1487

01:02:35,990 --> 01:02:35,440

then you bring out this earth further

1488

01:02:38,150 --> 01:02:36,000

out

1489

01:02:40,549 --> 01:02:38,160

to the point where the ocean start to

1490

01:02:43,190 --> 01:02:40,559

freeze that is the outer limit

1491

01:02:44,950 --> 01:02:43,200

in our solar system there were only two

1492

01:02:46,069 --> 01:02:44,960

habitable planets according to that

1493

01:02:48,950 --> 01:02:46,079

definition

1494

01:02:49,670 --> 01:02:48,960

the earth is dab in the middle of it

1495

01:02:52,710 --> 01:02:49,680

mars

1496

01:02:54,390 --> 01:02:52,720

is just that they out of fringe which is

1497

01:02:56,950 --> 01:02:54,400

why some people still say

1498

01:02:59,990 --> 01:02:56,960

there might be some life or noise today

1499

01:03:03,029 --> 01:03:00,000

it might not be completely extinct

1500

01:03:05,589 --> 01:03:03,039

but then you have to realize

1501

01:03:07,029 --> 01:03:05,599

this was an idealization people began

1502

01:03:10,230 --> 01:03:07,039

making other discoveries

1503

01:03:10,870 --> 01:03:10,240

one discovery was that there's a moon of

1504

01:03:14,069 --> 01:03:10,880

jupiter

1505

01:03:17,029 --> 01:03:14,079

called europa europa has

1506

01:03:20,230 --> 01:03:17,039

a ocean which is probably something like

1507

01:03:21,829 --> 01:03:20,240

30 or 40 kilometers deep

1508

01:03:24,470 --> 01:03:21,839

and it was supposed to be a completely

1509

01:03:27,670 --> 01:03:24,480

frozen ocean but they noticed hey

1510

01:03:29,109 --> 01:03:27,680

there's cracks in the ice some people

1511

01:03:33,430 --> 01:03:29,119

joked about it and said

1512

01:03:36,870 --> 01:03:33,440

the martian canal has migrated europa

1513

01:03:40,069 --> 01:03:36,880

laws but what seems to happen

1514

01:03:41,750 --> 01:03:40,079

is because of the proximity of this

1515

01:03:44,470 --> 01:03:41,760

planet to jupiter

1516

01:03:44,789 --> 01:03:44,480

tidal effects and maybe other effects

1517

01:03:47,109 --> 01:03:44,799

too

1518

01:03:49,349 --> 01:03:47,119

deep inside the planet internal heating

1519

01:03:52,390 --> 01:03:49,359

inside the satellite

1520

01:03:55,280 --> 01:03:52,400

raise the temperature replacement above

1521

01:03:56,829 --> 01:03:55,290

the melting point a freezing point of

1522

01:03:58,309 --> 01:03:56,839

[Music]

1523

01:04:01,029 --> 01:03:58,319

water

1524

01:04:01,670 --> 01:04:01,039

you could have life there now that's

1525

01:04:07,270 --> 01:04:01,680

sort of like

1526

01:04:12,870 --> 01:04:10,789

go ahead yeah sorry yeah

1527

01:04:15,270 --> 01:04:12,880

oh i was going to say in one of the

1528

01:04:19,029 --> 01:04:15,280

sequels to 2001

1529

01:04:21,349 --> 01:04:19,039

among the alien

1530

01:04:23,109 --> 01:04:21,359

species who have put the monolith in

1531

01:04:25,829 --> 01:04:23,119

really aren't interested in us they're

1532

01:04:27,349 --> 01:04:25,839

listed in europa and they give a message

1533

01:04:30,390 --> 01:04:27,359

to terrestrial people

1534

01:04:32,069 --> 01:04:30,400

when they convert jupiter into a sun and

1535

01:04:35,510 --> 01:04:32,079

they say

1536

01:04:37,270 --> 01:04:35,520

all these worlds are yours but don't you

1537

01:04:39,910 --> 01:04:37,280

dare touch europa

1538

01:04:42,230 --> 01:04:39,920

and that's very and so there might be

1539

01:04:45,029 --> 01:04:42,240

something there also a titan

1540

01:04:47,829 --> 01:04:45,039

and finally we've now discovered that

1541

01:04:51,270 --> 01:04:47,839

there are internal heat sources

1542

01:04:55,190 --> 01:04:51,280

in many probably most solar system

1543

01:04:58,069 --> 01:04:55,200

bodies larger than the big asteroids

1544

01:04:59,750 --> 01:04:58,079

uh ceres which was just visited by a u.s

1545

01:05:01,910 --> 01:04:59,760

probe

1546

01:05:03,750 --> 01:05:01,920

surprisingly to everybody seems to have

1547

01:05:06,230 --> 01:05:03,760

an internal heat source

1548

01:05:08,309 --> 01:05:06,240

uh every major planet those that uranus

1549

01:05:11,190 --> 01:05:08,319

would ever knock you in this on its side

1550

01:05:13,750 --> 01:05:11,200

probably killed it millions of years ago

1551

01:05:17,029 --> 01:05:13,760

great point

1552

01:05:19,750 --> 01:05:17,039

yeah wow so the planet

1553

01:05:20,630 --> 01:05:19,760

you mentioned i mean i'm sorry the moon

1554

01:05:23,750 --> 01:05:20,640

you mentioned

1555

01:05:26,870 --> 01:05:23,760

um with the internal water

1556

01:05:28,549 --> 01:05:26,880

over ice in the the cracks um the tidal

1557

01:05:30,150 --> 01:05:28,559

effect is that

1558

01:05:32,069 --> 01:05:30,160

i know there's some type of effect

1559

01:05:34,390 --> 01:05:32,079

that's kind of like needing bread when

1560

01:05:35,829 --> 01:05:34,400

when you work it and it gets warm

1561

01:05:37,430 --> 01:05:35,839

because it's kind of like squishing

1562

01:05:39,990 --> 01:05:37,440

together and moving apart is that

1563

01:05:40,630 --> 01:05:40,000

is that kind of what that would be doing

1564

01:05:44,150 --> 01:05:40,640

it

1565

01:05:48,630 --> 01:05:44,160

course they could often

1566

01:05:51,910 --> 01:05:48,640

uh another possibility is this

1567

01:05:54,150 --> 01:05:51,920

in the i believe it's either the central

1568

01:05:57,430 --> 01:05:54,160

african republic or gabon

1569

01:06:00,230 --> 01:05:57,440

one of the african states

1570

01:06:02,549 --> 01:06:00,240

about two million years ago deep

1571

01:06:05,430 --> 01:06:02,559

underground there was a natural

1572

01:06:07,109 --> 01:06:05,440

nuclear reactor that operated for half a

1573

01:06:10,870 --> 01:06:07,119

million years

1574

01:06:14,630 --> 01:06:10,880

and what happened is uranium

1575

01:06:17,029 --> 01:06:14,640

another maybe radio visible material

1576  
01:06:18,390 --> 01:06:17,039  
came together under high pressure and

1577  
01:06:20,789 --> 01:06:18,400  
stayed there

1578  
01:06:21,750 --> 01:06:20,799  
long enough for a lot of energy to be

1579  
01:06:23,990 --> 01:06:21,760  
generated

1580  
01:06:25,270 --> 01:06:24,000  
this might also be where deep what is

1581  
01:06:27,990 --> 01:06:25,280  
the cause of deep focus

1582  
01:06:30,069 --> 01:06:28,000  
earthquakes deep focused earthquakes

1583  
01:06:34,390 --> 01:06:30,079  
still occur in places even not on

1584  
01:06:36,870 --> 01:06:34,400  
in on fourth zones there was one

1585  
01:06:38,470 --> 01:06:36,880  
oh 20 or 30 kilometers below new york

1586  
01:06:41,910 --> 01:06:38,480  
city in 1986

1587  
01:06:45,510 --> 01:06:41,920  
and 87 which i remember very well

1588  
01:06:46,150 --> 01:06:45,520

um it just made a very big bang that was

1589

01:06:49,270 --> 01:06:46,160

all

1590

01:06:51,829 --> 01:06:49,280

in the air pressure fell but

1591

01:06:54,150 --> 01:06:51,839

this might well be caused by local

1592

01:06:56,870 --> 01:06:54,160

radioactive heating

1593

01:06:58,470 --> 01:06:56,880

and this is going to go on inside bodies

1594

01:07:01,670 --> 01:06:58,480

other than the earth

1595

01:07:03,750 --> 01:07:01,680

a moon may have the two the moon

1596

01:07:04,789 --> 01:07:03,760

seems to be geologically dead in most

1597

01:07:07,109 --> 01:07:04,799

places

1598

01:07:07,910 --> 01:07:07,119

but there's one crater i believe and

1599

01:07:10,470 --> 01:07:07,920

this darkest

1600

01:07:12,470 --> 01:07:10,480

is its name that occasionally seems to

1601

01:07:13,910 --> 01:07:12,480

put out a puff of something

1602

01:07:16,789 --> 01:07:13,920

indicating that there's something going

1603

01:07:20,470 --> 01:07:16,799

on deep underneath

1604

01:07:24,069 --> 01:07:20,480

last year i thought i muted my mic

1605

01:07:27,510 --> 01:07:24,079

um so uh

1606

01:07:28,950 --> 01:07:27,520

how important is a magnetosphere you

1607

01:07:32,309 --> 01:07:28,960

know i understand that mars

1608

01:07:34,150 --> 01:07:32,319

probably had one at one point and uh

1609

01:07:36,390 --> 01:07:34,160

and that was you mentioned that it might

1610

01:07:38,549 --> 01:07:36,400

have been too cold to hang on to its

1611

01:07:39,430 --> 01:07:38,559

um water i i thought you said something

1612

01:07:42,470 --> 01:07:39,440

like that

1613

01:07:45,750 --> 01:07:42,480

no but is uh

1614

01:07:47,750 --> 01:07:45,760

can life survive without a magnetosphere

1615

01:07:49,829 --> 01:07:47,760

around a planet well that's a good

1616

01:07:53,750 --> 01:07:49,839

question

1617

01:07:57,430 --> 01:07:53,760

the magneto magnetosphere protects us

1618

01:07:57,829 --> 01:07:57,440

from galactic cosmic rays it turns out

1619

01:08:00,950 --> 01:07:57,839

that

1620

01:08:03,349 --> 01:08:00,960

astronauts in low altitudes space

1621

01:08:06,789 --> 01:08:03,359

stations and low altitude space fans

1622

01:08:08,950 --> 01:08:06,799

that will be building up to maybe

1623

01:08:10,069 --> 01:08:08,960

a few thousand kilometers opening the

1624

01:08:12,230 --> 01:08:10,079

earth

1625

01:08:13,510 --> 01:08:12,240

are relatively safe because you have the

1626

01:08:16,149 --> 01:08:13,520

earth below you

1627

01:08:17,990 --> 01:08:16,159

which is shielding you from 50 of the

1628

01:08:19,030 --> 01:08:18,000

galactic cosmic rays

1629

01:08:21,110 --> 01:08:19,040

and then you have the earth's

1630

01:08:23,110 --> 01:08:21,120

magnetosphere which are cutting out a

1631

01:08:27,269 --> 01:08:23,120

lot more of them

1632

01:08:29,990 --> 01:08:27,279

so you do pretty well but

1633

01:08:32,070 --> 01:08:30,000

periodically things happen to the

1634

01:08:34,550 --> 01:08:32,080

magnetosphere

1635

01:08:35,510 --> 01:08:34,560

uh there was an experiment done in great

1636

01:08:38,870 --> 01:08:35,520

britain

1637

01:08:39,430 --> 01:08:38,880

after world war ii they knew at this

1638

01:08:42,950 --> 01:08:39,440

point

1639

01:08:43,510 --> 01:08:42,960

that the earth had two cores the central

1640

01:08:46,950 --> 01:08:43,520

core

1641

01:08:49,590 --> 01:08:46,960

is mostly solid iron and nickel

1642

01:08:50,709 --> 01:08:49,600

the outer core is mostly molten iron and

1643

01:08:54,950 --> 01:08:50,719

nickel

1644

01:08:56,550 --> 01:08:54,960

they they rotate at a

1645

01:08:58,870 --> 01:08:56,560

at different rates because they're not

1646

01:09:00,950 --> 01:08:58,880

rigidly attached the feeling was that's

1647

01:09:02,470 --> 01:09:00,960

what produced the magnetosphere magnetic

1648

01:09:06,070 --> 01:09:02,480

field

1649

01:09:09,910 --> 01:09:06,080

so they set up in the laboratory

1650

01:09:11,590 --> 01:09:09,920

a version of this a small model

1651  
01:09:13,829 --> 01:09:11,600  
and they watched it evolve and then they

1652  
01:09:17,349 --> 01:09:13,839  
noticed heck

1653  
01:09:19,110 --> 01:09:17,359  
the poles are flipping periodically the

1654  
01:09:21,110 --> 01:09:19,120  
poles flipped so people started to

1655  
01:09:24,550 --> 01:09:21,120  
wonder does that happen

1656  
01:09:27,510 --> 01:09:24,560  
on the earth too and then you come back

1657  
01:09:29,669 --> 01:09:27,520  
to a little cold war cover-up because

1658  
01:09:33,829 --> 01:09:29,679  
that's how this was discovered

1659  
01:09:35,990 --> 01:09:33,839  
people realized in the 1960s and 1970s

1660  
01:09:37,590 --> 01:09:36,000  
that sooner or later a russian nuclear

1661  
01:09:40,470 --> 01:09:37,600  
submarine would sink

1662  
01:09:41,829 --> 01:09:40,480  
and it did two american nuclear

1663  
01:09:43,910 --> 01:09:41,839

submarines sank

1664

01:09:45,510 --> 01:09:43,920

or three or four i forget how many

1665

01:09:48,709 --> 01:09:45,520

russian nukes

1666

01:09:52,309 --> 01:09:48,719

could we develop a ship

1667

01:09:54,470 --> 01:09:52,319

that could basically retrieve this

1668

01:09:55,669 --> 01:09:54,480

and learn something about their nuclear

1669

01:09:58,630 --> 01:09:55,679

technology

1670

01:10:00,070 --> 01:09:58,640

so use aerospace was commissioned to

1671

01:10:02,470 --> 01:10:00,080

build a ship

1672

01:10:04,870 --> 01:10:02,480

but they realized this would be piracy

1673

01:10:08,149 --> 01:10:04,880

so they needed a cover for this

1674

01:10:10,870 --> 01:10:08,159

two ships were discovered one was called

1675

01:10:12,470 --> 01:10:10,880

the explorer and they forget what the

1676

01:10:14,229 --> 01:10:12,480

other challenger

1677

01:10:16,870 --> 01:10:14,239

the glomer challenger and global

1678

01:10:20,470 --> 01:10:16,880

explorer one was going to do

1679

01:10:22,070 --> 01:10:20,480

publicized work along a region

1680

01:10:24,229 --> 01:10:22,080

of the mid-atlantic called the

1681

01:10:25,189 --> 01:10:24,239

mid-atlantic ridge which is a volcanic

1682

01:10:28,630 --> 01:10:25,199

region

1683

01:10:30,470 --> 01:10:28,640

looking at old crust and getting further

1684

01:10:32,470 --> 01:10:30,480

and further from the volcanoes

1685

01:10:33,750 --> 01:10:32,480

as you go further and further out the

1686

01:10:36,149 --> 01:10:33,760

crust gets older

1687

01:10:38,630 --> 01:10:36,159

i'm looking at the magnetic alignment of

1688

01:10:40,950 --> 01:10:38,640

the solidified iron

1689

01:10:41,669 --> 01:10:40,960

and while the other one was secretly

1690

01:10:46,709 --> 01:10:41,679

retrieving

1691

01:10:47,750 --> 01:10:46,719

and apparently they gave the russian

1692

01:10:49,830 --> 01:10:47,760

sailors

1693

01:10:50,950 --> 01:10:49,840

a military funeral they were very nice

1694

01:10:52,630 --> 01:10:50,960

that way

1695

01:10:54,550 --> 01:10:52,640

they admitted this after the end of the

1696

01:10:58,470 --> 01:10:54,560

cold war of course

1697

01:11:00,070 --> 01:10:58,480

but the other ship god was able to bring

1698

01:11:02,229 --> 01:11:00,080

back samples

1699

01:11:03,350 --> 01:11:02,239

from from this ridge and what they

1700

01:11:04,950 --> 01:11:03,360

demonstrated

1701

01:11:07,030 --> 01:11:04,960

is that at intervals of a hundred

1702

01:11:10,390 --> 01:11:07,040

thousand years or so the earth's

1703

01:11:11,910 --> 01:11:10,400

magnetosphere does flip the south and

1704

01:11:14,950 --> 01:11:11,920

north poles flip

1705

01:11:15,990 --> 01:11:14,960

basically the magnetic field lines come

1706

01:11:18,229 --> 01:11:16,000

out of the north pole

1707

01:11:19,350 --> 01:11:18,239

in a magnet and go into the south pole

1708

01:11:21,430 --> 01:11:19,360

now on the earth

1709

01:11:24,070 --> 01:11:21,440

the north pole is really the south pole

1710

01:11:27,669 --> 01:11:24,080

but don't worry about it don't

1711

01:11:29,910 --> 01:11:27,679

but there's some indication

1712

01:11:31,350 --> 01:11:29,920

that the magnetosphere might be getting

1713

01:11:32,920 --> 01:11:31,360

a little unstable

1714

01:11:34,470 --> 01:11:32,930

and sometime in the next uh

1715

01:11:37,350 --> 01:11:34,480

[Music]

1716

01:11:40,070 --> 01:11:37,360

thousand years or so it might do a flip

1717

01:11:43,590 --> 01:11:40,080

i wouldn't worry about it too much yeah

1718

01:11:43,600 --> 01:11:47,590

it might have the effect of satellites

1719

01:11:52,630 --> 01:11:50,709

and what will happen is the radiation

1720

01:11:53,350 --> 01:11:52,640

level at earth's surface will go up a

1721

01:11:55,189 --> 01:11:53,360

bit

1722

01:11:56,390 --> 01:11:55,199

people probably won't go out as much

1723

01:11:59,510 --> 01:11:56,400

without

1724

01:12:01,510 --> 01:11:59,520

maybe lead parasols or spend more time

1725

01:12:03,830 --> 01:12:01,520

in their local subway stations

1726

01:12:06,630 --> 01:12:03,840

do things like that yeah wow doesn't

1727

01:12:08,229 --> 01:12:06,640

sound doesn't sound like a lot of fun

1728

01:12:10,070 --> 01:12:08,239

if you have a house the value of your

1729

01:12:13,110 --> 01:12:10,080

insured basement your

1730

01:12:13,990 --> 01:12:13,120

replacement will go up all the all the

1731

01:12:15,910 --> 01:12:14,000

preppers will be

1732

01:12:17,430 --> 01:12:15,920

so happy they'll be in the bunkers

1733

01:12:19,590 --> 01:12:17,440

exactly right yeah

1734

01:12:21,830 --> 01:12:19,600

uh so i'm going to ask you for a a

1735

01:12:23,270 --> 01:12:21,840

couple of opinions if that and i know a

1736

01:12:23,669 --> 01:12:23,280

lot of people in science really don't

1737

01:12:30,070 --> 01:12:23,679

like

1738

01:12:33,910 --> 01:12:30,080

person so

1739

01:12:36,390 --> 01:12:33,920

um do you think it's possible that

1740

01:12:37,830 --> 01:12:36,400

this new rover that landed on mars is

1741

01:12:40,229 --> 01:12:37,840

going to find

1742

01:12:41,430 --> 01:12:40,239

at least ancient life do you think i i

1743

01:12:42,709 --> 01:12:41,440

think it's possible

1744

01:12:44,310 --> 01:12:42,719

and i just wonder what your thoughts

1745

01:12:45,990 --> 01:12:44,320

were well i think it's possible and i

1746

01:12:51,510 --> 01:12:46,000

hope it does

1747

01:12:52,390 --> 01:12:51,520

only the chinese rover which hasn't

1748

01:12:55,189 --> 01:12:52,400

landed yet

1749

01:12:55,830 --> 01:12:55,199

will also have life detection apparatus

1750

01:12:59,590 --> 01:12:55,840

i

1751

01:13:01,910 --> 01:12:59,600

there are people

1752

01:13:04,149 --> 01:13:01,920

who say still today that the viking

1753

01:13:07,030 --> 01:13:04,159

experiment in 1976

1754

01:13:08,709 --> 01:13:07,040

was not as negative as people say you

1755

01:13:11,750 --> 01:13:08,719

may remember that there were two row

1756

01:13:12,630 --> 01:13:11,760

two landers from nasa viking one and

1757

01:13:14,630 --> 01:13:12,640

viking two

1758

01:13:15,750 --> 01:13:14,640

yeah each of them had three life

1759

01:13:18,470 --> 01:13:15,760

detection

1760

01:13:18,870 --> 01:13:18,480

devices the first one they got headlines

1761

01:13:25,430 --> 01:13:18,880

said

1762

01:13:26,790 --> 01:13:25,440

i think it's an active surface chemistry

1763

01:13:27,590 --> 01:13:26,800

we have to wait for the third one to

1764

01:13:30,470 --> 01:13:27,600

decide

1765

01:13:32,709 --> 01:13:30,480

the first one said i'm not sure so

1766

01:13:37,270 --> 01:13:32,719

basically the conservative people said

1767

01:13:40,470 --> 01:13:37,280

mars does not have life then in 1995

1768

01:13:44,310 --> 01:13:40,480

there was a woman roberta stone

1769

01:13:47,510 --> 01:13:44,320

a geologist at nasa johnson i believe

1770

01:13:50,070 --> 01:13:47,520

who was on a expedition to

1771

01:13:51,270 --> 01:13:50,080

the south pole but she found a nice

1772

01:13:54,310 --> 01:13:51,280

green meteorite

1773

01:13:56,709 --> 01:13:54,320

right knew what that was she said i know

1774

01:13:59,990 --> 01:13:56,719

by the color that's from mars

1775

01:14:04,669 --> 01:14:00,000

not naturally from the poles so it

1776

01:14:10,149 --> 01:14:05,830

a-l-h-o-o-a-l-h

1777

01:14:12,630 --> 01:14:10,159

1980 19 95 001

1778

01:14:13,189 --> 01:14:12,640

something like that and they brought it

1779

01:14:15,350 --> 01:14:13,199

back

1780

01:14:16,870 --> 01:14:15,360

and they analyzed it very carefully and

1781

01:14:18,790 --> 01:14:16,880

it is possible

1782

01:14:21,030 --> 01:14:18,800

that there are very very small

1783

01:14:23,350 --> 01:14:21,040

fossilized microorganisms

1784

01:14:25,990 --> 01:14:23,360

it is also possible that it's some type

1785

01:14:27,750 --> 01:14:26,000

of crystallization effect

1786

01:14:30,310 --> 01:14:27,760

we're gonna have to see what's there

1787

01:14:33,350 --> 01:14:30,320

hopefully this

1788

01:14:33,910 --> 01:14:33,360

sophisticated spacecraft of perseverance

1789

01:14:36,550 --> 01:14:33,920

or the

1790

01:14:37,430 --> 01:14:36,560

chinese lander i forget its name will

1791

01:14:41,990 --> 01:14:37,440

hopefully

1792

01:14:43,910 --> 01:14:42,000

i would i would love it if there was

1793

01:14:46,070 --> 01:14:43,920

something alive now but hopefully

1794

01:14:48,149 --> 01:14:46,080

yeah yeah i remember i think bill

1795

01:14:51,590 --> 01:14:48,159

clinton was in office at that time

1796

01:14:54,149 --> 01:14:51,600

um and you know one of the things i got

1797

01:14:54,709 --> 01:14:54,159

out of that was wow there could there

1798

01:14:57,830 --> 01:14:54,719

could be

1799

01:14:59,990 --> 01:14:57,840

you know uh evidence of that there was

1800

01:15:01,750 --> 01:15:00,000

life on mars

1801  
01:15:03,590 --> 01:15:01,760  
and i thought that was a really big

1802  
01:15:04,310 --> 01:15:03,600  
story and then you didn't hear about it

1803  
01:15:07,430 --> 01:15:04,320  
anymore

1804  
01:15:09,270 --> 01:15:07,440  
like it would seem like you would if it

1805  
01:15:11,510 --> 01:15:09,280  
was a possibility of life

1806  
01:15:12,870 --> 01:15:11,520  
elsewhere that would be the biggest

1807  
01:15:15,270 --> 01:15:12,880  
story of

1808  
01:15:16,310 --> 01:15:15,280  
you know the millennial because they

1809  
01:15:17,430 --> 01:15:16,320  
couldn't they couldn't do it

1810  
01:15:20,550 --> 01:15:17,440  
conclusively

1811  
01:15:22,390 --> 01:15:20,560  
i see absolutely like with the viking

1812  
01:15:24,630 --> 01:15:22,400  
experiment

1813  
01:15:25,510 --> 01:15:24,640

but with all our technology today we

1814

01:15:28,229 --> 01:15:25,520

still can't

1815

01:15:29,030 --> 01:15:28,239

take that sample and figure out if it

1816

01:15:32,630 --> 01:15:29,040

was

1817

01:15:35,750 --> 01:15:32,640

an organism what we might have to do

1818

01:15:38,709 --> 01:15:35,760

is in our plans of doing this this rover

1819

01:15:41,189 --> 01:15:38,719

is going to retrieve a number of samples

1820

01:15:43,750 --> 01:15:41,199

and put them in plastic baggies

1821

01:15:45,270 --> 01:15:43,760

and put them back on these treads with

1822

01:15:46,870 --> 01:15:45,280

trade tracks

1823

01:15:48,790 --> 01:15:46,880

then there's going to be a european

1824

01:15:50,390 --> 01:15:48,800

rover that's going to follow these tread

1825

01:15:53,270 --> 01:15:50,400

tracks in a few years

1826

01:15:53,669 --> 01:15:53,280

retrieve the baggies and bring them back

1827

01:16:00,229 --> 01:15:53,679

to

1828

01:16:01,430 --> 01:16:00,239

not everybody likes this if you've seen

1829

01:16:06,950 --> 01:16:01,440

the andromeda

1830

01:16:08,149 --> 01:16:06,960

or maybe the man who fell from space

1831

01:16:10,470 --> 01:16:08,159

david bowie

1832

01:16:11,510 --> 01:16:10,480

you might say well maybe it's not such a

1833

01:16:13,110 --> 01:16:11,520

good idea

1834

01:16:15,030 --> 01:16:13,120

to bring this stuff right back to the

1835

01:16:17,669 --> 01:16:15,040

earth but yeah

1836

01:16:20,390 --> 01:16:17,679

some biologists are saying they have to

1837

01:16:21,830 --> 01:16:20,400

get it into a lab somewhere either on

1838

01:16:23,750 --> 01:16:21,840

the surface of mars

1839

01:16:24,950 --> 01:16:23,760

the surface of the earth or in an

1840

01:16:27,430 --> 01:16:24,960

orbiting facility

1841

01:16:28,709 --> 01:16:27,440

a space station and then they can do the

1842

01:16:31,189 --> 01:16:28,719

experiments on it

1843

01:16:33,189 --> 01:16:31,199

and really determine is it alive or not

1844

01:16:36,550 --> 01:16:33,199

with certainty

1845

01:16:40,310 --> 01:16:36,560

yeah yeah it's amazing how life

1846

01:16:43,910 --> 01:16:40,320

fights so hard to survive in all these

1847

01:16:48,390 --> 01:16:43,920

odd odd places acidic places uh

1848

01:16:51,590 --> 01:16:48,400

you know and and uh kind of recently

1849

01:16:53,910 --> 01:16:51,600

um weren't they thinking that there was

1850

01:16:57,189 --> 01:16:53,920

a possibility of some type of life

1851

01:16:59,110 --> 01:16:57,199

detection in venus in the upper

1852

01:17:01,830 --> 01:16:59,120

atmosphere or something

1853

01:17:03,270 --> 01:17:01,840

when you look at venus the low venus has

1854

01:17:06,229 --> 01:17:03,280

been very well explored

1855

01:17:08,070 --> 01:17:06,239

mostly by the soviets to a lesser extent

1856

01:17:11,590 --> 01:17:08,080

by the us

1857

01:17:14,310 --> 01:17:11,600

we know that its surface is ridiculously

1858

01:17:18,709 --> 01:17:16,630

an atmospheric pressure 90 times out of

1859

01:17:20,870 --> 01:17:18,719

the earth and if that's not bad enough

1860

01:17:23,590 --> 01:17:20,880

there is acid rain falling it is

1861

01:17:24,070 --> 01:17:23,600

probably very close to dante's vision of

1862

01:17:27,430 --> 01:17:24,080

hell

1863

01:17:30,390 --> 01:17:27,440

from the middle ages but about

1864

01:17:32,229 --> 01:17:30,400

30 or 40 kilometers up in the atmosphere

1865

01:17:35,750 --> 01:17:32,239

of venus there is a clement

1866

01:17:38,229 --> 01:17:35,760

zone and if there's water vapor there

1867

01:17:39,990 --> 01:17:38,239

it is not impossible that there could be

1868

01:17:43,990 --> 01:17:40,000

life

1869

01:17:47,430 --> 01:17:44,000

so one research group has come up with

1870

01:17:50,709 --> 01:17:47,440

observations of what might be phosphine

1871

01:17:53,750 --> 01:17:50,719

and the theory rules if it is indeed

1872

01:17:56,709 --> 01:17:53,760

phosphane the most

1873

01:17:57,590 --> 01:17:56,719

likely way of producing it is an organic

1874

01:18:00,229 --> 01:17:57,600

process

1875

01:18:01,590 --> 01:18:00,239

but there might be others once again we

1876

01:18:03,270 --> 01:18:01,600

don't know for sure we're going to have

1877

01:18:05,110 --> 01:18:03,280

to go back to venus

1878

01:18:06,470 --> 01:18:05,120

and do something in those clouds

1879

01:18:10,790 --> 01:18:06,480

probably with

1880

01:18:14,070 --> 01:18:10,800

um equipment suspended from balloons

1881

01:18:15,590 --> 01:18:14,080

something like that yeah all fascinating

1882

01:18:17,350 --> 01:18:15,600

all right here's the other opinion

1883

01:18:21,189 --> 01:18:17,360

question you know this is

1884

01:18:23,669 --> 01:18:21,199

in the title of my show is the word ufo

1885

01:18:24,709 --> 01:18:23,679

and uh i wondered what your your opinion

1886

01:18:27,830 --> 01:18:24,719

is uh

1887

01:18:29,510 --> 01:18:27,840

with say i'm just gonna throw out uh

1888

01:18:31,030 --> 01:18:29,520

i don't know if you followed any of this

1889

01:18:33,270 --> 01:18:31,040

or watched any of it but

1890

01:18:34,229 --> 01:18:33,280

you know the pentagon released some

1891

01:18:36,709 --> 01:18:34,239

videos and

1892

01:18:38,390 --> 01:18:36,719

and um do you think there's a

1893

01:18:39,030 --> 01:18:38,400

possibility and i'm i'm not gonna say

1894

01:18:41,110 --> 01:18:39,040

that it's

1895

01:18:42,390 --> 01:18:41,120

extraterrestrial because i don't want to

1896

01:18:44,630 --> 01:18:42,400

say for sure

1897

01:18:45,669 --> 01:18:44,640

but do you think these things are are

1898

01:18:47,750 --> 01:18:45,679

possible that they're

1899

01:18:49,830 --> 01:18:47,760

seen here in the skies i have evolved in

1900

01:18:53,110 --> 01:18:49,840

this direction and i'll tell you

1901

01:18:55,350 --> 01:18:53,120

how this happened in 1970

1902

01:18:56,950 --> 01:18:55,360

my first academic position was as a

1903

01:18:59,030 --> 01:18:56,960

research associate

1904

01:19:00,550 --> 01:18:59,040

and teaching assistant at the vans like

1905

01:19:03,910 --> 01:19:00,560

observatory

1906

01:19:05,189 --> 01:19:03,920

in wesleyan university in middletown

1907

01:19:08,070 --> 01:19:05,199

connecticut

1908

01:19:09,430 --> 01:19:08,080

and i had done a stint at grumman after

1909

01:19:10,950 --> 01:19:09,440

being at kaulsman

1910

01:19:13,270 --> 01:19:10,960

and they get a call from the grumman

1911

01:19:16,149 --> 01:19:13,280

astronomer lou smith saying greg

1912

01:19:17,669 --> 01:19:16,159

we're doing an experiment on apollo 13

1913

01:19:18,870 --> 01:19:17,679

we're calling all of our friends and

1914

01:19:21,430 --> 01:19:18,880

observatories

1915

01:19:23,669 --> 01:19:21,440

to observe this and if you see the movie

1916

01:19:26,630 --> 01:19:23,679

apollo 13 i know most

1917

01:19:27,669 --> 01:19:26,640

viewers probably have in the very

1918

01:19:30,630 --> 01:19:27,679

beginning of the movie

1919

01:19:32,630 --> 01:19:30,640

there was a urine duck that's yeah

1920

01:19:33,270 --> 01:19:32,640

clifton's leaving earth orbit and people

1921

01:19:35,030 --> 01:19:33,280

say

1922

01:19:36,310 --> 01:19:35,040

why are they doing that it's not

1923

01:19:38,470 --> 01:19:36,320

explained

1924

01:19:39,350 --> 01:19:38,480

they don't get rid of that little bit of

1925

01:19:41,350 --> 01:19:39,360

extra weight

1926

01:19:42,630 --> 01:19:41,360

it was an experiment what they were

1927

01:19:44,870 --> 01:19:42,640

doing was creating

1928

01:19:46,390 --> 01:19:44,880

an artificial comet they asked the

1929

01:19:49,350 --> 01:19:46,400

astronauts to pee

1930

01:19:50,390 --> 01:19:49,360

if you can if i can use that word on the

1931

01:19:53,110 --> 01:19:50,400

urinate

1932

01:19:53,750 --> 01:19:53,120

on the podcast and then they collected

1933

01:19:56,229 --> 01:19:53,760

it and they

1934

01:19:57,430 --> 01:19:56,239

built it into space and it began to

1935

01:20:00,070 --> 01:19:57,440

expand

1936

01:20:02,070 --> 01:20:00,080

and i got the telescope going the 20

1937

01:20:04,310 --> 01:20:02,080

inch refractor and also we had students

1938

01:20:06,470 --> 01:20:04,320

on the six inch refractor

1939

01:20:08,390 --> 01:20:06,480

having a lot of fun with it and we could

1940

01:20:11,189 --> 01:20:08,400

see you can see that the apollo

1941

01:20:14,229 --> 01:20:11,199

spacecraft in the center is a solid dot

1942

01:20:15,189 --> 01:20:14,239

you can see the three fairings spinning

1943

01:20:17,350 --> 01:20:15,199

in space

1944

01:20:19,030 --> 01:20:17,360

twinkling like stars and then you can

1945

01:20:22,149 --> 01:20:19,040

see this expanding

1946

01:20:23,510 --> 01:20:22,159

beautiful star-like hazy object and then

1947

01:20:25,990 --> 01:20:23,520

the phone rang

1948

01:20:27,030 --> 01:20:26,000

and roger rosenbacher who was the senior

1949

01:20:28,870 --> 01:20:27,040

observer

1950

01:20:30,070 --> 01:20:28,880

looked at me and left he said greg this

1951

01:20:32,870 --> 01:20:30,080

is your project

1952

01:20:33,830 --> 01:20:32,880

you're taking the calls tonight i picked

1953

01:20:37,110 --> 01:20:33,840

it up

1954

01:20:40,390 --> 01:20:37,120

guys on the other end hello

1955

01:20:43,430 --> 01:20:40,400

who am i speaking to i'm greg maltloff

1956

01:20:46,470 --> 01:20:43,440

i'm astronomer at wesleyan and who am i

1957

01:20:49,189 --> 01:20:46,480

speaking to he gave his name you have

1958

01:20:49,590 --> 01:20:49,199

something you'd like to talk about yes i

1959

01:20:52,790 --> 01:20:49,600

am

1960

01:20:54,629 --> 01:20:52,800

observing a ufo it is about 30 degrees

1961

01:20:56,629 --> 01:20:54,639

above the southern horizon

1962

01:20:58,390 --> 01:20:56,639

it is as bright as the second magnitude

1963

01:21:01,110 --> 01:20:58,400

star

1964

01:21:02,229 --> 01:21:01,120

then said we're observing the same thing

1965

01:21:05,669 --> 01:21:02,239

what you are seeing

1966

01:21:09,270 --> 01:21:05,679

is a urine dump from apollo 14

1967

01:21:10,229 --> 01:21:09,280

when they were fired and then he said

1968

01:21:12,310 --> 01:21:10,239

very loud

1969

01:21:14,470 --> 01:21:12,320

well then you're in the conspiracy and

1970

01:21:17,030 --> 01:21:14,480

the phone swam down

1971

01:21:19,270 --> 01:21:17,040

later on somebody called back maybe the

1972

01:21:22,790 --> 01:21:19,280

same guy about the same thing

1973

01:21:24,310 --> 01:21:22,800

so i became a little negative about ufo

1974

01:21:27,590 --> 01:21:24,320

conspiracy theories

1975

01:21:31,510 --> 01:21:27,600

people like them and then later on in

1976

01:21:34,070 --> 01:21:31,520

1986 my wife steve bangs who's an artist

1977

01:21:36,390 --> 01:21:34,080

was working as an artist for the

1978

01:21:38,790 --> 01:21:36,400

development of parks and recreation

1979

01:21:40,790 --> 01:21:38,800

in new york city and they needed an

1980

01:21:43,110 --> 01:21:40,800

astronomer in the parks because

1981

01:21:43,990 --> 01:21:43,120

when holly's comment came by they had no

1982

01:21:46,629 --> 01:21:44,000

idea what to do

1983

01:21:49,990 --> 01:21:46,639

they were embarrassed so they hired me

1984

01:21:53,189 --> 01:21:50,000

as a consulting astronomer

1985

01:21:54,229 --> 01:21:53,199

and um did this for four years until

1986

01:21:56,310 --> 01:21:54,239

there was

1987

01:21:59,669 --> 01:21:56,320

a financial crisis that we all got laid

1988

01:22:02,790 --> 01:21:59,679

off but before that in 1990

1989

01:22:07,430 --> 01:22:02,800

there was the casino park

1990

01:22:10,070 --> 01:22:07,440

ufo incident three nurses and queens

1991

01:22:11,110 --> 01:22:10,080

sitting in their bus going home from the

1992

01:22:13,750 --> 01:22:11,120

local hospital

1993

01:22:15,510 --> 01:22:13,760

after shift late at night they look over

1994

01:22:18,070 --> 01:22:15,520

with christina park

1995

01:22:20,390 --> 01:22:18,080

which is not far from queen's college i

1996

01:22:23,350 --> 01:22:20,400

got my bachelor's degree

1997

01:22:24,950 --> 01:22:23,360

and they say oh my god there are lights

1998

01:22:27,910 --> 01:22:24,960

over the park

1999

01:22:29,590 --> 01:22:27,920

we have to report this to somebody they

2000

01:22:30,790 --> 01:22:29,600

could have called the police

2001

01:22:33,830 --> 01:22:30,800

they could have called the park

2002

01:22:36,830 --> 01:22:33,840

department they could have called nasa

2003

01:22:39,910 --> 01:22:36,840

no they brought in a professional

2004

01:22:42,310 --> 01:22:39,920

ufologist we lost such people

2005

01:22:43,350 --> 01:22:42,320

the professional loophole against walks

2006

01:22:45,910 --> 01:22:43,360

back

2007

01:22:46,790 --> 01:22:45,920

in that direction and he keeps walking

2008

01:22:50,310 --> 01:22:46,800

until he comes

2009

01:22:53,430 --> 01:22:50,320

to dead spots in the grass he said well

2010

01:22:54,550 --> 01:22:53,440

this is where ufos landed then he takes

2011

01:22:57,750 --> 01:22:54,560

out his compass

2012

01:22:59,910 --> 01:22:57,760

and he looks at the lamppost near the

2013

01:23:03,030 --> 01:22:59,920

near them and he says the oldies are

2014

01:23:05,990 --> 01:23:03,040

magnetized that's from the ufo

2015

01:23:08,149 --> 01:23:06,000

and he starts getting enormous amount of

2016

01:23:09,990 --> 01:23:08,159

attention on the local press

2017

01:23:12,390 --> 01:23:10,000

and the queens below these local

2018

01:23:15,189 --> 01:23:12,400

presidents are for free

2019

01:23:16,950 --> 01:23:15,199

but of course people pick them up and

2020

01:23:19,590 --> 01:23:16,960

they read them for the ads

2021

01:23:20,310 --> 01:23:19,600

and the advertisers are spending good

2022

01:23:23,030 --> 01:23:20,320

money

2023

01:23:24,310 --> 01:23:23,040

because the circulation is going up the

2024

01:23:27,430 --> 01:23:24,320

parts department says

2025

01:23:29,590 --> 01:23:27,440

greg you have to get in there

2026

01:23:30,709 --> 01:23:29,600

and you have to find out the truth of

2027

01:23:33,110 --> 01:23:30,719

this

2028

01:23:33,990 --> 01:23:33,120

so i went in i first of all went in with

2029

01:23:37,110 --> 01:23:34,000

the ranger

2030

01:23:37,510 --> 01:23:37,120

for every reason the lights if you had

2031

01:23:41,110 --> 01:23:37,520

seen

2032

01:23:43,510 --> 01:23:41,120

park

2033

01:23:44,709 --> 01:23:43,520

over the over the pool these were not

2034

01:23:47,270 --> 01:23:44,719

the lights

2035

01:23:48,070 --> 01:23:47,280

that had come down over the landing

2036

01:23:52,310 --> 01:23:48,080

zones

2037

01:23:55,910 --> 01:23:52,320

took samples

2038

01:23:57,110 --> 01:23:55,920

of the rock and yes the ufologist was

2039

01:23:58,550 --> 01:23:57,120

correct

2040

01:24:00,149 --> 01:23:58,560

some of the rock samples are very

2041

01:24:06,070 --> 01:24:00,159

strange

2042

01:24:09,189 --> 01:24:08,070

diatom i think i forget the name of the

2043

01:24:11,430 --> 01:24:09,199

rock

2044

01:24:12,870 --> 01:24:11,440

but it's usually only found in aruba

2045

01:24:15,510 --> 01:24:12,880

they said what is this doing

2046

01:24:16,790 --> 01:24:15,520

here well they recent i write research a

2047

01:24:19,189 --> 01:24:16,800

little bit more

2048

01:24:21,669 --> 01:24:19,199

and i learned that the park was

2049

01:24:26,149 --> 01:24:21,679

renovating their tennis courts

2050

01:24:28,830 --> 01:24:26,159

and this particular rock is

2051  
01:24:30,070 --> 01:24:28,840  
an ingredient of a tennis court so

2052  
01:24:33,270 --> 01:24:30,080  
obviously

2053  
01:24:35,669 --> 01:24:33,280  
there's been a spill from a park truck

2054  
01:24:38,950 --> 01:24:35,679  
and i got to know parkies pretty well

2055  
01:24:42,390 --> 01:24:38,960  
you never admit that you killed grass

2056  
01:24:43,590 --> 01:24:42,400  
maybe the aliens did it in the lamppost

2057  
01:24:46,790 --> 01:24:43,600  
the ufologist was

2058  
01:24:47,590 --> 01:24:46,800  
absolutely correct about this the land

2059  
01:24:50,709 --> 01:24:47,600  
post

2060  
01:24:53,270 --> 01:24:50,719  
near the landing sites led landing sites

2061  
01:24:53,990 --> 01:24:53,280  
will magnetize but with the ranger i

2062  
01:24:56,390 --> 01:24:54,000  
walked through

2063  
01:24:57,990 --> 01:24:56,400

and checked many many other lampposts

2064

01:25:00,470 --> 01:24:58,000

they were all magnetized

2065

01:25:01,590 --> 01:25:00,480

so the ufo comes back to play tennis

2066

01:25:04,550 --> 01:25:01,600

every night

2067

01:25:05,750 --> 01:25:04,560

one possibility or it was something like

2068

01:25:09,030 --> 01:25:05,760

a transformer

2069

01:25:11,510 --> 01:25:09,040

in every casino park lamppost

2070

01:25:12,950 --> 01:25:11,520

by elkins razor you take the simplest of

2071

01:25:16,229 --> 01:25:12,960

the possibilities

2072

01:25:18,790 --> 01:25:16,239

so i then decided you really

2073

01:25:20,709 --> 01:25:18,800

can't trust the local press too much

2074

01:25:23,590 --> 01:25:20,719

about this

2075

01:25:26,470 --> 01:25:23,600

for years go on a few years ago there's

2076

01:25:29,830 --> 01:25:26,480

a release by the pentagon

2077

01:25:31,750 --> 01:25:29,840

and this is on tv and on the computer

2078

01:25:34,950 --> 01:25:31,760

and you get to see

2079

01:25:38,390 --> 01:25:34,960

two navy fighter pilots and then

2080

01:25:39,350 --> 01:25:38,400

an f18 i believe off the coast of

2081

01:25:44,070 --> 01:25:39,360

california

2082

01:25:45,990 --> 01:25:44,080

flying from their carrier have

2083

01:25:48,550 --> 01:25:46,000

and they not only did they see it they

2084

01:25:52,830 --> 01:25:48,560

interact with the screen

2085

01:25:56,790 --> 01:25:52,840

um they caught it like a tic tac

2086

01:25:59,430 --> 01:25:56,800

tick and it also appears on radar

2087

01:26:00,310 --> 01:25:59,440

about their radar screen in the ship now

2088

01:26:03,990 --> 01:26:00,320

some people

2089

01:26:05,910 --> 01:26:04,000

in the study field notably

2090

01:26:08,070 --> 01:26:05,920

our friend steph justice came out and

2091

01:26:10,390 --> 01:26:08,080

said well maybe they made a mistake

2092

01:26:12,470 --> 01:26:10,400

maybe they're looking at reflections in

2093

01:26:15,270 --> 01:26:12,480

the window and stuff like that

2094

01:26:15,910 --> 01:26:15,280

i heard that that was on public radio

2095

01:26:18,470 --> 01:26:15,920

yeah

2096

01:26:19,270 --> 01:26:18,480

i think people like the city people have

2097

01:26:21,270 --> 01:26:19,280

to do this

2098

01:26:22,310 --> 01:26:21,280

they don't want to be identified as

2099

01:26:24,070 --> 01:26:22,320

morphologists

2100

01:26:25,430 --> 01:26:24,080

which is why they don't like talking

2101

01:26:28,470 --> 01:26:25,440

about the possibility

2102

01:26:30,709 --> 01:26:28,480

of aliens in the solar system but

2103

01:26:32,550 --> 01:26:30,719

you know i looked at that said you have

2104

01:26:36,149 --> 01:26:32,560

to take this phenomenon

2105

01:26:39,510 --> 01:26:36,159

seriously and you put that together with

2106

01:26:40,950 --> 01:26:39,520

habitable planets all over the place

2107

01:26:42,950 --> 01:26:40,960

with what we're knowing about

2108

01:26:44,790 --> 01:26:42,960

interstellar transit times

2109

01:26:47,669 --> 01:26:44,800

even without primitive understanding

2110

01:26:50,310 --> 01:26:47,679

today with what we know about the ages

2111

01:26:52,229 --> 01:26:50,320

of local stars what we know about the

2112

01:26:55,350 --> 01:26:52,239

relative and relative frequency

2113

01:26:57,030 --> 01:26:55,360

of close stellar encounters yeah i'd say

2114

01:26:58,629 --> 01:26:57,040

there's a good possibility that they

2115

01:27:01,350 --> 01:26:58,639

could be in the kuiper belt

2116

01:27:02,550 --> 01:27:01,360

now if they're in the kuiper belt you no

2117

01:27:05,030 --> 01:27:02,560

longer can argue

2118

01:27:06,310 --> 01:27:05,040

that they can't visit the earth because

2119

01:27:08,070 --> 01:27:06,320

their

2120

01:27:10,390 --> 01:27:08,080

speed of light limitation which may or

2121

01:27:13,830 --> 01:27:10,400

may not apply to them who knows

2122

01:27:15,590 --> 01:27:13,840

but okay then you have to say

2123

01:27:18,229 --> 01:27:15,600

why are they visiting what would they be

2124

01:27:19,669 --> 01:27:18,239

visiting the earth for where you had avi

2125

01:27:24,470 --> 01:27:19,679

lobon

2126

01:27:32,149 --> 01:27:28,870

i think that's that's close yeah

2127

01:27:34,070 --> 01:27:32,159

in hawaii yeah he

2128

01:27:35,590 --> 01:27:34,080

brings up some very interesting points

2129

01:27:37,830 --> 01:27:35,600

he says okay

2130

01:27:38,790 --> 01:27:37,840

this thing does seem to look like a life

2131

01:27:41,990 --> 01:27:38,800

sale it doesn't

2132

01:27:43,110 --> 01:27:42,000

really seem to look like a comet and

2133

01:27:45,110 --> 01:27:43,120

also it comes

2134

01:27:47,430 --> 01:27:45,120

from a point in the sky which is

2135

01:27:50,790 --> 01:27:47,440

basically the centroid

2136

01:27:51,830 --> 01:27:50,800

of all local stars other people have

2137

01:27:53,830 --> 01:27:51,840

said well you know

2138

01:27:55,030 --> 01:27:53,840

it's very unlikely this is an

2139

01:27:57,350 --> 01:27:55,040

interstellar probe

2140

01:27:59,189 --> 01:27:57,360

because it would take tens of thousands

2141

01:27:59,990 --> 01:27:59,199

or hundreds of thousands of years to get

2142

01:28:02,149 --> 01:28:00,000

here

2143

01:28:05,350 --> 01:28:02,159

but what if it's an interstellar probe

2144

01:28:08,390 --> 01:28:05,360

simply designed to get our attention

2145

01:28:09,510 --> 01:28:08,400

in other words launched locally to be

2146

01:28:12,470 --> 01:28:09,520

observed locally

2147

01:28:14,070 --> 01:28:12,480

and then maybe retrieved and come back

2148

01:28:17,590 --> 01:28:14,080

people don't want to talk about that

2149

01:28:18,149 --> 01:28:17,600

because i think i think there's a lot of

2150

01:28:21,990 --> 01:28:18,159

people

2151  
01:28:26,470 --> 01:28:22,000  
in the realm

2152  
01:28:30,070 --> 01:28:28,870  
who would like to think that we have

2153  
01:28:31,669 --> 01:28:30,080  
totally free will

2154  
01:28:33,669 --> 01:28:31,679  
that we are discovering things for the

2155  
01:28:37,110 --> 01:28:33,679  
first time

2156  
01:28:38,950 --> 01:28:37,120  
that there is nobody out there nearby to

2157  
01:28:42,310 --> 01:28:38,960  
interfere with us

2158  
01:28:45,350 --> 01:28:42,320  
and there might be you know it is very

2159  
01:28:47,910 --> 01:28:45,360  
not outside of the range of possibility

2160  
01:28:48,950 --> 01:28:47,920  
that there could be millions or even

2161  
01:28:52,070 --> 01:28:48,960  
billions

2162  
01:28:52,709 --> 01:28:52,080  
of small space habitats in the kuiper

2163  
01:28:55,910 --> 01:28:52,719

belt

2164

01:28:57,990 --> 01:28:55,920

and we have no idea we can't detect them

2165

01:29:01,110 --> 01:28:58,000

there could be smaller objects

2166

01:29:04,709 --> 01:29:01,120

probes or even small bases much

2167

01:29:07,669 --> 01:29:04,719

nearer be they dead probes dead bases

2168

01:29:09,350 --> 01:29:07,679

are still existing i have no idea but

2169

01:29:12,229 --> 01:29:09,360

you have to be open to this

2170

01:29:14,550 --> 01:29:12,239

universe is a lot faster and a lot

2171

01:29:16,470 --> 01:29:14,560

stranger than we could imagine

2172

01:29:18,149 --> 01:29:16,480

now let me ask you this the phones are

2173

01:29:18,790 --> 01:29:18,159

open by the way if anyone wants to call

2174

01:29:22,870 --> 01:29:18,800

in

2175

01:29:24,390 --> 01:29:22,880

um that number is 855-472-5483 bill is

2176

01:29:27,590 --> 01:29:24,400

standing by

2177

01:29:30,870 --> 01:29:27,600

um so let me ask you this

2178

01:29:33,430 --> 01:29:30,880

why why would you think that we would be

2179

01:29:34,629 --> 01:29:33,440

so special that we'd be observed if uh

2180

01:29:38,070 --> 01:29:34,639

if life could be

2181

01:29:40,550 --> 01:29:38,080

frequent and everywhere only because

2182

01:29:41,350 --> 01:29:40,560

they're they're close and we're closed i

2183

01:29:43,510 --> 01:29:41,360

mean

2184

01:29:45,830 --> 01:29:43,520

they could have come to our type about

2185

01:29:47,430 --> 01:29:45,840

any time within the last million years

2186

01:29:49,990 --> 01:29:47,440

and suddenly they're saying well you

2187

01:29:51,110 --> 01:29:50,000

know there's somebody there who's

2188

01:29:52,709 --> 01:29:51,120

interesting i mean they're like

2189

01:29:54,310 --> 01:29:52,719

intelligent termites

2190

01:29:55,910 --> 01:29:54,320

let's go mess with them a little bit

2191

01:29:58,550 --> 01:29:55,920

abduct them and

2192

01:29:59,669 --> 01:29:58,560

kill a few problems whatever i mean you

2193

01:30:02,790 --> 01:29:59,679

know

2194

01:30:04,950 --> 01:30:02,800

you can't you you because of what's

2195

01:30:06,870 --> 01:30:04,960

going on with the pentagon papers

2196

01:30:08,310 --> 01:30:06,880

by the way i tried to go through that

2197

01:30:12,229 --> 01:30:08,320

cia file

2198

01:30:14,070 --> 01:30:12,239

and i gave up anybody who wants to

2199

01:30:15,910 --> 01:30:14,080

find what's useful i'm sure there's good

2200

01:30:18,790 --> 01:30:15,920

stuff but it's so

2201

01:30:20,390 --> 01:30:18,800

big and so bright and there's so much

2202

01:30:23,750 --> 01:30:20,400

which is not good which is not

2203

01:30:24,790 --> 01:30:23,760

relevant so by all means somebody should

2204

01:30:28,709 --> 01:30:24,800

go through that

2205

01:30:31,270 --> 01:30:28,719

and pick out the good stuff from them

2206

01:30:32,470 --> 01:30:31,280

yeah i know uh there's a guy named john

2207

01:30:35,750 --> 01:30:32,480

greenwald who's

2208

01:30:37,590 --> 01:30:35,760

has these all up online uh but there's

2209

01:30:38,950 --> 01:30:37,600

hundreds of thousands of documents or

2210

01:30:42,149 --> 01:30:38,960

something like that right

2211

01:30:43,750 --> 01:30:42,159

something like that it's amazing some

2212

01:30:47,110 --> 01:30:43,760

people say well maybe

2213

01:30:48,550 --> 01:30:47,120

these things are advanced technology on

2214

01:30:52,229 --> 01:30:48,560

the planet

2215

01:30:54,870 --> 01:30:52,239

well if russia had that

2216

01:30:56,629 --> 01:30:54,880

why would they feel an aircraft carrier

2217

01:30:59,110 --> 01:30:56,639

that breaks down

2218

01:31:00,629 --> 01:30:59,120

and needs the tugboat every time it goes

2219

01:31:03,030 --> 01:31:00,639

to syria

2220

01:31:05,110 --> 01:31:03,040

that has toilets that back up making the

2221

01:31:07,669 --> 01:31:05,120

crew very uncomfortable

2222

01:31:09,510 --> 01:31:07,679

and is so designed that there's 27

2223

01:31:10,310 --> 01:31:09,520

fighter planes two of them fall into the

2224

01:31:12,790 --> 01:31:10,320

ocean

2225

01:31:13,990 --> 01:31:12,800

during during sorties and the crews have

2226

01:31:16,470 --> 01:31:14,000

to be rescued

2227

01:31:18,149 --> 01:31:16,480

if they could fly with these ufos why

2228

01:31:22,390 --> 01:31:18,159

are they doing that

2229

01:31:24,550 --> 01:31:22,400

why are the chinese experimenting with

2230

01:31:26,550 --> 01:31:24,560

aircraft carriers and they have a

2231

01:31:28,390 --> 01:31:26,560

fighter plane flying on this thing which

2232

01:31:30,390 --> 01:31:28,400

is vertical takeoff and landing

2233

01:31:31,510 --> 01:31:30,400

which is nowhere near as good as our

2234

01:31:33,350 --> 01:31:31,520

f-35

2235

01:31:34,550 --> 01:31:33,360

but government give me a break because

2236

01:31:38,229 --> 01:31:34,560

the chinese

2237

01:31:40,070 --> 01:31:38,239

and the um russians don't have access to

2238

01:31:40,790 --> 01:31:40,080

this technology who does the north

2239

01:31:43,270 --> 01:31:40,800

koreans

2240

01:31:44,790 --> 01:31:43,280

i certainly hope not the iranians i

2241

01:31:45,350 --> 01:31:44,800

don't think that might be a good idea

2242

01:31:49,110 --> 01:31:45,360

either

2243

01:31:52,629 --> 01:31:49,120

but whatever to me it's very very very

2244

01:31:54,550 --> 01:31:52,639

unlikely uh one of

2245

01:31:55,990 --> 01:31:54,560

my friend my colleagues i think it's

2246

01:32:02,870 --> 01:31:56,000

eric davis

2247

01:32:05,030 --> 01:32:02,880

from the discovery institute and

2248

01:32:06,070 --> 01:32:05,040

my wife was in the show had a whole art

2249

01:32:08,790 --> 01:32:06,080

in the show at the

2250

01:32:10,470 --> 01:32:08,800

at the museum in las vegas he gave him a

2251

01:32:14,470 --> 01:32:10,480

little tour of the city

2252

01:32:17,590 --> 01:32:14,480

he was very nice about this but

2253

01:32:21,510 --> 01:32:17,600

eric also worked for um

2254

01:32:24,390 --> 01:32:21,520

bill um billingham

2255

01:32:26,610 --> 01:32:24,400

are you talking about uh bigelow bigelow

2256

01:32:28,709 --> 01:32:26,620

he worked

2257

01:32:31,590 --> 01:32:28,719

[Music]

2258

01:32:32,149 --> 01:32:31,600

and when he was working for bigelow he

2259

01:32:36,390 --> 01:32:32,159

was

2260

01:32:38,790 --> 01:32:36,400

trying to do scientific studies and ufo

2261

01:32:40,070 --> 01:32:38,800

incidents and i believe it was he it

2262

01:32:42,310 --> 01:32:40,080

might have been somebody else

2263

01:32:43,189 --> 01:32:42,320

interviewed a four-star brigadier

2264

01:32:45,110 --> 01:32:43,199

general

2265

01:32:47,270 --> 01:32:45,120

now i would bet this was pete warden

2266

01:32:49,030 --> 01:32:47,280

knowing pete wasn't from breakthrough

2267

01:32:51,669 --> 01:32:49,040

you're talking about the wilson and the

2268

01:32:54,229 --> 01:32:51,679

wilson documents and they're

2269

01:32:55,990 --> 01:32:54,239

i'm not 100 sure if that really happened

2270

01:32:56,470 --> 01:32:56,000

there's something really peculiar about

2271

01:33:00,229 --> 01:32:56,480

that

2272

01:33:03,830 --> 01:33:00,239

whatever it is if it did happen yeah

2273

01:33:07,030 --> 01:33:03,840

oh yes we have an alien craft

2274

01:33:07,669 --> 01:33:07,040

because in area 51 we're keeping it

2275

01:33:09,910 --> 01:33:07,679

secret

2276

01:33:11,110 --> 01:33:09,920

we only roll out new technology when we

2277

01:33:14,149 --> 01:33:11,120

need it

2278

01:33:17,110 --> 01:33:14,159

well does that solve it no yeah

2279

01:33:18,149 --> 01:33:17,120

because the brigadier general maybe pete

2280

01:33:22,229 --> 01:33:18,159

warden

2281

01:33:25,110 --> 01:33:22,239

could be putting out misinformation

2282

01:33:25,910 --> 01:33:25,120

foreign power would think twice or ten

2283

01:33:28,870 --> 01:33:25,920

times

2284

01:33:30,229 --> 01:33:28,880

about messing with the united states who

2285

01:33:32,550 --> 01:33:30,239

could simply bring out

2286

01:33:34,310 --> 01:33:32,560

another bit of technology a million

2287

01:33:35,110 --> 01:33:34,320

years or a billion years ahead of what

2288

01:33:37,990 --> 01:33:35,120

we have

2289

01:33:38,870 --> 01:33:38,000

so you know information could make a

2290

01:33:41,110 --> 01:33:38,880

difference

2291

01:33:42,310 --> 01:33:41,120

yeah yeah um i i believe you're right i

2292

01:33:45,510 --> 01:33:42,320

mean that's that's

2293

01:33:47,189 --> 01:33:45,520

uh been um an mo for a long time you

2294

01:33:49,510 --> 01:33:47,199

know the disinformation for

2295

01:33:50,229 --> 01:33:49,520

power you know that type of thing but

2296

01:33:52,629 --> 01:33:50,239

you know

2297

01:33:54,229 --> 01:33:52,639

along those lines i think this is an

2298

01:33:54,950 --> 01:33:54,239

interesting conversation along those

2299

01:33:56,629 --> 01:33:54,960

lines

2300

01:33:58,709 --> 01:33:56,639

um you know a lot of people have seen

2301

01:34:01,750 --> 01:33:58,719

these you know these big

2302

01:34:02,950 --> 01:34:01,760

black triangles that hover i mean this

2303

01:34:06,229 --> 01:34:02,960

is reported everywhere

2304

01:34:07,669 --> 01:34:06,239

you know like sometimes hundreds and

2305

01:34:10,070 --> 01:34:07,679

hundreds of yards

2306

01:34:11,030 --> 01:34:10,080

you know maybe even a mile wide these

2307

01:34:12,870 --> 01:34:11,040

reports

2308

01:34:15,030 --> 01:34:12,880

uh like the phoenix lights for instance

2309

01:34:17,350 --> 01:34:15,040

but there's a number of them

2310

01:34:19,590 --> 01:34:17,360

but a lot of times people will say oh

2311

01:34:21,270 --> 01:34:19,600

that's just some secret military

2312

01:34:22,790 --> 01:34:21,280

yeah uh well this thing could float and

2313

01:34:25,669 --> 01:34:22,800

then it shoots off like

2314

01:34:26,310 --> 01:34:25,679

well if that's just like you said if

2315

01:34:29,590 --> 01:34:26,320

that's

2316

01:34:32,070 --> 01:34:29,600

if we do have that technology um

2317

01:34:33,110 --> 01:34:32,080

wouldn't we have used it by now you know

2318

01:34:34,709 --> 01:34:33,120

or

2319

01:34:36,629 --> 01:34:34,719

at least we would have used it in

2320

01:34:37,590 --> 01:34:36,639

afghanistan rather than being there for

2321

01:34:39,990 --> 01:34:37,600

20 years

2322

01:34:44,470 --> 01:34:40,000

and not exactly anything you know i mean

2323

01:34:52,149 --> 01:34:47,750

they have this great conspiracy but

2324

01:34:56,950 --> 01:34:55,030

yeah yeah here's another another

2325

01:35:00,390 --> 01:34:56,960

hypothetical question to ask

2326

01:35:04,149 --> 01:35:00,400

you um i always think that we think

2327

01:35:07,830 --> 01:35:04,159

and uh we compare

2328

01:35:08,390 --> 01:35:07,840

what we think an alien civilization

2329

01:35:10,550 --> 01:35:08,400

would do

2330

01:35:12,149 --> 01:35:10,560

or not do you know violent or not

2331

01:35:14,310 --> 01:35:12,159

violent this or that

2332

01:35:15,189 --> 01:35:14,320

but we always do it in the way of human

2333

01:35:18,790 --> 01:35:15,199

thinking

2334

01:35:20,629 --> 01:35:18,800

yeah you know um would you agree

2335

01:35:21,990 --> 01:35:20,639

that we have no idea what type of

2336

01:35:23,830 --> 01:35:22,000

thinking another

2337

01:35:25,590 --> 01:35:23,840

civilization would have i wouldn't even

2338

01:35:27,750 --> 01:35:25,600

take an example

2339

01:35:28,790 --> 01:35:27,760

if you have a wet planet like mars which

2340

01:35:32,629 --> 01:35:28,800

has an atmosphere

2341

01:35:36,149 --> 01:35:32,639

there was no reason why creatures like

2342

01:35:39,109 --> 01:35:36,159

spiders could grow to a much

2343

01:35:40,310 --> 01:35:39,119

larger size maybe who knows maybe they

2344

01:35:42,470 --> 01:35:40,320

were intelligent

2345

01:35:43,750 --> 01:35:42,480

arrhythmias spiders running around the

2346

01:35:47,910 --> 01:35:43,760

galaxy

2347

01:35:50,470 --> 01:35:47,920

now my set of ethics human ethics say

2348

01:35:51,270 --> 01:35:50,480

if i have an intimate relationship with

2349

01:35:53,350 --> 01:35:51,280

a woman

2350

01:35:54,709 --> 01:35:53,360

or she has an intimate relationship with

2351

01:35:56,870 --> 01:35:54,719

me we're going to treat

2352

01:35:57,750 --> 01:35:56,880

each other respectfully and everybody is

2353

01:36:00,390 --> 01:35:57,760

going home

2354

01:36:01,030 --> 01:36:00,400

to go home afterwards and have dinner

2355

01:36:04,550 --> 01:36:01,040

and

2356

01:36:06,629 --> 01:36:04,560

be friendly but if you're a spider

2357

01:36:08,830 --> 01:36:06,639

that set of ethics doesn't work or if

2358

01:36:11,669 --> 01:36:08,840

you are evolved from a

2359

01:36:13,510 --> 01:36:11,679

um praying mantis

2360

01:36:14,950 --> 01:36:13,520

because in cases like this the male

2361

01:36:18,550 --> 01:36:14,960

better be very careful

2362

01:36:22,390 --> 01:36:18,560

because while he's feeling off the glow

2363

01:36:24,870 --> 01:36:22,400

he may eat him that's right

2364

01:36:25,750 --> 01:36:24,880

this is the ethics of that particular

2365

01:36:29,750 --> 01:36:25,760

species

2366

01:36:33,270 --> 01:36:29,760

is why

2367

01:36:37,189 --> 01:36:33,280

the klingons in um star trek

2368

01:36:40,709 --> 01:36:37,199

are probably based upon the um

2369

01:36:41,830 --> 01:36:40,719

what are they called a type of catalytic

2370

01:36:45,830 --> 01:36:41,840

creatures and

2371

01:36:48,149 --> 01:36:45,840

larry nibbens really um war with the

2372

01:36:50,390 --> 01:36:48,159

but i'm not gonna i'm not gonna because

2373

01:36:52,149 --> 01:36:50,400

i'm talking now i'm not down there

2374

01:36:53,510 --> 01:36:52,159

my memory isn't working the way it

2375

01:36:55,910 --> 01:36:53,520

usually does

2376

01:36:57,350 --> 01:36:55,920

but these creatures they're cat-like

2377

01:36:59,109 --> 01:36:57,360

they think about things

2378

01:37:00,950 --> 01:36:59,119

from the point of view of feline

2379

01:37:03,910 --> 01:37:00,960

dominance not the way

2380

01:37:04,390 --> 01:37:03,920

humans do you know you surrender to a

2381

01:37:07,270 --> 01:37:04,400

cat

2382

01:37:08,709 --> 01:37:07,280

you might find yourself in a totally

2383

01:37:10,550 --> 01:37:08,719

different situation than if you

2384

01:37:14,629 --> 01:37:10,560

surrender to a human

2385

01:37:16,390 --> 01:37:14,639

so if um we

2386

01:37:18,550 --> 01:37:16,400

i know i don't know if you know what

2387

01:37:20,390 --> 01:37:18,560

seth i know

2388

01:37:22,390 --> 01:37:20,400

uh another guy from the setting

2389

01:37:26,870 --> 01:37:22,400

institute

2390

01:37:29,669 --> 01:37:26,880

um hold on a second he's a sociologist

2391

01:37:32,229 --> 01:37:29,679

no no i only know seth and and jill

2392

01:37:35,510 --> 01:37:33,669

he's come up with the concept of

2393

01:37:38,550 --> 01:37:35,520

altruism that

2394

01:37:41,510 --> 01:37:38,560

an alien civilization will only survive

2395

01:37:42,709 --> 01:37:41,520

for a very long period of doug vakruge

2396

01:37:44,709 --> 01:37:42,719

will only survive

2397

01:37:46,629 --> 01:37:44,719

for a long enough period of time to

2398

01:37:49,830 --> 01:37:46,639

contact or fly somewhere

2399

01:37:51,590 --> 01:37:49,840

if it is altruistic and basically the

2400

01:37:54,070 --> 01:37:51,600

concept of altruism

2401  
01:37:56,790 --> 01:37:54,080  
might be specie dependent we don't know

2402  
01:38:03,270 --> 01:37:59,830  
wow yeah and you know i mean there's

2403  
01:38:06,550 --> 01:38:03,280  
also there's a lot of speculation like

2404  
01:38:08,550 --> 01:38:06,560  
okay whatever it is that's visiting us

2405  
01:38:09,990 --> 01:38:08,560  
i think you mentioned this even you know

2406  
01:38:11,669 --> 01:38:10,000  
what do they want you know what do they

2407  
01:38:14,709 --> 01:38:11,679  
want why are they here

2408  
01:38:15,669 --> 01:38:14,719  
and uh you know i mean that that can be

2409  
01:38:17,910 --> 01:38:15,679  
a scary thought

2410  
01:38:20,149 --> 01:38:17,920  
you know if you think about it and if

2411  
01:38:23,430 --> 01:38:20,159  
the air force can't control the skies

2412  
01:38:25,590 --> 01:38:23,440  
you know um you know that

2413  
01:38:26,950 --> 01:38:25,600

a lot of people speculate that's why

2414

01:38:29,590 --> 01:38:26,960

it's not talked about

2415

01:38:31,030 --> 01:38:29,600

much because how would they possibly

2416

01:38:32,070 --> 01:38:31,040

explain they have no control over

2417

01:38:34,629 --> 01:38:32,080

something

2418

01:38:36,709 --> 01:38:34,639

that's a very good point that's why we

2419

01:38:39,990 --> 01:38:36,719

have misinformation

2420

01:38:41,510 --> 01:38:40,000

yeah that may also be why for so many

2421

01:38:44,709 --> 01:38:41,520

decades

2422

01:38:47,590 --> 01:38:44,719

it was a no-no for a military fire

2423

01:38:48,470 --> 01:38:47,600

a commercial fire or a private fire to

2424

01:38:52,390 --> 01:38:48,480

admit

2425

01:38:54,790 --> 01:38:52,400

that they've seen things i once had a

2426

01:38:56,950 --> 01:38:54,800

brother of somebody a guy we knew who

2427

01:38:59,750 --> 01:38:56,960

was a commercial pilot i asked you ever

2428

01:39:02,550 --> 01:38:59,760

see a ufo he said i don't even admit it

2429

01:39:02,870 --> 01:39:02,560

and there was a private pilot who told

2430

01:39:06,070 --> 01:39:02,880

me

2431

01:39:09,990 --> 01:39:06,080

he has seen them but he's never

2432

01:39:13,030 --> 01:39:10,000

he's never claimed it to the tower

2433

01:39:13,510 --> 01:39:13,040

and the reason is then people might say

2434

01:39:14,870 --> 01:39:13,520

well

2435

01:39:16,629 --> 01:39:14,880

there's something wrong with this guy's

2436

01:39:18,310 --> 01:39:16,639

perception he shouldn't be in the

2437

01:39:20,310 --> 01:39:18,320

driver's seat anymore

2438

01:39:22,149 --> 01:39:20,320

or takes away his flying license or

2439

01:39:23,830 --> 01:39:22,159

something like that

2440

01:39:25,270 --> 01:39:23,840

yeah that happened i can't remember it's

2441

01:39:29,990 --> 01:39:25,280

jal it's a

2442

01:39:34,550 --> 01:39:31,350

there was a shipping flight not a

2443

01:39:37,030 --> 01:39:34,560

commercial passenger flight

2444

01:39:37,990 --> 01:39:37,040

and that was over alaska there was a 300

2445

01:39:39,750 --> 01:39:38,000

some odd mile

2446

01:39:41,350 --> 01:39:39,760

encounter that was something that looked

2447

01:39:44,550 --> 01:39:41,360

like a a large

2448

01:39:46,709 --> 01:39:44,560

walnut and uh and had little like

2449

01:39:47,669 --> 01:39:46,719

baby ships type going around this thing

2450

01:39:50,709 --> 01:39:47,679

and so they

2451

01:39:53,109 --> 01:39:50,719

they did it they went around

2452

01:39:55,030 --> 01:39:53,119

out of their course and the thing

2453

01:39:56,310 --> 01:39:55,040

followed them and actually like circled

2454

01:39:57,109 --> 01:39:56,320

around it was all on radar and

2455

01:40:00,149 --> 01:39:57,119

everything

2456

01:40:03,750 --> 01:40:00,159

well that pilot had a desk job

2457

01:40:06,229 --> 01:40:03,760

after that he was reporting it live

2458

01:40:08,709 --> 01:40:06,239

uh but but he did get back uh back to

2459

01:40:11,830 --> 01:40:08,719

flying again 30 years of experience

2460

01:40:14,550 --> 01:40:11,840

and that happened and yeah no

2461

01:40:16,470 --> 01:40:14,560

it wouldn't happen anymore because

2462

01:40:18,149 --> 01:40:16,480

because of the pentagon releases

2463

01:40:19,750 --> 01:40:18,159

i think at this point it's taken

2464

01:40:21,350 --> 01:40:19,760

seriously yes

2465

01:40:22,950 --> 01:40:21,360

i think that's uh i think that's been a

2466

01:40:24,229 --> 01:40:22,960

great thing and i'm glad i'm doing this

2467

01:40:26,790 --> 01:40:24,239

show during this

2468

01:40:28,229 --> 01:40:26,800

this whole time because i'm not so

2469

01:40:30,550 --> 01:40:28,239

embarrassed to admit that i do

2470

01:40:32,149 --> 01:40:30,560

a uh a show when i'm talking to someone

2471

01:40:34,070 --> 01:40:32,159

about antiques and art

2472

01:40:35,669 --> 01:40:34,080

yeah ufos can come up i won't feel so

2473

01:40:38,790 --> 01:40:35,679

embarrassed

2474

01:40:41,350 --> 01:40:38,800

that i

2475

01:40:41,910 --> 01:40:41,360

can be looked at in a different way you

2476

01:40:44,149 --> 01:40:41,920

know

2477

01:40:45,189 --> 01:40:44,159

because of while you're in you're an art

2478

01:40:48,790 --> 01:40:45,199

expert and you

2479

01:40:51,750 --> 01:40:48,800

like ufos so

2480

01:40:54,149 --> 01:40:51,760

what do you think about the taboo side

2481

01:40:59,590 --> 01:40:54,159

of that i mean you must have seen

2482

01:41:02,149 --> 01:40:59,600

a lot of that over the years oh my okay

2483

01:41:03,910 --> 01:41:02,159

one of the interesting phenomenon in

2484

01:41:06,310 --> 01:41:03,920

this associated with this is the

2485

01:41:09,270 --> 01:41:06,320

abduction phenomenon

2486

01:41:11,030 --> 01:41:09,280

and i know of two figures of a

2487

01:41:14,229 --> 01:41:11,040

mathematician and the physicist

2488

01:41:16,390 --> 01:41:14,239

would kill me if i mentioned their names

2489

01:41:18,310 --> 01:41:16,400

who have reported that they were almost

2490

01:41:20,229 --> 01:41:18,320

abducted at one point or another they

2491

01:41:22,229 --> 01:41:20,239

saw strange lights near them

2492

01:41:23,590 --> 01:41:22,239

and look like a silvery craft in one

2493

01:41:26,950 --> 01:41:23,600

case

2494

01:41:28,390 --> 01:41:26,960

and my wife she and i know of a woman

2495

01:41:30,830 --> 01:41:28,400

who i'm not going to mention her name

2496

01:41:31,990 --> 01:41:30,840

either she started life as a very

2497

01:41:35,030 --> 01:41:32,000

successful

2498

01:41:35,830 --> 01:41:35,040

uh financial lawyer at war on wall

2499

01:41:39,910 --> 01:41:35,840

street

2500

01:41:43,030 --> 01:41:39,920

and she got tired of this became a

2501

01:41:45,430 --> 01:41:43,040

combination astrologer uh psychic

2502

01:41:46,229 --> 01:41:45,440

and rock singer interesting combination

2503

01:41:48,550 --> 01:41:46,239

wow

2504

01:41:49,990 --> 01:41:48,560

and one of her concerts she pointed out

2505

01:41:53,350 --> 01:41:50,000

on her neck

2506

01:41:55,990 --> 01:41:53,360

the two marks that they

2507

01:41:57,910 --> 01:41:56,000

deliver when they abduct her and i spoke

2508

01:42:00,870 --> 01:41:57,920

to one of her fans after this

2509

01:42:03,830 --> 01:42:00,880

and the fans had the same for what i did

2510

01:42:06,950 --> 01:42:03,840

was a boyfriend a little kinky

2511

01:42:08,629 --> 01:42:06,960

so i had strange feelings about the

2512

01:42:12,390 --> 01:42:08,639

abduction

2513

01:42:13,669 --> 01:42:12,400

uh phenomenon then see my wife see bangs

2514

01:42:16,470 --> 01:42:13,679

was in an art show

2515

01:42:18,790 --> 01:42:16,480

in the chelsea section of brooklyn a

2516

01:42:20,709 --> 01:42:18,800

couple of years after that

2517

01:42:22,790 --> 01:42:20,719

and there's a woman who attended the

2518

01:42:24,310 --> 01:42:22,800

show who said look i like your art it's

2519

01:42:27,030 --> 01:42:24,320

space related

2520

01:42:28,950 --> 01:42:27,040

i'm taking part in planning this con

2521

01:42:29,669 --> 01:42:28,960

conference which will be in hoboken new

2522

01:42:32,390 --> 01:42:29,679

jersey

2523

01:42:33,669 --> 01:42:32,400

in this course about city it is called

2524

01:42:40,950 --> 01:42:33,679

the conscious

2525

01:42:43,030 --> 01:42:40,960

contact can't come

2526

01:42:46,070 --> 01:42:43,040

consciousness of contact something like

2527

01:42:47,910 --> 01:42:46,080

that i forget the exact name for it

2528

01:42:49,270 --> 01:42:47,920

and she said yeah and they said maybe

2529

01:42:49,910 --> 01:42:49,280

your husband will be on one of the

2530

01:42:53,189 --> 01:42:49,920

panels

2531

01:42:55,030 --> 01:42:53,199

so we went there and it was in an old

2532

01:42:57,270 --> 01:42:55,040

theater that frank sinatra used to

2533

01:43:00,870 --> 01:42:57,280

perform in which was interesting

2534

01:43:03,430 --> 01:43:00,880

and seeing her work and every other

2535

01:43:05,510 --> 01:43:03,440

piece of work in the show had this the

2536

01:43:08,629 --> 01:43:05,520

standard picture of aliens with

2537

01:43:11,510 --> 01:43:08,639

big bug eyes green faces

2538

01:43:13,750 --> 01:43:11,520

sort of features shaped and we both

2539

01:43:17,669 --> 01:43:13,760

looked at each other and said oh oh

2540

01:43:19,669 --> 01:43:17,679

this is what this is what is going on

2541

01:43:20,950 --> 01:43:19,679

what's just happening in this what we're

2542

01:43:24,629 --> 01:43:20,960

involved in

2543

01:43:26,950 --> 01:43:24,639

so i went into the panel and i served in

2544

01:43:29,590 --> 01:43:26,960

it with a number of other people

2545

01:43:32,310 --> 01:43:29,600

i was the only scientist on there was a

2546

01:43:35,510 --> 01:43:32,320

writer there was a psychologist

2547

01:43:36,310 --> 01:43:35,520

and in the middle of it a rather very

2548

01:43:40,070 --> 01:43:36,320

eloquent

2549

01:43:41,990 --> 01:43:40,080

ordinary suburban new busy woman gets up

2550

01:43:44,070 --> 01:43:42,000

and she says i have a problem that maybe

2551

01:43:45,990 --> 01:43:44,080

you could help me with

2552

01:43:47,430 --> 01:43:46,000

and she said i've been abducted seven

2553

01:43:49,830 --> 01:43:47,440

times

2554

01:43:51,189 --> 01:43:49,840

and each time i'm abducted i get

2555

01:43:54,550 --> 01:43:51,199

pregnant

2556

01:43:57,669 --> 01:43:54,560

they remove the fetus

2557

01:43:58,229 --> 01:43:57,679

wow i have only been able to see the

2558

01:44:00,870 --> 01:43:58,239

children

2559

01:44:02,629 --> 01:44:00,880

when they abduct me the next time what

2560

01:44:04,390 --> 01:44:02,639

can why do you do about it well i

2561

01:44:07,030 --> 01:44:04,400

haven't heard of it

2562

01:44:08,310 --> 01:44:07,040

a psychologist haven't been a part of it

2563

01:44:11,430 --> 01:44:08,320

later on

2564

01:44:13,350 --> 01:44:11,440

afterwards or during a break when i was

2565

01:44:17,910 --> 01:44:13,360

listening to the psychologist

2566

01:44:21,030 --> 01:44:17,920

he said well you know this is a standard

2567

01:44:24,229 --> 01:44:21,040

symptom of a woman who has been

2568

01:44:27,430 --> 01:44:24,239

sexually abused when she was a child

2569

01:44:30,629 --> 01:44:27,440

because what she does is apparently it's

2570

01:44:33,750 --> 01:44:30,639

not uncommon is

2571

01:44:35,030 --> 01:44:33,760

she's being tormented basically by

2572

01:44:37,350 --> 01:44:35,040

people who are supposed to be her

2573

01:44:39,590 --> 01:44:37,360

protectors

2574

01:44:40,709 --> 01:44:39,600

family they love her but they are doing

2575

01:44:44,070 --> 01:44:40,719

something that

2576

01:44:47,590 --> 01:44:44,080

is damaging so she internalizes it

2577

01:44:50,790 --> 01:44:47,600

in this particular fashion and it's not

2578

01:44:54,070 --> 01:44:50,800

an unusual psychological aspect

2579

01:44:55,109 --> 01:44:54,080

this is not to say that people haven't

2580

01:44:58,870 --> 01:44:55,119

been abducted

2581

01:45:01,109 --> 01:44:58,880

the body no case for instance

2582

01:45:02,790 --> 01:45:01,119

that's a very interesting one i don't

2583

01:45:05,830 --> 01:45:02,800

know what happened there

2584

01:45:08,950 --> 01:45:05,840

but i know that in some cases

2585

01:45:10,070 --> 01:45:08,960

a psychological explanation might make

2586

01:45:13,510 --> 01:45:10,080

sense

2587

01:45:16,470 --> 01:45:13,520

not at all maybe yeah yeah i mean i've

2588

01:45:17,669 --> 01:45:16,480

i've kind of bounced back and forth with

2589

01:45:21,189 --> 01:45:17,679

that whole segment

2590

01:45:22,470 --> 01:45:21,199

of of this i think it's uh i think it's

2591

01:45:25,510 --> 01:45:22,480

really

2592

01:45:27,590 --> 01:45:25,520

interesting i think it's

2593

01:45:29,669 --> 01:45:27,600

a possibility and the reason i think

2594

01:45:31,830 --> 01:45:29,679

it's a possibility at least for some

2595

01:45:34,950 --> 01:45:31,840

is that uh you know you think about it

2596

01:45:37,510 --> 01:45:34,960

if if whatever it is is visiting here

2597

01:45:38,310 --> 01:45:37,520

you know why wouldn't they go a step

2598

01:45:41,830 --> 01:45:38,320

further and

2599

01:45:44,390 --> 01:45:41,840

maybe examine you know and i've had uh

2600

01:45:45,510 --> 01:45:44,400

oh we have someone on the line and i

2601

01:45:48,950 --> 01:45:45,520

think it's a friend

2602

01:45:50,149 --> 01:45:48,960

actually so i'm going to hang on just

2603

01:45:51,669 --> 01:45:50,159

one second here i'm going to move a

2604

01:45:53,910 --> 01:45:51,679

couple things around

2605

01:45:55,430 --> 01:45:53,920

and uh all right we're ready dean from

2606

01:45:58,950 --> 01:45:55,440

l.a

2607

01:46:00,070 --> 01:45:58,960

dean yes hey i can't i came in late is

2608

01:46:03,910 --> 01:46:00,080

this about ufos

2609

01:46:06,629 --> 01:46:03,920

just kidding uh so here's my question

2610

01:46:07,830 --> 01:46:06,639

well maybe not well yeah but okay go

2611

01:46:09,990 --> 01:46:07,840

ahead yeah

2612

01:46:11,990 --> 01:46:10,000

are all the above um so here's my

2613

01:46:15,189 --> 01:46:12,000

question it seems like these pilots

2614

01:46:16,149 --> 01:46:15,199

especially as an example favor uh felt

2615

01:46:20,709 --> 01:46:16,159

that the

2616

01:46:21,430 --> 01:46:20,719

in other words it responds to them as

2617

01:46:24,149 --> 01:46:21,440

almost

2618

01:46:24,870 --> 01:46:24,159

like it's aware self-aware if that's the

2619

01:46:28,149 --> 01:46:24,880

case

2620

01:46:30,550 --> 01:46:28,159

do you think that they meant they mean

2621

01:46:33,109 --> 01:46:30,560

to be seen and second of all

2622

01:46:34,470 --> 01:46:33,119

the next layer is if they do is that so

2623

01:46:35,910 --> 01:46:34,480

that we are aware that we're not the

2624

01:46:36,470 --> 01:46:35,920

only ones here that there is something

2625

01:46:39,430 --> 01:46:36,480

else

2626  
01:46:39,990 --> 01:46:39,440  
going on and so sometimes these these

2627  
01:46:41,750 --> 01:46:40,000  
sightings

2628  
01:46:43,830 --> 01:46:41,760  
are meant to be something that just

2629  
01:46:47,350 --> 01:46:43,840  
makes us more aware

2630  
01:46:49,109 --> 01:46:47,360  
about um the possibility beyond us

2631  
01:46:50,709 --> 01:46:49,119  
okay i think that's an excellent

2632  
01:46:54,149 --> 01:46:50,719  
question and what i would say

2633  
01:46:54,950 --> 01:46:54,159  
is from our own experience on this

2634  
01:46:57,830 --> 01:46:54,960  
planet

2635  
01:46:58,950 --> 01:46:57,840  
when a technologically advanced culture

2636  
01:47:01,830 --> 01:46:58,960  
meets

2637  
01:47:03,350 --> 01:47:01,840  
for the first time a technologically

2638  
01:47:06,390 --> 01:47:03,360

less advanced culture

2639

01:47:06,830 --> 01:47:06,400

it's curtains for the less advanced it's

2640

01:47:10,709 --> 01:47:06,840

not

2641

01:47:12,390 --> 01:47:10,719

good maybe they realize this

2642

01:47:14,149 --> 01:47:12,400

maybe particularly if they're in our

2643

01:47:17,590 --> 01:47:14,159

type of build as i think is a

2644

01:47:20,070 --> 01:47:17,600

possibility they realize that they're a

2645

01:47:23,350 --> 01:47:20,080

billion years ahead of us perhaps

2646

01:47:26,310 --> 01:47:23,360

they know that

2647

01:47:26,950 --> 01:47:26,320

what could happen if we had too early a

2648

01:47:29,109 --> 01:47:26,960

contact

2649

01:47:30,950 --> 01:47:29,119

and they are doing a lot of these things

2650

01:47:33,990 --> 01:47:30,960

to sort of prepare us

2651  
01:47:36,709 --> 01:47:34,000  
to put us in a mindset where

2652  
01:47:37,750 --> 01:47:36,719  
it won't destroy us and we can actually

2653  
01:47:41,109 --> 01:47:37,760  
maybe join

2654  
01:47:44,149 --> 01:47:41,119  
a galactic community down the line

2655  
01:47:45,030 --> 01:47:44,159  
but that's my take that's that's

2656  
01:47:47,830 --> 01:47:45,040  
assuming that

2657  
01:47:50,310 --> 01:47:47,840  
that they're benign and i think you have

2658  
01:47:52,470 --> 01:47:50,320  
to assume that they're benign because

2659  
01:47:54,229 --> 01:47:52,480  
if they were malign if they wanted to

2660  
01:47:54,950 --> 01:47:54,239  
get rid of us it would be very easy for

2661  
01:47:58,550 --> 01:47:54,960  
them

2662  
01:48:01,430 --> 01:47:58,560  
to move a few asteroids slightly

2663  
01:48:03,510 --> 01:48:01,440

yeah you know that's all it would take i

2664

01:48:04,950 --> 01:48:03,520

never thought of that but you're right

2665

01:48:07,270 --> 01:48:04,960

that's all they have to do is line that

2666

01:48:10,870 --> 01:48:07,280

baby up like going bowling or something

2667

01:48:12,550 --> 01:48:10,880

yeah uh anything else dean

2668

01:48:14,149 --> 01:48:12,560

no that's it now i'm thinking about

2669

01:48:16,149 --> 01:48:14,159

bowling thinking about the big lebowski

2670

01:48:18,149 --> 01:48:16,159

and ufos it's a perfect combination

2671

01:48:20,470 --> 01:48:18,159

thank you appreciate it hey dean we'll

2672

01:48:23,669 --> 01:48:20,480

see you on monday

2673

01:48:26,229 --> 01:48:23,679

yes you will all right yeah everyone

2674

01:48:27,830 --> 01:48:26,239

yeah all right talk to you later yeah

2675

01:48:31,669 --> 01:48:27,840

he's visiting out in the area

2676

01:48:33,830 --> 01:48:31,679

and uh and doing some filming uh

2677

01:48:35,270 --> 01:48:33,840

yeah um that is that is the question

2678

01:48:39,109 --> 01:48:35,280

that a lot of people have

2679

01:48:42,229 --> 01:48:39,119

said on or asked on this show is uh

2680

01:48:43,270 --> 01:48:42,239

you know why why whatever it is that's

2681

01:48:45,030 --> 01:48:43,280

flying

2682

01:48:47,030 --> 01:48:45,040

overhead why does it have lights you

2683

01:48:47,510 --> 01:48:47,040

know why why does does it want to be

2684

01:48:50,149 --> 01:48:47,520

seen

2685

01:48:50,790 --> 01:48:50,159

i think that's a really good question i

2686

01:48:54,470 --> 01:48:50,800

think

2687

01:48:56,149 --> 01:48:54,480

you know if somebody just transferred or

2688

01:48:57,990 --> 01:48:56,159

different species transferred through

2689

01:48:59,030 --> 01:48:58,000

al-qaeda belt over the last billion

2690

01:49:00,790 --> 01:48:59,040

years

2691

01:49:02,629 --> 01:49:00,800

and all of a sudden they see us

2692

01:49:04,709 --> 01:49:02,639

developing

2693

01:49:06,870 --> 01:49:04,719

they may realize it's soon related

2694

01:49:10,070 --> 01:49:06,880

there's going to have to be a contact

2695

01:49:13,350 --> 01:49:10,080

and why not prepare us for it

2696

01:49:15,189 --> 01:49:13,360

slowly gradually

2697

01:49:17,990 --> 01:49:15,199

very interesting things in the solar

2698

01:49:20,870 --> 01:49:18,000

system that could be

2699

01:49:24,430 --> 01:49:20,880

maybe signs of artificiality there was a

2700

01:49:27,510 --> 01:49:24,440

moon of saturn called methone

2701

01:49:31,109 --> 01:49:27,520

m-e-t-h-o-n-e and look it up online

2702

01:49:33,270 --> 01:49:31,119

it is maybe a couple of miles long

2703

01:49:35,510 --> 01:49:33,280

and it's perfectly egg-shaped and

2704

01:49:37,510 --> 01:49:35,520

completely smooth

2705

01:49:38,950 --> 01:49:37,520

people say it's that smooth because it's

2706

01:49:41,990 --> 01:49:38,960

close to the rings

2707

01:49:42,470 --> 01:49:42,000

i don't believe that maybe it is but of

2708

01:49:45,589 --> 01:49:42,480

course

2709

01:49:47,750 --> 01:49:45,599

maybe it isn't and when i mentioned

2710

01:49:48,870 --> 01:49:47,760

my colleague les johnston at nasa

2711

01:49:50,870 --> 01:49:48,880

marshall

2712

01:49:52,790 --> 01:49:50,880

wanted to do a science fiction novel he

2713

01:49:56,629 --> 01:49:52,800

said greg

2714

01:49:59,350 --> 01:49:56,639

name me as a an anomalous

2715

01:50:01,109 --> 01:49:59,360

uh object of the solar system and he

2716

01:50:03,910 --> 01:50:01,119

mentioned methoney and he

2717

01:50:05,270 --> 01:50:03,920

came up with a book called mission to

2718

01:50:08,310 --> 01:50:05,280

methoni

2719

01:50:10,229 --> 01:50:08,320

another one is the smaller

2720

01:50:11,870 --> 01:50:10,239

kuiper belt object that was visited by

2721

01:50:14,870 --> 01:50:11,880

new horizons called

2722

01:50:17,990 --> 01:50:14,880

mu69 now you may remember that

2723

01:50:21,030 --> 01:50:18,000

mu-69 of ultima thule initially

2724

01:50:22,950 --> 01:50:21,040

initially looked like two

2725

01:50:24,149 --> 01:50:22,960

spherical objects that had joined

2726  
01:50:26,470 --> 01:50:24,159  
together

2727  
01:50:27,669 --> 01:50:26,480  
and the various models that people put

2728  
01:50:29,830 --> 01:50:27,679  
together that i've seen of the

2729  
01:50:33,030 --> 01:50:29,840  
planetologists they're good models

2730  
01:50:35,109 --> 01:50:33,040  
they can show you can have two spherical

2731  
01:50:36,550 --> 01:50:35,119  
icy objects coming together at low

2732  
01:50:38,790 --> 01:50:36,560  
velocity

2733  
01:50:39,990 --> 01:50:38,800  
but the later pictures show that they're

2734  
01:50:42,470 --> 01:50:40,000  
shaved off

2735  
01:50:44,709 --> 01:50:42,480  
on the bottom but they're not spheres

2736  
01:50:48,149 --> 01:50:44,719  
they're like partial spheres

2737  
01:50:50,629 --> 01:50:48,159  
so either something something saved them

2738  
01:50:53,510 --> 01:50:50,639

to make them non-spherical beforehand

2739

01:50:55,189 --> 01:50:53,520

and then put them in such a position

2740

01:50:59,109 --> 01:50:55,199

that they would still

2741

01:51:01,830 --> 01:50:59,119

line up showing exactly the same way

2742

01:51:02,550 --> 01:51:01,840

or after they're lined up barely stuck

2743

01:51:04,149 --> 01:51:02,560

together

2744

01:51:06,149 --> 01:51:04,159

something came and shaved off their

2745

01:51:09,189 --> 01:51:06,159

bottoms but didn't

2746

01:51:11,910 --> 01:51:09,199

describe them to me that's an anomaly

2747

01:51:14,390 --> 01:51:11,920

i don't have regulation for it i don't i

2748

01:51:17,189 --> 01:51:14,400

haven't seen any real explanations

2749

01:51:18,070 --> 01:51:17,199

and i would say it's a strange one

2750

01:51:21,510 --> 01:51:18,080

whether

2751  
01:51:24,790 --> 01:51:21,520  
was done

2752  
01:51:27,030 --> 01:51:24,800  
for us another little thing saying

2753  
01:51:27,910 --> 01:51:27,040  
hey get them ready for it or maybe

2754  
01:51:31,589 --> 01:51:27,920  
there's another

2755  
01:51:34,629 --> 01:51:31,599  
natural physical mechanical explanation

2756  
01:51:36,310 --> 01:51:34,639  
that i can't think of i don't know right

2757  
01:51:38,070 --> 01:51:36,320  
right well we're you know we're getting

2758  
01:51:39,109 --> 01:51:38,080  
close to to being out of time i'm just

2759  
01:51:42,950 --> 01:51:39,119  
going to pop up your

2760  
01:51:45,669 --> 01:51:42,960  
your book here and uh so

2761  
01:51:48,149 --> 01:51:45,679  
stellar engineering i highly recommend

2762  
01:51:49,750 --> 01:51:48,159  
it it's a book you're going to start and

2763  
01:51:51,510 --> 01:51:49,760

not want to put down it's really

2764

01:51:54,149 --> 01:51:51,520

fascinating and uh

2765

01:51:54,870 --> 01:51:54,159

i've really enjoyed our talk very much

2766

01:51:58,390 --> 01:51:54,880

this evening

2767

01:52:00,390 --> 01:51:58,400

i did thank you yeah and uh so we'll

2768

01:52:01,990 --> 01:52:00,400

we'll talk soon and i hope you have

2769

01:52:03,430 --> 01:52:02,000

really good luck with this book and

2770

01:52:03,910 --> 01:52:03,440

remember you have to write one more to

2771

01:52:07,510 --> 01:52:03,920

get that

2772

01:52:10,550 --> 01:52:09,830

thank you very much have a great night

2773

01:52:13,030 --> 01:52:10,560

everybody

2774

01:52:13,910 --> 01:52:13,040

bye-bye all right take care bye-bye all

2775

01:52:16,310 --> 01:52:13,920

right everyone

2776

01:52:17,109 --> 01:52:16,320

so uh next week we have uh frank

2777

01:52:19,910 --> 01:52:17,119

fischino

2778

01:52:20,950 --> 01:52:19,920

talking about the flatwoods uh monster

2779

01:52:24,310 --> 01:52:20,960

incident a real

2780

01:52:25,510 --> 01:52:24,320

real uh unusual one there and i want to

2781

01:52:28,709 --> 01:52:25,520

thank everyone for