



FRASER CAIN

1
00:00:26,230 --> 00:00:11,770

[Music]

2
00:00:31,700 --> 00:00:29,179

hello and welcome to the show on Martin

3
00:00:34,390 --> 00:00:31,710

Willis your host and we have an exciting

4
00:00:38,509 --> 00:00:34,400

show for you tonight I'm a fan of the

5
00:00:39,860 --> 00:00:38,519

person we have on Frasier Kane from the

6
00:00:43,729 --> 00:00:39,870

publisher of Universe Today

7
00:00:45,470 --> 00:00:43,739

and also a podcast that I started

8
00:00:48,410 --> 00:00:45,480

listening to when it very first started

9
00:00:50,180 --> 00:00:48,420

and on and off many times over I think

10
00:00:52,610 --> 00:00:50,190

it's been 13 years or something like

11
00:00:55,729 --> 00:00:52,620

that they're already up to episode 500

12
00:00:59,389 --> 00:00:55,739

and that's called astronomy cast and I

13
00:01:01,760 --> 00:00:59,399

love the show and so anyway I was really

14

00:01:04,369 --> 00:01:01,770

happy that Frasier now Frasier is not

15

00:01:07,760 --> 00:01:04,379

someone that is really down with UFOs we

16

00:01:10,969 --> 00:01:07,770

will discuss it and get it we'll get his

17

00:01:12,469 --> 00:01:10,979

opinion and I promise you it won't be

18

00:01:14,990 --> 00:01:12,479

violent or anything we'll may have a

19

00:01:16,580 --> 00:01:15,000

couple of semi-soft debates about the

20

00:01:18,080 --> 00:01:16,590

topic and we'll see where it goes from

21

00:01:20,510 --> 00:01:18,090

there and then we're gonna be talking a

22

00:01:23,389 --> 00:01:20,520

lot of space and all that stuff later on

23

00:01:25,100 --> 00:01:23,399

in the show torte after the first hour

24

00:01:28,160 --> 00:01:25,110

we will take calls anyone would like to

25

00:01:30,590 --> 00:01:28,170

call in and ask questions and you know

26
00:01:31,910 --> 00:01:30,600
the host some questions or or whatever

27
00:01:33,230 --> 00:01:31,920
we will go from there

28
00:01:35,929 --> 00:01:33,240
so I want to thank everyone that

29
00:01:38,600 --> 00:01:35,939
supports the show anyone can do that you

30
00:01:43,640 --> 00:01:38,610
can find that info on podcast UFO comm

31
00:01:46,940 --> 00:01:43,650
and generally we are live on kgr a radio

32
00:01:49,789 --> 00:01:46,950
and so first of all the producer race

33
00:01:51,520 --> 00:01:49,799
Hobbs is stuck somewhere in a canyon he

34
00:01:53,660 --> 00:01:51,530
was I think he was actually in a tunnel

35
00:01:57,469 --> 00:01:53,670
people were trying to turn around it was

36
00:02:00,050 --> 00:01:57,479
a big mess and so his fill-in guy sent

37
00:02:02,359 --> 00:02:00,060
me his radar picture this tornados all

38
00:02:05,870 --> 00:02:02,369

in his area so they're just popping on a

39

00:02:08,300 --> 00:02:05,880

replay over there so I apologize for you

40

00:02:10,160 --> 00:02:08,310

regular I don't even know how to get to

41

00:02:12,440 --> 00:02:10,170

you people over at kg are a radio

42

00:02:14,569 --> 00:02:12,450

hopefully they'll wander over to the

43

00:02:17,270 --> 00:02:14,579

YouTube channel or my web site and see

44

00:02:19,789 --> 00:02:17,280

the show Alejandro welcome to the show

45

00:02:22,430 --> 00:02:19,799

how are you I'm doing well how are you

46

00:02:26,949 --> 00:02:22,440

doing Betty not doing just great doing

47

00:02:28,970 --> 00:02:26,959

great it's raining and pouring it's it's

48

00:02:31,189 --> 00:02:28,980

ringing and pouring I guess the same

49

00:02:35,229 --> 00:02:31,199

thing but it's cold chilly we're getting

50

00:02:37,960 --> 00:02:35,239

the winter chill already here in

51
00:02:41,309 --> 00:02:37,970
from October it's raining here and it's

52
00:02:43,839 --> 00:02:41,319
it's cold for Arizona it's probably

53
00:02:47,050 --> 00:02:43,849
probably still in the 70s or 80s but

54
00:02:50,530 --> 00:02:47,060
where Arizona that's very cold yeah I

55
00:02:52,930 --> 00:02:50,540
know and well you need the rain right

56
00:02:55,839 --> 00:02:52,940
yeah we've got it yeah so we've got a

57
00:03:00,309 --> 00:02:55,849
lot of rain going on but yeah we do need

58
00:03:02,440 --> 00:03:00,319
it yep so that's good yeah I hear the

59
00:03:05,199 --> 00:03:02,450
whole Southwest is gonna get quite a

60
00:03:08,979 --> 00:03:05,209
deluge out there and so what's going on

61
00:03:11,289 --> 00:03:08,989
in the UFO etc world yeah so I've got

62
00:03:13,780 --> 00:03:11,299
three stories I'd like to cover two UFOs

63
00:03:15,910 --> 00:03:13,790

and in celebration of your guests today

64

00:03:21,009 --> 00:03:15,920

or just because I love space I've got a

65

00:03:23,229 --> 00:03:21,019

space one two my own space story so to

66

00:03:25,300 --> 00:03:23,239

begin this I'm not sure if this is even

67

00:03:27,580 --> 00:03:25,310

a new story but it's someone something

68

00:03:31,119 --> 00:03:27,590

someone posted in the open minds UFO

69

00:03:34,210 --> 00:03:31,129

news group and this is from casino org

70

00:03:36,009 --> 00:03:34,220

and they actually have a UFO site it's

71

00:03:38,319 --> 00:03:36,019

pretty cool where they've got a lot of

72

00:03:41,110 --> 00:03:38,329

information some stats and everything

73

00:03:43,030 --> 00:03:41,120

regarding UFOs and of course up top what

74

00:03:46,240 --> 00:03:43,040

do they have they've got the odds of

75

00:03:48,699 --> 00:03:46,250

seeing a UFO so according to Las Vegas

76

00:03:56,289 --> 00:03:48,709

essentially it's it looks like if I'm

77

00:03:58,300 --> 00:03:56,299

reading this it's a plus 120 4700 which

78

00:04:01,270 --> 00:03:58,310

I think means one thousand two hundred

79

00:04:04,930 --> 00:04:01,280

and forty seven to one odds that you'll

80

00:04:08,530 --> 00:04:04,940

see a UFO they list that's not that bad

81

00:04:10,509 --> 00:04:08,540

yeah and well that's just Alabama it

82

00:04:12,610 --> 00:04:10,519

looks like so they've got everything for

83

00:04:15,129 --> 00:04:12,620

every different state let's see we'll

84

00:04:16,659 --> 00:04:15,139

just look up a couple in Maine it's a

85

00:04:18,699 --> 00:04:16,669

lot better it's three hundred and

86

00:04:21,279 --> 00:04:18,709

seventy to one that's because there's

87

00:04:24,700 --> 00:04:21,289

only 370 people in Maine I think yeah

88

00:04:26,320 --> 00:04:24,710

and then let's check Arizona really wow

89

00:04:27,310 --> 00:04:26,330

the odds are really I think their

90

00:04:29,950 --> 00:04:27,320

numbers are way off

91

00:04:32,620 --> 00:04:29,960

according to I'm sure they didn't use

92

00:04:34,980 --> 00:04:32,630

like population and stuff like that but

93

00:04:37,960 --> 00:04:34,990

Arizona they have it at something like

94

00:04:40,060 --> 00:04:37,970

nearly two thousand to one odds so very

95

00:04:42,550 --> 00:04:40,070

high which is kind of weird

96

00:04:45,190 --> 00:04:42,560

but there's a lot more information about

97

00:04:46,870 --> 00:04:45,200

history of UFO sightings including a

98

00:04:47,770 --> 00:04:46,880

timeline that's interactive where you

99

00:04:49,030 --> 00:04:47,780

can click and look at different

100

00:04:51,790 --> 00:04:49,040

sightings

101

00:04:53,470 --> 00:04:51,800

it also has a few facts and here they

102

00:04:56,410 --> 00:04:53,480

are these are interesting you're most

103

00:04:59,320 --> 00:04:56,420

likely to see a UFO in Wyoming according

104

00:05:02,170 --> 00:04:59,330

to them Florida is a state with the

105

00:05:04,210 --> 00:05:02,180

lowest odds of seeing a UFO which is

106

00:05:05,680 --> 00:05:04,220

according to them which is completely

107

00:05:07,090 --> 00:05:05,690

different than any statistics that's

108

00:05:10,510 --> 00:05:07,100

right I don't know where they're getting

109

00:05:13,380 --> 00:05:10,520

their numbers Oh yep

110

00:05:18,700 --> 00:05:13,390

over 40,000 Americans have taken out

111

00:05:21,100 --> 00:05:18,710

alien abduction insurance boy I didn't

112

00:05:23,230 --> 00:05:21,110

see that coming boy yeah yeah yeah weird

113

00:05:25,900 --> 00:05:23,240

is that yeah so they've got a lot of

114

00:05:27,550 --> 00:05:25,910

starting a comebacks I'm not sure where

115

00:05:28,990 --> 00:05:27,560

they get their numbers I would argue

116

00:05:30,820 --> 00:05:29,000

their numbers but it is pretty

117

00:05:33,550 --> 00:05:30,830

interesting can you before you go on

118

00:05:36,460 --> 00:05:33,560

there so if you do happen to get

119

00:05:38,980 --> 00:05:36,470

abducted how do you collect your you

120

00:05:40,690 --> 00:05:38,990

know I don't know you know I've heard of

121

00:05:42,550 --> 00:05:40,700

this before actually this alien

122

00:05:45,330 --> 00:05:42,560

abduction insurance because you can get

123

00:05:48,220 --> 00:05:45,340

insurance pretty much for everything and

124

00:05:51,550 --> 00:05:48,230

yeah yeah exactly and I think this is

125

00:05:52,870 --> 00:05:51,560

alloyed product as well so you'd have to

126

00:05:55,960 --> 00:05:52,880

look that up if you're looking to get

127

00:05:59,560 --> 00:05:55,970

alien abduction insurance although you

128

00:06:02,440 --> 00:05:59,570

know I'm sure as we know especially that

129

00:06:04,540 --> 00:06:02,450

many of those 40,000 probably the

130

00:06:06,730 --> 00:06:04,550

majority probably really genuinely

131

00:06:09,970 --> 00:06:06,740

believe that you know they may be

132

00:06:12,700 --> 00:06:09,980

abducted or have been before so who

133

00:06:15,850 --> 00:06:12,710

knows yeah I would really love to see

134

00:06:17,710 --> 00:06:15,860

that policy yeah really interesting but

135

00:06:19,870 --> 00:06:17,720

the interface and the graphics you can

136

00:06:21,760 --> 00:06:19,880

tell that this they spent a lot of time

137

00:06:23,710 --> 00:06:21,770

on this site and it's really really cool

138

00:06:27,910 --> 00:06:23,720

in fact there's a little map and when

139

00:06:31,510 --> 00:06:27,920

you click on your country or where you

140

00:06:33,160 --> 00:06:31,520

are your state I mean this little UFO

141

00:06:36,040 --> 00:06:33,170

flies above it and begins this little

142

00:06:38,890 --> 00:06:36,050

light down so the graphics are really

143

00:06:42,280 --> 00:06:38,900

cool it's a really cool site interesting

144

00:06:43,990 --> 00:06:42,290

something to check out so a couple other

145

00:06:46,510 --> 00:06:44,000

pieces of news so you and I talked at

146

00:06:51,220 --> 00:06:46,520

length about this on my podcast but to

147

00:06:54,340 --> 00:06:51,230

the Stars Academy has come out with an

148

00:06:56,560 --> 00:06:54,350

article recently about some alleged

149

00:07:00,040 --> 00:06:56,570

anomalous materials that they have are

150

00:07:01,659 --> 00:07:00,050

examining you know I complained a lot

151
00:07:02,500 --> 00:07:01,669
about you know how they wrote this

152
00:07:05,770 --> 00:07:02,510
article and

153
00:07:07,620 --> 00:07:05,780
came about but the point is what's

154
00:07:10,240 --> 00:07:07,630
interesting of course is they have this

155
00:07:13,420 --> 00:07:10,250
project where they're taking what people

156
00:07:16,030 --> 00:07:13,430
are claiming to be mysterious material

157
00:07:17,410 --> 00:07:16,040
and they're actually looking into it it

158
00:07:19,360 --> 00:07:17,420
appears that the material they're

159
00:07:21,940 --> 00:07:19,370
looking into right now are what are

160
00:07:24,640 --> 00:07:21,950
known as arts parts so it's something

161
00:07:27,580 --> 00:07:24,650
art Bell got and we're deducing this

162
00:07:30,340 --> 00:07:27,590
because the article said it had similar

163
00:07:34,120 --> 00:07:30,350

elements magnesium zinc bismuth that

164

00:07:35,860 --> 00:07:34,130

were claimed and in small layers just

165

00:07:38,170 --> 00:07:35,870

like we're claimed that that were to be

166

00:07:39,910 --> 00:07:38,180

part of these arts parts and the story

167

00:07:42,670 --> 00:07:39,920

and here is my big big complaint the

168

00:07:44,950 --> 00:07:42,680

article referred to this material and

169

00:07:47,620 --> 00:07:44,960

that it has been out there for decades

170

00:07:49,960 --> 00:07:47,630

if it is our sparks which I'm sure it is

171

00:07:52,450 --> 00:07:49,970

they really I feel should have done the

172

00:07:54,790 --> 00:07:52,460

whole history of the material you know

173

00:07:57,370 --> 00:07:54,800

how it was anonymously sent to art Bell

174

00:08:00,790 --> 00:07:57,380

so we have a full story of what the heck

175

00:08:04,090 --> 00:08:00,800

this stuff is I hope that it was just an

176

00:08:06,610 --> 00:08:04,100

oversight because it's kind of deceptive

177

00:08:07,450 --> 00:08:06,620

not to give history even if it hurts the

178

00:08:09,190 --> 00:08:07,460

credibility

179

00:08:11,440 --> 00:08:09,200

I mean because history is going to come

180

00:08:14,740 --> 00:08:11,450

out regardless that's right we should

181

00:08:16,990 --> 00:08:14,750

know either way but there's a another

182

00:08:18,700 --> 00:08:17,000

development so researchers have found

183

00:08:20,710 --> 00:08:18,710

and I'm not sure who found this in the

184

00:08:22,750 --> 00:08:20,720

beginning I think it might have been

185

00:08:24,060 --> 00:08:22,760

this website and I identified aerial

186

00:08:27,660 --> 00:08:24,070

phenomenon

187

00:08:34,089 --> 00:08:27,670

scientific research - blog on blogspot

188

00:08:35,620 --> 00:08:34,099

but they looked into the SEC files this

189

00:08:39,040 --> 00:08:35,630

is the US Securities and Exchange

190

00:08:42,430 --> 00:08:39,050

Commission and they actually found some

191

00:08:45,760 --> 00:08:42,440

paperwork an update on to the Stars

192

00:08:48,810 --> 00:08:45,770

Academy and if we read this right some

193

00:08:53,500 --> 00:08:48,820

of the things that it says here is that

194

00:08:56,200 --> 00:08:53,510

dr. Gary Nolan reason resigned and later

195

00:08:59,050 --> 00:08:56,210

yes yeah I mean we're talking about him

196

00:09:01,810 --> 00:08:59,060

he's the one who analyzed these alleged

197

00:09:03,430 --> 00:09:01,820

you know alien bodies out of Peru which

198

00:09:05,590 --> 00:09:03,440

of course all turned out to be human

199

00:09:07,920 --> 00:09:05,600

which we knew before even though people

200

00:09:10,630 --> 00:09:07,930

like dr. Steven Greer claimed otherwise

201
00:09:12,420 --> 00:09:10,640
but dr. Greer is the one who hired this

202
00:09:15,090 --> 00:09:12,430
guy to look into it or at least

203
00:09:16,640 --> 00:09:15,100
partnered with him and then was

204
00:09:19,350 --> 00:09:16,650
unfortunately did

205
00:09:23,820 --> 00:09:19,360
like his results because it looks alien

206
00:09:28,170 --> 00:09:23,830
but it's not but the most shocking thing

207
00:09:31,950 --> 00:09:28,180
in here is that it looks like let me

208
00:09:35,400 --> 00:09:31,960
find the number but it's huge it looks

209
00:09:38,820 --> 00:09:35,410
like they are in debt to the tune of

210
00:09:42,390 --> 00:09:38,830
nearly 40 million dollars how could that

211
00:09:47,040 --> 00:09:42,400
be even I don't know let me read this to

212
00:09:49,290 --> 00:09:47,050
you so this is page 13 note 2 and the

213
00:09:51,300 --> 00:09:49,300

title is growing concern

214

00:09:52,560 --> 00:09:51,310

it says the accompanying financial

215

00:09:54,840 --> 00:09:52,570

statements have been prepared on a

216

00:09:56,580 --> 00:09:54,850

growing concern basic which contemplates

217

00:09:58,440 --> 00:09:56,590

the realization of assets and

218

00:10:00,660 --> 00:09:58,450

buh-buh-buh-buh-buh let me get a license

219

00:10:03,420 --> 00:10:00,670

the company has encouraged losses from

220

00:10:08,430 --> 00:10:03,430

operations and has an accumulated

221

00:10:10,830 --> 00:10:08,440

deficit at June 30th 2018 of 37 million

222

00:10:13,830 --> 00:10:10,840

four hundred and thirty two thousand

223

00:10:16,560 --> 00:10:13,840

dollars these factors raise doubt about

224

00:10:20,120 --> 00:10:16,570

the company's ability to continue as a

225

00:10:25,080 --> 00:10:20,130

growing concern I can't even house

226

00:10:27,780 --> 00:10:25,090

imagine what yeah this is really weird

227

00:10:29,790 --> 00:10:27,790

now there were some other documents that

228

00:10:32,910 --> 00:10:29,800

came out and one of the other documents

229

00:10:35,160 --> 00:10:32,920

that is in here talks about their

230

00:10:37,710 --> 00:10:35,170

material studies program essentially the

231

00:10:41,340 --> 00:10:37,720

Adam project and it also talks about

232

00:10:42,840 --> 00:10:41,350

another partnership they have research

233

00:10:46,350 --> 00:10:42,850

that they've got going on with earth

234

00:10:50,190 --> 00:10:46,360

tech International regarding beamed

235

00:10:52,590 --> 00:10:50,200

energy launch systems program a planning

236

00:10:54,240 --> 00:10:52,600

project B Els and I think you could ask

237

00:10:57,330 --> 00:10:54,250

your guests this would probably be a

238

00:11:00,120 --> 00:10:57,340

interesting topic for Frazier about this

239

00:11:02,420 --> 00:11:00,130

because this is essentially the same

240

00:11:07,230 --> 00:11:02,430

technology that they want to use for

241

00:11:12,330 --> 00:11:07,240

that URI gildner I forget his last name

242

00:11:15,810 --> 00:11:12,340

the teller yeah no the Russian owner who

243

00:11:17,460 --> 00:11:15,820

started the project I I don't know man

244

00:11:19,980 --> 00:11:17,470

his name right off that I know you mean

245

00:11:21,780 --> 00:11:19,990

yeah yeah so he wanted to send all of

246

00:11:24,680 --> 00:11:21,790

these little micro spaceships using a

247

00:11:27,540 --> 00:11:24,690

laser that pushes them the solar

248

00:11:29,550 --> 00:11:27,550

technology essentially it's like a light

249

00:11:30,840 --> 00:11:29,560

technology where these lasers push these

250

00:11:33,840 --> 00:11:30,850

objects

251
00:11:37,310 --> 00:11:33,850
so that maybe yet now of course many of

252
00:11:40,260 --> 00:11:37,320
the members of to the stars are also

253
00:11:42,780 --> 00:11:40,270
previous members are at least with work

254
00:11:45,210 --> 00:11:42,790
with Bigelow Aerospace Bigelow Aerospace

255
00:11:47,610 --> 00:11:45,220
has some huge contracts especially with

256
00:11:50,400 --> 00:11:47,620
Boeing they've partnered up with they're

257
00:11:53,640 --> 00:11:50,410
working with NASA so it could be that

258
00:11:56,130 --> 00:11:53,650
there is a very high dollar project that

259
00:11:58,950 --> 00:11:56,140
they're being farmed out to help with

260
00:12:00,780 --> 00:11:58,960
Bigelow that could explain this because

261
00:12:03,230 --> 00:12:00,790
of course the dollars are dealing with

262
00:12:06,300 --> 00:12:03,240
are huge when it comes to some of these

263
00:12:10,680 --> 00:12:06,310

aerospace projects so there could be an

264

00:12:12,240 --> 00:12:10,690

answer that doesn't you mean that it is

265

00:12:13,650 --> 00:12:12,250

what it looks like which is that there's

266

00:12:14,910 --> 00:12:13,660

thirty seven million dollars in debt and

267

00:12:16,920 --> 00:12:14,920

they're screwed how could they have

268

00:12:20,070 --> 00:12:16,930

spent that much money it could be part

269

00:12:21,930 --> 00:12:20,080

of some work they're doing where they

270

00:12:23,760 --> 00:12:21,940

they are planning to recover that I

271

00:12:25,950 --> 00:12:23,770

could be work with I'd imagine that

272

00:12:28,860 --> 00:12:25,960

would be through Bigelow because he's

273

00:12:30,240 --> 00:12:28,870

got of course it's ties into a space

274

00:12:32,340 --> 00:12:30,250

industry right

275

00:12:34,650 --> 00:12:32,350

that's a yuri milner is the person

276

00:12:38,790 --> 00:12:34,660

you're with Milner yeah and it was close

277

00:12:43,170 --> 00:12:38,800

yeah so yeah so speaking at Bigelow but

278

00:12:44,880 --> 00:12:43,180

more along the space is this new space

279

00:12:46,470 --> 00:12:44,890

race so of course I've talked a lot

280

00:12:48,660 --> 00:12:46,480

about the space race to the moon and

281

00:12:50,340 --> 00:12:48,670

some of the other motivations going on

282

00:12:52,920 --> 00:12:50,350

than just science of course there's a

283

00:12:54,600 --> 00:12:52,930

lot of politics and global politics

284

00:12:56,640 --> 00:12:54,610

going on there but there are also

285

00:12:58,740 --> 00:12:56,650

politics going on in another really

286

00:13:01,079 --> 00:12:58,750

important race which is to get the

287

00:13:03,870 --> 00:13:01,089

United States back in the game of

288

00:13:06,030 --> 00:13:03,880

getting humans to the International

289

00:13:08,610 --> 00:13:06,040

Space Station so getting humans into

290

00:13:10,949 --> 00:13:08,620

space and there's actually two

291

00:13:12,630 --> 00:13:10,959

spacecraft that have been given the

292

00:13:15,390 --> 00:13:12,640

green light who are already scheduled to

293

00:13:17,670 --> 00:13:15,400

take humans and that is the spacex

294

00:13:21,060 --> 00:13:17,680

dragon spacecraft and then the boeing

295

00:13:23,519 --> 00:13:21,070

Starliner so i've got an article in den

296

00:13:26,310 --> 00:13:23,529

of geek all about these what I kind of

297

00:13:28,620 --> 00:13:26,320

did was a head-to-head you know what are

298

00:13:30,870 --> 00:13:28,630

the the similarities and the differences

299

00:13:32,970 --> 00:13:30,880

between these two and there are some

300

00:13:35,850 --> 00:13:32,980

really interesting things about each the

301
00:13:38,880 --> 00:13:35,860
SpaceX Dragon if you see the interior

302
00:13:43,290 --> 00:13:38,890
looks a lot like a Tesla car it's very

303
00:13:45,030 --> 00:13:43,300
fancy minimalistic super futuristic with

304
00:13:47,670 --> 00:13:45,040
these panels

305
00:13:49,560 --> 00:13:47,680
that display panels that you can fold

306
00:13:52,260 --> 00:13:49,570
away and they're touchscreen and

307
00:13:54,030 --> 00:13:52,270
everything so it's pretty cool what's

308
00:13:56,910 --> 00:13:54,040
unique couple things that are unique

309
00:14:00,240 --> 00:13:56,920
about the Dragon spacecraft one is that

310
00:14:03,870 --> 00:14:00,250
it has a trunk just like your car so it

311
00:14:07,800 --> 00:14:03,880
really has a section that holds the

312
00:14:09,990 --> 00:14:07,810
solar panels that also can hold a bunch

313
00:14:12,270 --> 00:14:10,000

more cargo so that's going to be really

314

00:14:13,890 --> 00:14:12,280

important this is unpressurized cargo so

315

00:14:15,780 --> 00:14:13,900

humans can't fit in there but a lot of

316

00:14:18,270 --> 00:14:15,790

other cargo can which is really

317

00:14:20,190 --> 00:14:18,280

important now the cargo in the trunk is

318

00:14:21,630 --> 00:14:20,200

going for a one-way trip because this

319

00:14:25,010 --> 00:14:21,640

trunk actually burns up in the

320

00:14:27,270 --> 00:14:25,020

atmosphere when they come back in but

321

00:14:28,920 --> 00:14:27,280

anything else they can you know they can

322

00:14:30,960 --> 00:14:28,930

stuff in the the capsule if there aren't

323

00:14:32,880 --> 00:14:30,970

any humans for bringing back more

324

00:14:34,920 --> 00:14:32,890

material but that's been one benefit

325

00:14:37,320 --> 00:14:34,930

that the Dragon capsule has had it's

326

00:14:41,790 --> 00:14:37,330

already been going to the ISS the

327

00:14:44,550 --> 00:14:41,800

uncrewed version and it's able to bring

328

00:14:46,920 --> 00:14:44,560

materials back as well now the Dragon

329

00:14:49,580 --> 00:14:46,930

capsule here's one big difference it is

330

00:14:51,810 --> 00:14:49,590

going to use more of a traditional

331

00:14:54,540 --> 00:14:51,820

parachute just like the Apollo program

332

00:14:56,700 --> 00:14:54,550

it will fall into the ocean slow down by

333

00:14:58,590 --> 00:14:56,710

a parachute one of the things they're

334

00:15:01,200 --> 00:14:58,600

working on they were hoping to have is

335

00:15:03,060 --> 00:15:01,210

more of a kind of futuristic where this

336

00:15:05,970 --> 00:15:03,070

thing can land just like their Falcon

337

00:15:08,310 --> 00:15:05,980

rockets do where they have a retro

338

00:15:10,620 --> 00:15:08,320

engine set that will slow the craft down

339

00:15:12,240 --> 00:15:10,630

so it can land on land but they that

340

00:15:14,340 --> 00:15:12,250

isn't ready so at least at the beginning

341

00:15:16,320 --> 00:15:14,350

they're gonna have these parachutes that

342

00:15:18,660 --> 00:15:16,330

are gonna be slowing it down

343

00:15:20,820 --> 00:15:18,670

getting to the Starliner one of the cool

344

00:15:23,010 --> 00:15:20,830

things about the Starliner on that front

345

00:15:24,390 --> 00:15:23,020

is that the Starliner is actually going

346

00:15:27,570 --> 00:15:24,400

to land on the ground it's got these

347

00:15:30,480 --> 00:15:27,580

giant balloons that blow up and then

348

00:15:32,760 --> 00:15:30,490

allow it it's slowed down by a parachute

349

00:15:34,620 --> 00:15:32,770

but these balloons allow it to land on

350

00:15:36,240 --> 00:15:34,630

the balloons soft enough where they can

351
00:15:37,920 --> 00:15:36,250
make ground landing so that's going to

352
00:15:40,350 --> 00:15:37,930
be very important it's gonna be much

353
00:15:42,210 --> 00:15:40,360
easier to retrieve and I think it'd be

354
00:15:45,240 --> 00:15:42,220
really scary it's one of the scariest

355
00:15:46,980 --> 00:15:45,250
parts I think in all the space movies

356
00:15:48,930 --> 00:15:46,990
when they come back and they've got to

357
00:15:50,640 --> 00:15:48,940
land in the ocean and you know it's

358
00:15:54,090 --> 00:15:50,650
scary what if something happens and of

359
00:15:55,830 --> 00:15:54,100
course there was an incident where you

360
00:15:58,110 --> 00:15:55,840
know it's debated exactly what happened

361
00:16:00,870 --> 00:15:58,120
I think now it's not so much but one of

362
00:16:05,340 --> 00:16:00,880
the astronauts I guess freaked out and

363
00:16:09,540 --> 00:16:05,350

pulled the the port door open

364

00:16:11,670 --> 00:16:09,550

essentially and almost drowned when I

365

00:16:13,920 --> 00:16:11,680

forget the details I'm sure Frasier

366

00:16:17,190 --> 00:16:13,930

would have that tasking him with all of

367

00:16:19,260 --> 00:16:17,200

this stuff but yeah that's one cool

368

00:16:21,540 --> 00:16:19,270

thing about the Starliner the Starliner

369

00:16:24,990 --> 00:16:21,550

this is really interesting too

370

00:16:27,240 --> 00:16:25,000

so the space tourism is something new

371

00:16:29,220 --> 00:16:27,250

that starting up the big new SpaceX made

372

00:16:30,990 --> 00:16:29,230

in the last few weeks is that they're

373

00:16:33,150 --> 00:16:31,000

going to fly that this Japanese

374

00:16:34,920 --> 00:16:33,160

millionaire around the moon Phileas well

375

00:16:36,900 --> 00:16:34,930

the steel liner says they're gonna be

376

00:16:38,790 --> 00:16:36,910

doing that too they're gonna be working

377

00:16:41,280 --> 00:16:38,800

with a company called space adventures

378

00:16:45,210 --> 00:16:41,290

and space adventures was renting seats

379

00:16:47,880 --> 00:16:45,220

from the Russians to fly people to the

380

00:16:50,700 --> 00:16:47,890

ISS they did this a few times in the 90s

381

00:16:53,160 --> 00:16:50,710

early 2000 but they stopped because

382

00:16:54,660 --> 00:16:53,170

essentially the US was renting all those

383

00:16:57,690 --> 00:16:54,670

seats those extra seats

384

00:16:59,100 --> 00:16:57,700

well now what the Starliner says Boeing

385

00:17:01,800 --> 00:16:59,110

says is that they're gonna actually rent

386

00:17:04,590 --> 00:17:01,810

extra seats to potential space tourists

387

00:17:05,490 --> 00:17:04,600

so they might be doing that they're

388

00:17:07,860 --> 00:17:05,500

going to be working with space

389

00:17:09,600 --> 00:17:07,870

adventures so they may be flying you

390

00:17:11,939 --> 00:17:09,610

know if they're flying humans up as soon

391

00:17:13,040 --> 00:17:11,949

as next year they may be doing this in

392

00:17:15,360 --> 00:17:13,050

the next year or two

393

00:17:17,280 --> 00:17:15,370

renting out seats for people to be able

394

00:17:20,010 --> 00:17:17,290

to fly up to the ISS just like the

395

00:17:22,290 --> 00:17:20,020

Russians were doing so that's some

396

00:17:24,840 --> 00:17:22,300

interesting stuff here you could look

397

00:17:28,590 --> 00:17:24,850

into it more the one thing that makes

398

00:17:31,680 --> 00:17:28,600

this very pressing is that our contract

399

00:17:34,890 --> 00:17:31,690

with Russia to take us to the ISS us

400

00:17:37,880 --> 00:17:34,900

astronauts is expiring in April 2019

401
00:17:41,490 --> 00:17:37,890
which happens to be the same month that

402
00:17:45,600 --> 00:17:41,500
SpaceX will be taking the first their

403
00:17:47,549 --> 00:17:45,610
first crew to the ISS but we actually

404
00:17:49,799 --> 00:17:47,559
have I guess rented seats up until

405
00:17:52,320 --> 00:17:49,809
November of next year with the Russians

406
00:17:53,549 --> 00:17:52,330
but after that you know we've got to

407
00:17:56,130 --> 00:17:53,559
figure out what we're gonna do to get

408
00:17:59,340 --> 00:17:56,140
people up there so hopefully there will

409
00:18:01,080 --> 00:17:59,350
be no more delays boeing was a

410
00:18:03,419 --> 00:18:01,090
front-runner for a long time of course

411
00:18:05,850 --> 00:18:03,429
they actually have built all of the

412
00:18:10,080 --> 00:18:05,860
spacecraft that have taken humans into

413
00:18:12,060 --> 00:18:10,090

space from for for nasa but surprisingly

414

00:18:14,700 --> 00:18:12,070

they just had to

415

00:18:18,270 --> 00:18:14,710

shoes and SpaceX came from behind and

416

00:18:20,670 --> 00:18:18,280

SpaceX's is right now ahead of the race

417

00:18:22,800 --> 00:18:20,680

they most likely will be the first to

418

00:18:24,960 --> 00:18:22,810

you know be a commercial private

419

00:18:28,470 --> 00:18:24,970

organization to take astronauts to the

420

00:18:30,570 --> 00:18:28,480

ISS very exciting yeah it is Wow

421

00:18:32,400 --> 00:18:30,580

interesting so I think it's really

422

00:18:35,490 --> 00:18:32,410

amazing that there's actually be

423

00:18:37,350 --> 00:18:35,500

passengers you know flying and I've

424

00:18:39,090 --> 00:18:37,360

wonder you know what the tickets cost

425

00:18:40,440 --> 00:18:39,100

it's amazing I wonder if they got a

426

00:18:42,990 --> 00:18:40,450

double booked too you know

427

00:18:45,960 --> 00:18:43,000

well there's huge in fact we've got a

428

00:18:47,880 --> 00:18:45,970

another article a supplemental an

429

00:18:53,040 --> 00:18:47,890

article coming out that I did on space

430

00:18:55,500 --> 00:18:53,050

tourism and it's part of the magazine we

431

00:18:57,030 --> 00:18:55,510

put together for den of geek for the New

432

00:18:58,530 --> 00:18:57,040

York Comic Con which is going on

433

00:19:01,080 --> 00:18:58,540

something like the end of this week I

434

00:19:03,810 --> 00:19:01,090

think it starts and so that will be out

435

00:19:06,690 --> 00:19:03,820

soon but I've got pricing for all of the

436

00:19:09,180 --> 00:19:06,700

different options out there but we don't

437

00:19:11,730 --> 00:19:09,190

know how much the the Japanese gentleman

438

00:19:14,730 --> 00:19:11,740

is going to be paying to go around the

439

00:19:17,190 --> 00:19:14,740

moon but these travelers with space

440

00:19:20,640 --> 00:19:17,200

adventures are paying hundreds of

441

00:19:23,430 --> 00:19:20,650

millions of dollars so I mean it ain't

442

00:19:25,590 --> 00:19:23,440

cheap yeah yeah rightly so I mean it

443

00:19:27,410 --> 00:19:25,600

costs so much per pound just to get out

444

00:19:29,880 --> 00:19:27,420

of orbit thanks so much

445

00:19:31,710 --> 00:19:29,890

mm-hmm all right pleasure all right then

446

00:19:33,150 --> 00:19:31,720

I'll talk to you next week all right

447

00:19:35,700 --> 00:19:33,160

have a great show talk to you later

448

00:19:38,790 --> 00:19:35,710

all right thanks all right so our guest

449

00:19:40,800 --> 00:19:38,800

Fraser King I contacted him I believe

450

00:19:42,960 --> 00:19:40,810

quite a while ago I was so glad when he

451
00:19:46,620 --> 00:19:42,970
finally said that he would actually be

452
00:19:48,150 --> 00:19:46,630
come on the show first off I remember

453
00:19:50,370 --> 00:19:48,160
contacting him he said something along

454
00:19:53,220 --> 00:19:50,380
the lines well no I don't want to talk

455
00:19:55,470 --> 00:19:53,230
about UFOs I'm going to talk about him

456
00:19:58,110 --> 00:19:55,480
for a little while Fraser Cain welcome

457
00:20:01,200 --> 00:19:58,120
to the show thank you for having me

458
00:20:03,630 --> 00:20:01,210
yes love your your podcast as you

459
00:20:07,500 --> 00:20:03,640
probably know after I've been talking

460
00:20:10,530 --> 00:20:07,510
about it and you co-host with Pam look

461
00:20:14,040 --> 00:20:10,540
at dr. Pamela gay and she is such a

462
00:20:15,930 --> 00:20:14,050
delight entertaining and so much fun and

463
00:20:18,060 --> 00:20:15,940

she really the thing that I like the

464

00:20:21,810 --> 00:20:18,070

best about your show is that you both

465

00:20:24,300 --> 00:20:21,820

really explained in terms that someone

466

00:20:25,310 --> 00:20:24,310

like myself and anyone is just getting

467

00:20:27,830 --> 00:20:25,320

into it can act

468

00:20:29,840 --> 00:20:27,840

understand yeah that's the that's really

469

00:20:32,930 --> 00:20:29,850

the the wonderful thing about about

470

00:20:36,379 --> 00:20:32,940

astronomy cast is Pamela knows the

471

00:20:41,210 --> 00:20:36,389

material so deeply that we don't have to

472

00:20:42,980 --> 00:20:41,220

prepare right topic and you just go we

473

00:20:45,710 --> 00:20:42,990

just have a topic and we were just

474

00:20:48,440 --> 00:20:45,720

following my curiosity I will yeah I'm

475

00:20:50,659 --> 00:20:48,450

the four-year-old like what about black

476

00:20:53,690 --> 00:20:50,669

holes didn't you know and I just asked

477

00:20:57,409 --> 00:20:53,700

my questions and she patiently answers

478

00:20:59,659 --> 00:20:57,419

all of my questions so it's it's it's

479

00:21:02,330 --> 00:20:59,669

been wonderful and an absolute honor to

480

00:21:05,090 --> 00:21:02,340

work with her over these twelve years as

481

00:21:08,539 --> 00:21:05,100

you said just we just wrapped up episode

482

00:21:10,490 --> 00:21:08,549

500 of the of the podcast and we're

483

00:21:12,680 --> 00:21:10,500

still going strong so it's amazing and

484

00:21:14,749 --> 00:21:12,690

now I somehow found out about your

485

00:21:17,180 --> 00:21:14,759

podcast and actually listened to the

486

00:21:19,490 --> 00:21:17,190

very first one when it came out I think

487

00:21:21,049 --> 00:21:19,500

I wrote that in the email to you I was

488

00:21:23,119 --> 00:21:21,059

in about living in California at the

489

00:21:24,950 --> 00:21:23,129

time and it was my son who contacted me

490

00:21:27,799 --> 00:21:24,960

said hey check out this new podcast is

491

00:21:30,049 --> 00:21:27,809

coming out and so I think it was maybe

492

00:21:31,519 --> 00:21:30,059

either the first or second episode but I

493

00:21:34,100 --> 00:21:31,529

do remember I did listen to the first

494

00:21:36,799 --> 00:21:34,110

episode so um and you pretty much state

495

00:21:37,970 --> 00:21:36,809

very consistent I know you went to you

496

00:21:39,350 --> 00:21:37,980

changed a little bit you were doing

497

00:21:41,090 --> 00:21:39,360

Google Hangouts with a whole bunch of

498

00:21:43,610 --> 00:21:41,100

people at one time I remember that

499

00:21:45,320 --> 00:21:43,620

transition and then now it's back to

500

00:21:45,680 --> 00:21:45,330

just you and Pamela again it's really

501
00:21:53,360 --> 00:21:45,690
good

502
00:21:55,999 --> 00:21:53,370
doing what we used to do the shows like

503
00:21:58,249 --> 00:21:56,009
we would record the episode over Skype

504
00:22:01,789 --> 00:21:58,259
kind of like what you're doing but we

505
00:22:03,259 --> 00:22:01,799
would you know it was just a utility for

506
00:22:05,810 --> 00:22:03,269
us to be able to record the show and

507
00:22:07,279 --> 00:22:05,820
then when it was done we would process

508
00:22:09,200 --> 00:22:07,289
the audio and release it as a podcast

509
00:22:11,899 --> 00:22:09,210
and then at some point I think in like

510
00:22:13,970 --> 00:22:11,909
2011 2012 I had the bright idea that we

511
00:22:19,999 --> 00:22:13,980
should switch to doing this show was a

512
00:22:24,350 --> 00:22:20,009
live show to bring in the the live

513
00:22:26,570 --> 00:22:24,360

audience aspect of it and and I that set

514

00:22:28,730 --> 00:22:26,580

us on a whole new path and we still do

515

00:22:32,180 --> 00:22:28,740

it so every episode we do is a live

516

00:22:33,740 --> 00:22:32,190

episode half an hour of it is is the two

517

00:22:35,029 --> 00:22:33,750

of us hanging out and doing the actual

518

00:22:37,129 --> 00:22:35,039

episode and the other half hours that's

519

00:22:38,630 --> 00:22:37,139

just answering questions and interacting

520

00:22:41,810 --> 00:22:38,640

with the audience and

521

00:22:45,530 --> 00:22:41,820

it's there is nothing like doing a live

522

00:22:46,850 --> 00:22:45,540

show for for helping you focusing your

523

00:22:48,380 --> 00:22:46,860

brain helping you understand what you

524

00:22:50,780 --> 00:22:48,390

don't what you don't know because you're

525

00:22:52,720 --> 00:22:50,790

you're on the spot all the time and so I

526
00:22:55,010 --> 00:22:52,730
highly recommend it for anybody who

527
00:22:59,210 --> 00:22:55,020
wants to create some kind of content and

528
00:23:01,880 --> 00:22:59,220
and wants to take their I guess what

529
00:23:03,560 --> 00:23:01,890
they do to the next level turn it into a

530
00:23:05,740 --> 00:23:03,570
live show and answer people's questions

531
00:23:08,780 --> 00:23:05,750
and you will be amazed at how quickly

532
00:23:11,030 --> 00:23:08,790
all of the puzzle pieces fit into your

533
00:23:12,260 --> 00:23:11,040
into your brain but but I think you're

534
00:23:13,580 --> 00:23:12,270
what you're probably talking about is

535
00:23:15,740 --> 00:23:13,590
the weekly space hangout so that's a

536
00:23:18,260 --> 00:23:15,750
separate show which is very similar to

537
00:23:19,880 --> 00:23:18,270
your news part where different space

538
00:23:22,700 --> 00:23:19,890

journalists join me and we talked about

539

00:23:24,230 --> 00:23:22,710

the big events of the week and and so

540

00:23:25,370 --> 00:23:24,240

there's sort of - shall we do so many

541

00:23:27,320 --> 00:23:25,380

shows now it's kind of hard to keep

542

00:23:30,080 --> 00:23:27,330

track of them all yes and you have your

543

00:23:32,030 --> 00:23:30,090

own YouTube channel which is a very very

544

00:23:33,970 --> 00:23:32,040

active it and by the way really nice

545

00:23:36,850 --> 00:23:33,980

production on your videos on that -

546

00:23:39,350 --> 00:23:36,860

thank you so much a lot of work on that

547

00:23:40,549 --> 00:23:39,360

yeah yeah I know and it's it's funny if

548

00:23:42,560 --> 00:23:40,559

you go right back to the beginning you

549

00:23:44,470 --> 00:23:42,570

can see our first experiments they were

550

00:23:47,510 --> 00:23:44,480

a couple of minutes long and it was me

551
00:23:48,919 --> 00:23:47,520
sort of slouching in a forest and we

552
00:23:51,860 --> 00:23:48,929
showed a couple of pictures and now the

553
00:23:52,549 --> 00:23:51,870
new ones are 15 sometimes 20 minutes

554
00:23:56,390 --> 00:23:52,559
long

555
00:23:58,520 --> 00:23:56,400
very 4k video almost the entire thing

556
00:24:00,919 --> 00:23:58,530
has just really beautiful background

557
00:24:03,919 --> 00:24:00,929
graphics that we're using so so it's in

558
00:24:06,860 --> 00:24:03,929
this learning probably took us 360

559
00:24:08,390 --> 00:24:06,870
episodes to to learn know all the little

560
00:24:11,419 --> 00:24:08,400
lessons that we wanted to get to where

561
00:24:13,970 --> 00:24:11,429
we are now and we're only really still a

562
00:24:16,669 --> 00:24:13,980
tiny piece along the journey as we learn

563
00:24:18,260 --> 00:24:16,679

to make better space content yes

564

00:24:20,810 --> 00:24:18,270

well by the way I do agree with you

565

00:24:23,510 --> 00:24:20,820

about the live show aspect I've been

566

00:24:24,950 --> 00:24:23,520

doing I don't know maybe three years or

567

00:24:27,980 --> 00:24:24,960

something like that live maybe longer

568

00:24:29,600 --> 00:24:27,990

live shows and it's horrifying but at

569

00:24:32,240 --> 00:24:29,610

the same time you're right it keeps you

570

00:24:34,280 --> 00:24:32,250

sharp and and I like won't go back to a

571

00:24:36,470 --> 00:24:34,290

recorded show now unless I have to for

572

00:24:38,030 --> 00:24:36,480

some reason yeah there's something nice

573

00:24:41,000 --> 00:24:38,040

to be able to just like record the show

574

00:24:43,220 --> 00:24:41,010

it's done no it's not - you have to edit

575

00:24:47,570 --> 00:24:43,230

it it's just finished you did it I move

576

00:24:48,650 --> 00:24:47,580

on right right so I in our conversation

577

00:24:51,350 --> 00:24:48,660

ahead of the show I mentioned to you

578

00:24:51,900 --> 00:24:51,360

that I wanted to discuss you fos for a

579

00:24:54,630 --> 00:24:51,910

little bit

580

00:24:56,130 --> 00:24:54,640

show and and then I have a whole bunch

581

00:24:58,290 --> 00:24:56,140

of space stuff I'd like to talk about

582

00:25:01,100 --> 00:24:58,300

sure however you want to balance it out

583

00:25:04,470 --> 00:25:01,110

I'm cool with either either topic okay

584

00:25:06,690 --> 00:25:04,480

I'm a fan of I'm not I wouldn't even

585

00:25:08,160 --> 00:25:06,700

call myself an amateur astronomer or

586

00:25:10,230 --> 00:25:08,170

anything like that I'm just a fan of

587

00:25:14,040 --> 00:25:10,240

astronomy that's the best way I'd put it

588

00:25:15,870 --> 00:25:14,050

and I'm also I'm not a ufologist so to

589

00:25:17,730 --> 00:25:15,880

speak I'm someone that talks to people

590

00:25:20,610 --> 00:25:17,740

about UFOs and gets their ideas and

591

00:25:24,750 --> 00:25:20,620

that's why I have all kinds of people on

592

00:25:28,260 --> 00:25:24,760

the show I did my first UFO debate when

593

00:25:31,590 --> 00:25:28,270

I was only 20 episodes in with dr. seth

594

00:25:36,090 --> 00:25:31,600

shostack at SETI and he really crushed

595

00:25:37,740 --> 00:25:36,100

me that was so and I'm not saying that

596

00:25:41,310 --> 00:25:37,750

I'm good at debating and I'm not really

597

00:25:44,970 --> 00:25:41,320

looking for a debate but I in our email

598

00:25:46,500 --> 00:25:44,980

exchange I sense that you were did not

599

00:25:48,870 --> 00:25:46,510

think there was anything to the UFO

600

00:25:53,460 --> 00:25:48,880

topic so I guess I'll ask you do you

601
00:25:56,010 --> 00:25:53,470
think there's anything to UFOs no I and

602
00:25:57,930 --> 00:25:56,020
we can kind of go into it for sure and I

603
00:26:00,780 --> 00:25:57,940
can sort of explain my perspective on it

604
00:26:03,720 --> 00:26:00,790
but but do I think that the earth is

605
00:26:06,810 --> 00:26:03,730
being regularly visited by aliens from

606
00:26:09,660 --> 00:26:06,820
another world no I don't think so is

607
00:26:11,540 --> 00:26:09,670
that this or and and and to sort of more

608
00:26:14,820 --> 00:26:11,550
specifically say it is that I am

609
00:26:18,360 --> 00:26:14,830
unconvinced of any of the evidence that

610
00:26:20,820 --> 00:26:18,370
says that we are that's also all right

611
00:26:26,070 --> 00:26:20,830
there is nothing that okay oh go ahead

612
00:26:28,590 --> 00:26:26,080
yeah what about people that are really

613
00:26:30,420 --> 00:26:28,600

have to have real credible people that

614

00:26:32,370 --> 00:26:30,430

have had really credible sightings that

615

00:26:33,930 --> 00:26:32,380

are unexplainable and sometimes mass

616

00:26:35,850 --> 00:26:33,940

sightings I mean I could go into a

617

00:26:36,540 --> 00:26:35,860

number of sightings and I'm not saying

618

00:26:38,610 --> 00:26:36,550

that there

619

00:26:41,040 --> 00:26:38,620

I'm not also jumping on the alien

620

00:26:43,020 --> 00:26:41,050

bandwagon because I don't care how long

621

00:26:45,540 --> 00:26:43,030

anyone's been doing what I'm doing as

622

00:26:47,190 --> 00:26:45,550

far as I know no one really knows what's

623

00:26:49,560 --> 00:26:47,200

going on but they know something's going

624

00:26:51,510 --> 00:26:49,570

on and that's and that's you know the

625

00:26:54,120 --> 00:26:51,520

questions I'd like to ask you what do

626
00:26:56,220 --> 00:26:54,130
you think is there something to the

627
00:26:58,260 --> 00:26:56,230
sightings that the 30,000 sightings a

628
00:27:00,090 --> 00:26:58,270
year or whatever it is with a small

629
00:27:01,500 --> 00:27:00,100
portion of them unexplainable do you

630
00:27:02,970 --> 00:27:01,510
think there's something yeah I mean I

631
00:27:05,400 --> 00:27:02,980
think it's important to just go back to

632
00:27:09,000 --> 00:27:05,410
the term right unidentified flying

633
00:27:11,340 --> 00:27:09,010
so so things are unidentified and they

634
00:27:13,110 --> 00:27:11,350
are flying and they are objects and I

635
00:27:15,300 --> 00:27:13,120
think it's a perfectly rational way to

636
00:27:16,470 --> 00:27:15,310
describe a thing that's flying through

637
00:27:20,730 --> 00:27:16,480
the air that you don't know what it is

638
00:27:23,310 --> 00:27:20,740

and and and so for you to then for

639

00:27:25,140 --> 00:27:23,320

anybody to make a to then take that and

640

00:27:30,180 --> 00:27:25,150

make a leap to say that they know what

641

00:27:31,980 --> 00:27:30,190

it is that is that is sort of jumping to

642

00:27:34,230 --> 00:27:31,990

a conclusion before you've gathered the

643

00:27:38,610 --> 00:27:34,240

evidence for for what it is that you

644

00:27:40,920 --> 00:27:38,620

found and the most fundamental question

645

00:27:43,710 --> 00:27:40,930

the deepest most important question that

646

00:27:46,710 --> 00:27:43,720

we can ask ourselves as human beings as

647

00:27:49,290 --> 00:27:46,720

as sentient creatures here in this tiny

648

00:27:53,580 --> 00:27:49,300

rock floating in the middle of this vast

649

00:27:55,410 --> 00:27:53,590

cosmos is are we alone right it is the

650

00:27:58,920 --> 00:27:55,420

most it is the most important question

651
00:28:01,410 --> 00:27:58,930
that we can possibly ask and and it's

652
00:28:05,370 --> 00:28:01,420
it's definitely not an understatement to

653
00:28:08,460 --> 00:28:05,380
say that I've dedicated my life to to

654
00:28:11,280 --> 00:28:08,470
helping in that search to helping to

655
00:28:15,120 --> 00:28:11,290
communicate that search to help people

656
00:28:18,720 --> 00:28:15,130
sort of come to grips with the the

657
00:28:20,910 --> 00:28:18,730
wonder and scale of this search for life

658
00:28:23,160 --> 00:28:20,920
in the universe I would say probably a

659
00:28:26,160 --> 00:28:23,170
third or a quarter of the episodes that

660
00:28:31,230 --> 00:28:26,170
I do on my youtube channel are in some

661
00:28:33,240 --> 00:28:31,240
way connected to this topic so there is

662
00:28:35,120 --> 00:28:33,250
in my mind no more important question

663
00:28:38,970 --> 00:28:35,130

that you can possibly ask it it

664

00:28:44,340 --> 00:28:38,980

fascinates me it's the paradox of why we

665

00:28:45,930 --> 00:28:44,350

don't have evidence for aliens haunts me

666

00:28:47,550 --> 00:28:45,940

you always go back to that arthur c

667

00:28:49,980 --> 00:28:47,560

clarke question like you do the universe

668

00:28:55,440 --> 00:28:49,990

is there were alone in the universe and

669

00:28:58,020 --> 00:28:55,450

all that yeah yeah right like if we're

670

00:29:00,120 --> 00:28:58,030

alone that's weird because the universe

671

00:29:02,090 --> 00:29:00,130

is big and it's old and life on Earth

672

00:29:05,730 --> 00:29:02,100

form the moment that it could have and

673

00:29:07,770 --> 00:29:05,740

there's no reason under the laws of

674

00:29:09,390 --> 00:29:07,780

physics why aliens why there shouldn't

675

00:29:11,070 --> 00:29:09,400

be a way that a technological

676

00:29:15,240 --> 00:29:11,080

civilization should be able to travel

677

00:29:18,720 --> 00:29:15,250

from world to world those all seem like

678

00:29:19,320 --> 00:29:18,730

they're Givens and yet where is the you

679

00:29:21,090 --> 00:29:19,330

know but then

680

00:29:22,560 --> 00:29:21,100

where is the evidence and so just just

681

00:29:25,290 --> 00:29:22,570

to finish this up and so I feel like

682

00:29:28,590 --> 00:29:25,300

with a question that's that important

683

00:29:30,900 --> 00:29:28,600

that that is that that fundamental where

684

00:29:33,810 --> 00:29:30,910

the ramifications of the answer would

685

00:29:35,100 --> 00:29:33,820

have would have implications to every

686

00:29:37,500 --> 00:29:35,110

part of our society

687

00:29:39,060 --> 00:29:37,510

you just want you want to be sure you

688

00:29:41,370 --> 00:29:39,070

want to feel like the evidence that has

689

00:29:43,890 --> 00:29:41,380

been gathered really supports the

690

00:29:48,090 --> 00:29:43,900

conclusion that it turns out we're not

691

00:29:49,320 --> 00:29:48,100

alone in the universe and so so people

692

00:29:50,730 --> 00:29:49,330

always ask me like do I believe in

693

00:29:53,340 --> 00:29:50,740

aliens and my answer is always just like

694

00:29:56,040 --> 00:29:53,350

I am unconvinced by the evidence that

695

00:29:57,570 --> 00:29:56,050

has been provided so far I absolutely

696

00:29:59,820 --> 00:29:57,580

believe that there are things that are I

697

00:30:02,730 --> 00:29:59,830

done identified and they are flying and

698

00:30:06,000 --> 00:30:02,740

they are objects but I don't have a way

699

00:30:07,710 --> 00:30:06,010

to say what they are and and and I don't

700

00:30:09,030 --> 00:30:07,720

believe that any that any of the

701
00:30:13,470 --> 00:30:09,040
evidence that has been provided so far

702
00:30:15,740 --> 00:30:13,480
indicates that they're aliens aliens

703
00:30:18,660 --> 00:30:15,750
well I'll agree with you on that because

704
00:30:20,880 --> 00:30:18,670
I also say you know I've said a number

705
00:30:22,830 --> 00:30:20,890
of times on the show that if someone

706
00:30:26,850 --> 00:30:22,840
tells you they know exactly what these

707
00:30:29,910 --> 00:30:26,860
things are then run because no one

708
00:30:31,500 --> 00:30:29,920
really knows and the reason if it does

709
00:30:35,010 --> 00:30:31,510
boil down to evidence we don't really

710
00:30:37,530 --> 00:30:35,020
know for sure but I do believe I have an

711
00:30:40,050 --> 00:30:37,540
open mind in the topic of course because

712
00:30:42,810 --> 00:30:40,060
I had a I had a go fo studying that I

713
00:30:45,390 --> 00:30:42,820

absolutely could not explain what it was

714

00:30:46,980 --> 00:30:45,400

and it it's no technology that I don't

715

00:30:50,160 --> 00:30:46,990

think we've ever had the technology that

716

00:30:54,390 --> 00:30:50,170

I saw and I do want to talk a little bit

717

00:30:56,940 --> 00:30:54,400

about that too but so I think my

718

00:30:59,840 --> 00:30:56,950

personal view is that it is it's

719

00:31:03,630 --> 00:30:59,850

possible that we are being visited by

720

00:31:05,280 --> 00:31:03,640

alien intelligence and so and the reason

721

00:31:07,670 --> 00:31:05,290

I think it's possible is a number of

722

00:31:09,780 --> 00:31:07,680

reasons first of all we're very young

723

00:31:11,550 --> 00:31:09,790

civilization compared to what could be

724

00:31:14,970 --> 00:31:11,560

out there I mean we're a young solar

725

00:31:18,750 --> 00:31:14,980

system so and on and on and if you think

726
00:31:19,650 --> 00:31:18,760
about if some 150 years ago if we handed

727
00:31:22,080 --> 00:31:19,660
the Milwaukee talkie

728
00:31:23,520 --> 00:31:22,090
today's walkie talkie you know that they

729
00:31:26,700 --> 00:31:23,530
wouldn't understand it you know perhaps

730
00:31:28,650 --> 00:31:26,710
an intelligence out there has and I

731
00:31:30,630 --> 00:31:28,660
think you kind of alluded to this has

732
00:31:32,670 --> 00:31:30,640
learned how to travel the Stars has

733
00:31:33,330 --> 00:31:32,680
learned the physics of how to do it what

734
00:31:36,180 --> 00:31:33,340
other it's been

735
00:31:39,870 --> 00:31:36,190
spacetime whatever it is so it is

736
00:31:43,440 --> 00:31:39,880
possible that we could be being visited

737
00:31:46,200 --> 00:31:43,450
otherwise we have to come up with what

738
00:31:48,120 --> 00:31:46,210

what else you know what other thoughts

739

00:31:49,920 --> 00:31:48,130

could it be could it be interdimensional

740

00:31:52,590 --> 00:31:49,930

there's people that think it could be

741

00:31:54,150 --> 00:31:52,600

that or time travel or you know all

742

00:31:57,350 --> 00:31:54,160

kinds of things but there's definitely

743

00:31:59,520 --> 00:31:57,360

something weird going on and have you

744

00:32:02,520 --> 00:31:59,530

have I'm not sure that there's anything

745

00:32:04,670 --> 00:32:02,530

weird going on but so so you know we can

746

00:32:07,170 --> 00:32:04,680

even have a conversation about that but

747

00:32:08,790 --> 00:32:07,180

but it's late and until that's all it

748

00:32:14,130 --> 00:32:08,800

really it's just like what does it take

749

00:32:17,130 --> 00:32:14,140

to convince you right so so if you if if

750

00:32:20,850 --> 00:32:17,140

you show me a box and the box is closed

751
00:32:23,580 --> 00:32:20,860
and you say what's in the box my answer

752
00:32:24,960 --> 00:32:23,590
is I don't know right I can make some

753
00:32:26,370 --> 00:32:24,970
guesses about the size of things that

754
00:32:27,900 --> 00:32:26,380
could be in there but really at the end

755
00:32:29,820 --> 00:32:27,910
the answer is I don't know one until I

756
00:32:32,340 --> 00:32:29,830
can open the box and look inside and

757
00:32:35,070 --> 00:32:32,350
study then I can make some conclusions

758
00:32:38,190 --> 00:32:35,080
and so I feel like the only honest

759
00:32:40,530 --> 00:32:38,200
answer to say is I don't know and then I

760
00:32:43,050 --> 00:32:40,540
let the evidence convince me either way

761
00:32:44,670 --> 00:32:43,060
right so if if if something can be

762
00:32:47,070 --> 00:32:44,680
provided that is compelling evidence and

763
00:32:52,260 --> 00:32:47,080

I will change my position and heartbeat

764

00:32:54,300 --> 00:32:52,270

right you have experienced or you

765

00:32:57,140 --> 00:32:54,310

believe or that you have seen something

766

00:33:01,350 --> 00:32:57,150

that you know that you couldn't explain

767

00:33:04,650 --> 00:33:01,360

but but you can't make the leap or I

768

00:33:06,090 --> 00:33:04,660

don't think it's the right thing to make

769

00:33:08,160 --> 00:33:06,100

the leap to then D and then you know

770

00:33:10,170 --> 00:33:08,170

what it is because then that closes you

771

00:33:12,900 --> 00:33:10,180

down to the possibilities for what it

772

00:33:14,550 --> 00:33:12,910

could be sure and so it's sort of more

773

00:33:16,470 --> 00:33:14,560

like for now you're like I saw something

774

00:33:21,650 --> 00:33:16,480

super weird and I don't know what it was

775

00:33:26,220 --> 00:33:21,660

and until I have some way of knowing

776

00:33:28,350 --> 00:33:26,230

that trail ends there for now and then

777

00:33:29,880 --> 00:33:28,360

hopefully later on something some new

778

00:33:31,920 --> 00:33:29,890

piece of information is gonna come your

779

00:33:33,240 --> 00:33:31,930

way someone's gonna go oh turns out

780

00:33:35,130 --> 00:33:33,250

there's a flight that was going here was

781

00:33:37,290 --> 00:33:35,140

a new stealth bomber that was being

782

00:33:38,610 --> 00:33:37,300

tested by the the Air Force and they've

783

00:33:40,560 --> 00:33:38,620

written you a personal letter and

784

00:33:42,540 --> 00:33:40,570

they've apologized for freaking you out

785

00:33:45,180 --> 00:33:42,550

and here's all the evidence you're like

786

00:33:47,160 --> 00:33:45,190

oh okay new stealth aircraft got it

787

00:33:50,460 --> 00:33:47,170

okay evidence supplied and now I'm can

788

00:33:51,780 --> 00:33:50,470

minced but until then yeah it has to

789

00:33:55,290 --> 00:33:51,790
remain in me in the I don't know

790

00:33:59,070 --> 00:33:55,300
category right have you heard of the you

791

00:34:01,980 --> 00:33:59,080
USS Nimitz case in 2004 there was a lot

792

00:34:05,370 --> 00:34:01,990
of talk about it that was you know the

793

00:34:07,980 --> 00:34:05,380
Navy was involved and there was there

794

00:34:09,990 --> 00:34:07,990
was some filming how about did you

795

00:34:12,570 --> 00:34:10,000
happen to pay attention when the the

796

00:34:15,720 --> 00:34:12,580
story came out December 16th last year

797

00:34:18,060 --> 00:34:15,730
about the Pentagon's search for UFOs I'd

798

00:34:19,950 --> 00:34:18,070
heard a bit about this yeah and you know

799

00:34:21,900 --> 00:34:19,960
I didn't look too deeply into it because

800

00:34:25,440 --> 00:34:21,910
it looked to me like a lot of blobs

801
00:34:27,540 --> 00:34:25,450
moving on on a TV screen so on the

802
00:34:29,010 --> 00:34:27,550
particular that particular video about

803
00:34:32,400 --> 00:34:29,020
faith just the fact that they were

804
00:34:35,250 --> 00:34:32,410
looking into the into the topic alone

805
00:34:38,220 --> 00:34:35,260
yeah they actually and you can see why

806
00:34:42,480 --> 00:34:38,230
they would write like like again the

807
00:34:45,180 --> 00:34:42,490
existence of aliens capable of traveling

808
00:34:47,280 --> 00:34:45,190
from world to world means someone

809
00:34:48,570 --> 00:34:47,290
essentially is technologically way

810
00:34:50,240 --> 00:34:48,580
beyond anything that we can possibly

811
00:34:55,680 --> 00:34:50,250
comprehend it would be a serious threat

812
00:34:57,630 --> 00:34:55,690
to earth and to the existing nations and

813
00:34:59,790 --> 00:34:57,640

and all of that right it would be a it

814

00:35:02,370 --> 00:34:59,800

would be an existential threat so it

815

00:35:04,890 --> 00:35:02,380

definitely makes sense to have a look

816

00:35:06,390 --> 00:35:04,900

around to just see if you can understand

817

00:35:08,490 --> 00:35:06,400

what's going on there and then gather

818

00:35:12,120 --> 00:35:08,500

any evidence that you can find that's

819

00:35:14,480 --> 00:35:12,130

right so let's see I think it was called

820

00:35:18,690 --> 00:35:14,490

something like the advanced aerospace

821

00:35:20,430 --> 00:35:18,700

threat investigation program I believe

822

00:35:21,900 --> 00:35:20,440

that's what they call that so I had

823

00:35:24,660 --> 00:35:21,910

threat right in the work you know right

824

00:35:27,300 --> 00:35:24,670

in the title mm-hmm which yeah doesn't

825

00:35:28,350 --> 00:35:27,310

make total sense yeah and if I was part

826

00:35:31,290 --> 00:35:28,360

of the Defense Department I would

827

00:35:33,450 --> 00:35:31,300

absolutely throw some money to some

828

00:35:35,580 --> 00:35:33,460

astronomers to point their telescopes in

829

00:35:37,500 --> 00:35:35,590

this guy and see if there's anything out

830

00:35:40,350 --> 00:35:37,510

there and you know there have been

831

00:35:44,150 --> 00:35:40,360

plenty of civilian attempts to perform

832

00:35:46,290 --> 00:35:44,160

really comprehensive searches of the sky

833

00:35:48,540 --> 00:35:46,300

you know some really interesting stuff

834

00:35:51,930 --> 00:35:48,550

that I love to report on there's a lot

835

00:35:55,020 --> 00:35:51,940

of really great people are searching for

836

00:35:58,200 --> 00:35:55,030

evidence of advanced civilizations that

837

00:35:59,730 --> 00:35:58,210

have that have sort of messed up their

838

00:36:01,739 --> 00:35:59,740

atmospheres to the point that we could

839

00:36:03,870 --> 00:36:01,749

actually detect them

840

00:36:05,489 --> 00:36:03,880

other you know the kinds of

841

00:36:08,640 --> 00:36:05,499

civilizations that maybe have enclosed

842

00:36:13,140 --> 00:36:08,650

their entire star in a in a Dyson Sphere

843

00:36:16,019 --> 00:36:13,150

too to be able to utilize all the power

844

00:36:19,919 --> 00:36:16,029

coming from the star other potentially a

845

00:36:22,739 --> 00:36:19,929

civilization has wrapped up all of their

846

00:36:24,689 --> 00:36:22,749

stars in their entire galaxy in Dyson

847

00:36:25,829 --> 00:36:24,699

spheres and and these are the kind they

848

00:36:28,019 --> 00:36:25,839

would actually give off a fairly

849

00:36:30,059 --> 00:36:28,029

telltale signature that we could see

850

00:36:31,499 --> 00:36:30,069

here on earth and comprehensive searches

851

00:36:32,999 --> 00:36:31,509

have actually been done for a lot of

852

00:36:35,309 --> 00:36:33,009

this stuff I think you've actually

853

00:36:37,919 --> 00:36:35,319

talked about that on your show the type

854

00:36:40,049 --> 00:36:37,929

1 type 2 submissions that type of thing

855

00:36:41,939 --> 00:36:40,059

yeah yeah I think that's really

856

00:36:43,679 --> 00:36:41,949

fascinating in I know there was some

857

00:36:46,229 --> 00:36:43,689

question out there I think it was am I

858

00:36:50,219 --> 00:36:46,239

thinking the table star where there was

859

00:36:51,989 --> 00:36:50,229

a strange yeah yeah yeah and that you

860

00:36:54,689 --> 00:36:51,999

know one possibility for that was that

861

00:36:56,880 --> 00:36:54,699

it was a an alien mega-structure in the

862

00:36:59,549 --> 00:36:56,890

process of construction which is a

863

00:37:02,429 --> 00:36:59,559

pretty fascinating and incredibly

864

00:37:03,959 --> 00:37:02,439

unlikely answer for for it you know the

865

00:37:06,120 --> 00:37:03,969

other answer was that it's probably dust

866

00:37:08,759 --> 00:37:06,130

and now it turns out that it was dust

867

00:37:11,339 --> 00:37:08,769

yeah yeah they did Mike for the person

868

00:37:13,709 --> 00:37:11,349

that isn't aware they did make more of a

869

00:37:19,009 --> 00:37:13,719

comprehensive discovery of what that

870

00:37:21,390 --> 00:37:19,019

actually was but so do you think that

871

00:37:24,029 --> 00:37:21,400

programs like SETI do you think programs

872

00:37:26,429 --> 00:37:24,039

like SETI have a good value or do that

873

00:37:28,140 --> 00:37:26,439

absolutely you do good yeah yeah I mean

874

00:37:30,120 --> 00:37:28,150

look it back to what I said right is the

875

00:37:31,769 --> 00:37:30,130

most important question that we could

876

00:37:34,559 --> 00:37:31,779

possibly you know is it important to

877

00:37:36,329 --> 00:37:34,569

spend energy and money on them on that

878

00:37:39,209 --> 00:37:36,339

fundamental question absolutely and

879

00:37:41,669 --> 00:37:39,219

there are some incredible ways that that

880

00:37:43,769 --> 00:37:41,679

we should be doing this SETI is just one

881

00:37:47,370 --> 00:37:43,779

the SETI Institute is doing wonderful

882

00:37:49,529 --> 00:37:47,380

work trying to point more and more radio

883

00:37:51,689 --> 00:37:49,539

telescopes at more and more stars to try

884

00:37:53,219 --> 00:37:51,699

and and see if you can detect any

885

00:37:58,319 --> 00:37:53,229

signals that would be coming from these

886

00:38:00,149 --> 00:37:58,329

other stars there there are new space

887

00:38:02,309 --> 00:38:00,159

telescopes in the works like the James

888

00:38:05,189 --> 00:38:02,319

Webb Space Telescope and one of its

889

00:38:07,380 --> 00:38:05,199

abilities is going to be to scan the

890

00:38:08,029 --> 00:38:07,390

atmosphere of planets orbiting other

891

00:38:11,689 --> 00:38:08,039

stars

892

00:38:14,670 --> 00:38:11,699

searching for bio signatures looking for

893

00:38:17,490 --> 00:38:14,680

evidence that there is

894

00:38:19,320 --> 00:38:17,500

some kind of life there that is it you

895

00:38:20,490 --> 00:38:19,330

know modifying the atmosphere of their

896

00:38:24,570 --> 00:38:20,500

planet

897

00:38:26,460 --> 00:38:24,580

you've got other ideas like just and

898

00:38:29,310 --> 00:38:26,470

other methods of searching for life here

899

00:38:31,650 --> 00:38:29,320

in the solar system you've got the the

900

00:38:32,490 --> 00:38:31,660

Mars rovers which are searching on the

901
00:38:35,370 --> 00:38:32,500
surface of Mars

902
00:38:38,160 --> 00:38:35,380
you've got instruments searching the

903
00:38:40,440 --> 00:38:38,170
methane in the Martian atmosphere which

904
00:38:44,190 --> 00:38:40,450
could potentially be a byproduct of life

905
00:38:45,990 --> 00:38:44,200
and then you've got the the potential

906
00:38:49,200 --> 00:38:46,000
for life in some of these icy ocean

907
00:38:52,380 --> 00:38:49,210
world like Enceladus and Europa and NASA

908
00:38:54,780 --> 00:38:52,390
sending a mission back to Europa whose

909
00:38:57,630 --> 00:38:54,790
job is to fly through and near these

910
00:39:01,140 --> 00:38:57,640
amazing pollutants that are of water ice

911
00:39:04,230 --> 00:39:01,150
they're spewing out of of Europa to

912
00:39:09,390 --> 00:39:04,240
sense if there's the chemicals of life

913
00:39:11,760 --> 00:39:09,400

in there so they're I you know if I

914

00:39:13,950 --> 00:39:11,770

could move wave a magic wand and

915

00:39:15,630 --> 00:39:13,960

increase budget I would I would really

916

00:39:18,750 --> 00:39:15,640

love to increase the budget that's going

917

00:39:22,110 --> 00:39:18,760

to SETI to a lot of these because we are

918

00:39:24,090 --> 00:39:22,120

now in striking distance of of getting

919

00:39:27,180 --> 00:39:24,100

an answer to this question if if we're

920

00:39:28,740 --> 00:39:27,190

alone like amazingly and I bring up this

921

00:39:30,300 --> 00:39:28,750

stack is it so wonderful there's a

922

00:39:32,580 --> 00:39:30,310

there's a next generation telescope

923

00:39:34,800 --> 00:39:32,590

that's gonna come out after James Webb

924

00:39:40,320 --> 00:39:34,810

called the Louvre are the large

925

00:39:43,740 --> 00:39:40,330

ultraviolet infrared telescope okay and

926
00:39:45,870 --> 00:39:43,750
it is it's gonna be an 18 meter 15 to 18

927
00:39:48,870 --> 00:39:45,880
meter Space Telescope so when you

928
00:39:53,210 --> 00:39:48,880
consider the Hubble is 2.6 meters James

929
00:39:56,160 --> 00:39:53,220
Webb is like seven meters this would be

930
00:39:57,990 --> 00:39:56,170
you know a dramatically larger amount of

931
00:40:00,300 --> 00:39:58,000
resolving power and one of the things

932
00:40:02,640 --> 00:40:00,310
that it should be able to do is observe

933
00:40:06,900 --> 00:40:02,650
the atmospheres of enough worlds around

934
00:40:08,700 --> 00:40:06,910
us to know with 90% accuracy whether

935
00:40:10,920 --> 00:40:08,710
there's life on any of those other

936
00:40:13,980 --> 00:40:10,930
worlds or essentially to know for a loan

937
00:40:18,840 --> 00:40:13,990
in the universe so we within 20 years

938
00:40:21,660 --> 00:40:18,850

can answer to a 90% accuracy to say

939

00:40:23,520 --> 00:40:21,670

we're alone or actually here's how many

940

00:40:25,920 --> 00:40:23,530

worlds this is what percentage of worlds

941

00:40:27,640 --> 00:40:25,930

have life on them and even here's what

942

00:40:29,410 --> 00:40:27,650

percentage of worlds out there have in

943

00:40:32,740 --> 00:40:29,420

industrial civilizations on them so it's

944

00:40:35,700 --> 00:40:32,750

a it's an amazing time we are just

945

00:40:38,260 --> 00:40:35,710

decades now away from being able to get

946

00:40:39,940 --> 00:40:38,270

answers to what thought what we used to

947

00:40:43,840 --> 00:40:39,950

think we're philosophical questions

948

00:40:46,330 --> 00:40:43,850

right right just I want to go back to

949

00:40:49,000 --> 00:40:46,340

Martha in just a little bit because I

950

00:40:51,670 --> 00:40:49,010

have some questions about that but I

951
00:40:54,190 --> 00:40:51,680
just wanted to talk quick story on

952
00:40:56,500 --> 00:40:54,200
something you said reminded me of it

953
00:40:57,940 --> 00:40:56,510
so a friend of the show became a friend

954
00:41:01,090 --> 00:40:57,950
of the show because he was actually an

955
00:41:03,910 --> 00:41:01,100
astronomer in England and his story when

956
00:41:05,740 --> 00:41:03,920
he he started listening to my show and

957
00:41:07,690 --> 00:41:05,750
he wrote me an email and he actually

958
00:41:12,100 --> 00:41:07,700
came on the show and did astronomy news

959
00:41:14,410 --> 00:41:12,110
basically for a while but anyway the

960
00:41:15,940 --> 00:41:14,420
reason he got in touch with me and all

961
00:41:18,160 --> 00:41:15,950
that he was he was telling me he was

962
00:41:20,170 --> 00:41:18,170
walking across he didn't say a field

963
00:41:22,960 --> 00:41:20,180

whatever it was in England with his

964

00:41:24,790 --> 00:41:22,970

telescope over a tripod over his

965

00:41:27,160 --> 00:41:24,800

shoulder and he said all of a sudden

966

00:41:29,800 --> 00:41:27,170

this big huge it looked like half a mile

967

00:41:34,810 --> 00:41:29,810

wide triangle glided right over him and

968

00:41:38,590 --> 00:41:34,820

he says okay you know so that really got

969

00:41:41,980 --> 00:41:38,600

him interested in the topic again we're

970

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

not saying I'm like I'm I agree with you

971

00:41:47,650 --> 00:41:44,000

that it's someone shouldn't jump on the

972

00:41:50,260 --> 00:41:47,660

alien bandwagon right away but when

973

00:41:52,600 --> 00:41:50,270

people are having such strange things

974

00:41:55,150 --> 00:41:52,610

are you saying basically that you don't

975

00:41:57,640 --> 00:41:55,160

want to try to guess what it is you just

976
00:41:59,470 --> 00:41:57,650
know that it could be something yeah I

977
00:42:02,700 --> 00:41:59,480
mean that's that's I think that's the

978
00:42:05,850 --> 00:42:02,710
best way to describe it is like like

979
00:42:08,980 --> 00:42:05,860
like if a person says they saw a thing

980
00:42:11,200 --> 00:42:08,990
right then you've got two options one is

981
00:42:12,550 --> 00:42:11,210
they're not they're lying and you know

982
00:42:14,590 --> 00:42:12,560
obviously there's examples of people

983
00:42:16,840 --> 00:42:14,600
making hoax videos and you know that's

984
00:42:18,790 --> 00:42:16,850
definitely happened you look at crop

985
00:42:20,950 --> 00:42:18,800
circles and I mean the people who made

986
00:42:22,600 --> 00:42:20,960
crop circles keep trying to tell people

987
00:42:22,960 --> 00:42:22,610
how they do it and nobody will listen

988
00:42:25,240 --> 00:42:22,970

now

989

00:42:26,650 --> 00:42:25,250

right then we'll believe them that

990

00:42:28,090 --> 00:42:26,660

they're the ones who invented crop

991

00:42:32,140 --> 00:42:28,100

circles they show you exactly how they

992

00:42:34,840 --> 00:42:32,150

did it and but but you but or they saw

993

00:42:37,420 --> 00:42:34,850

something until then so then the

994

00:42:39,670 --> 00:42:37,430

question is what did they see is the

995

00:42:41,530 --> 00:42:39,680

thing did they misunderstand what it was

996

00:42:44,170 --> 00:42:41,540

that they saw and plenty of people see

997

00:42:47,530 --> 00:42:44,180

Venus or the International Space Station

998

00:42:49,960 --> 00:42:47,540

which are surprisingly bright I've had a

999

00:42:51,550 --> 00:42:49,970

few people email me and go like I'm I

1000

00:42:55,660 --> 00:42:51,560

keep every night to keep seeing this red

1001
00:42:58,210 --> 00:42:55,670
UFO to the to the east and them well

1002
00:42:59,560 --> 00:42:58,220
that's Mars right where we're Mars is

1003
00:43:01,060 --> 00:42:59,570
that it's closest brightest point right

1004
00:43:03,010 --> 00:43:01,070
now and you can see it better than you

1005
00:43:04,180 --> 00:43:03,020
can in years and that's why you never

1006
00:43:06,280 --> 00:43:04,190
notice it before is because it's

1007
00:43:08,500 --> 00:43:06,290
actually moving so either it's a thing

1008
00:43:10,090 --> 00:43:08,510
that is is actually identified and they

1009
00:43:12,820 --> 00:43:10,100
just don't know and you can imagine a

1010
00:43:16,420 --> 00:43:12,830
triangle going over your head it could

1011
00:43:18,100 --> 00:43:16,430
be geese right we have we have that here

1012
00:43:20,020 --> 00:43:18,110
but but but let's say it's something

1013
00:43:22,030 --> 00:43:20,030

else right till then it just goes into

1014

00:43:24,460 --> 00:43:22,040

the unidentified category yeah and and

1015

00:43:25,750 --> 00:43:24,470

and unless you can have a way to go back

1016

00:43:28,150 --> 00:43:25,760

and understand it better

1017

00:43:33,730 --> 00:43:28,160

it just has to remain unidentified and

1018

00:43:35,170 --> 00:43:33,740

I'm I'm more than like again I can't

1019

00:43:40,210 --> 00:43:35,180

wait to find out the answer to these

1020

00:43:45,250 --> 00:43:40,220

questions so if if people can present

1021

00:43:46,990 --> 00:43:45,260

evidence that isn't hearsay is the bet

1022

00:43:49,720 --> 00:43:47,000

and that's really the problem is you

1023

00:43:52,600 --> 00:43:49,730

want something you want a alien hyper

1024

00:43:55,600 --> 00:43:52,610

spanner hydrospanner you want to you

1025

00:43:57,100 --> 00:43:55,610

want to have an alien that you can show

1026
00:43:59,950 --> 00:43:57,110
people you want to see the spacecraft

1027
00:44:03,190 --> 00:43:59,960
land and be able to bonk on the on the

1028
00:44:05,020 --> 00:44:03,200
door so so those are the kinds of

1029
00:44:07,990 --> 00:44:05,030
evidence those that's the evidence that

1030
00:44:11,560 --> 00:44:08,000
that then makes it a compelling answer

1031
00:44:13,960 --> 00:44:11,570
to the question what is it and until you

1032
00:44:16,720 --> 00:44:13,970
can get that answer again I just feel

1033
00:44:19,780 --> 00:44:16,730
like the the most honest response is you

1034
00:44:21,820 --> 00:44:19,790
just go mom I don't know what it is yeah

1035
00:44:24,130 --> 00:44:21,830
you know I appreciate the I don't know

1036
00:44:26,800 --> 00:44:24,140
but a lot of times when like for

1037
00:44:28,750 --> 00:44:26,810
instance this does happen a lot like my

1038
00:44:30,640 --> 00:44:28,760

friend that saw the triangle go over

1039

00:44:32,140 --> 00:44:30,650

he's not the only one a lot of people

1040

00:44:34,360 --> 00:44:32,150

are for some reason or seeing these

1041

00:44:36,370 --> 00:44:34,370

triangles I mean it's unbelievable how

1042

00:44:38,500 --> 00:44:36,380

many triangular sightings they are and a

1043

00:44:40,420 --> 00:44:38,510

lot of them have lights on them and the

1044

00:44:42,190 --> 00:44:40,430

most known one that I'm aware of well

1045

00:44:45,400 --> 00:44:42,200

there was a Belgium they called the

1046

00:44:48,610 --> 00:44:45,410

Belgium flap for back in the 90s for for

1047

00:44:50,050 --> 00:44:48,620

a few years where there were so many

1048

00:44:51,940 --> 00:44:50,060

witnesses but I don't know if he ever

1049

00:44:53,770 --> 00:44:51,950

heard of the Phoenix lights have you

1050

00:44:56,050 --> 00:44:53,780

ever heard of the Phoenix lights that

1051
00:45:00,339 --> 00:44:56,060
was a sighting in FINA

1052
00:45:02,559 --> 00:45:00,349
in March of 1997 where there was

1053
00:45:04,569 --> 00:45:02,569
possibly up to well I don't know exactly

1054
00:45:06,309 --> 00:45:04,579
how many thousand people but several

1055
00:45:09,609 --> 00:45:06,319
thousand when people were outside

1056
00:45:14,680 --> 00:45:09,619
watching the comment at the time I can't

1057
00:45:16,270 --> 00:45:14,690
remember the name of it Hatake 1997 yeah

1058
00:45:17,800 --> 00:45:16,280
Hika taki and there was Hale Bopp and

1059
00:45:20,680 --> 00:45:17,810
they all stood idle to show up sometime

1060
00:45:24,339 --> 00:45:20,690
yeah so anyway they were outside and

1061
00:45:25,599 --> 00:45:24,349
they all saw this huge some people

1062
00:45:27,640 --> 00:45:25,609
saying miles long

1063
00:45:29,980 --> 00:45:27,650

you know triangle go over then the

1064

00:45:31,660 --> 00:45:29,990

government governor of the state finally

1065

00:45:34,510 --> 00:45:31,670

came out and admitted that he was in a

1066

00:45:36,880 --> 00:45:34,520

park and watched it go over so all I'm

1067

00:45:40,930 --> 00:45:36,890

saying is I don't I under total II

1068

00:45:42,910 --> 00:45:40,940

understand that it a lien is the wrong

1069

00:45:44,920 --> 00:45:42,920

way to go with this a possibility of

1070

00:45:48,670 --> 00:45:44,930

alien in my mind is okay to go with it

1071

00:45:50,290 --> 00:45:48,680

but but a lot of times you can't say

1072

00:45:51,609 --> 00:45:50,300

something was like a flock of geese or

1073

00:45:55,359 --> 00:45:51,619

something when there's that many people

1074

00:45:56,770 --> 00:45:55,369

seeing the same thing and and again you

1075

00:45:58,990 --> 00:45:56,780

know when you look at the realm of

1076

00:46:02,740 --> 00:45:59,000

possibilities right the possibility that

1077

00:46:05,589 --> 00:46:02,750

the US Air Force has some new kind of

1078

00:46:07,809 --> 00:46:05,599

stealth bomber right we've seen them

1079

00:46:09,870 --> 00:46:07,819

they roll out a new stealth fighter and

1080

00:46:14,140 --> 00:46:09,880

they roll out a new stealth bomber so so

1081

00:46:15,520 --> 00:46:14,150

like if the the Air Force the US Air

1082

00:46:20,190 --> 00:46:15,530

Force or the Russians or the Chinese

1083

00:46:22,480 --> 00:46:20,200

have a have a new kind of aircraft that

1084

00:46:25,210 --> 00:46:22,490

no one's ever seen before and it's

1085

00:46:27,520 --> 00:46:25,220

designed to be hard to see that can also

1086

00:46:30,819 --> 00:46:27,530

explain what these things are and really

1087

00:46:33,370 --> 00:46:30,829

until you go and watch it land and come

1088

00:46:34,599 --> 00:46:33,380

over to it and and and take a sample of

1089

00:46:37,390 --> 00:46:34,609

the material that it's made of

1090

00:46:40,000 --> 00:46:37,400

it just has to remain an e in the l

1091

00:46:42,900 --> 00:46:40,010

don't know cap column and I agree with

1092

00:46:45,309 --> 00:46:42,910

that how you know in the particular case

1093

00:46:47,770 --> 00:46:45,319

everyone that I have ever heard talk

1094

00:46:49,329 --> 00:46:47,780

about seeing something triangular go

1095

00:46:52,420 --> 00:46:49,339

over they all say the same thing all the

1096

00:46:55,450 --> 00:46:52,430

way back to 1970s is there's absolutely

1097

00:46:58,180 --> 00:46:55,460

no sound and a lot of times it's gliding

1098

00:46:59,740 --> 00:46:58,190

and so there's a lot of you know it's a

1099

00:47:03,910 --> 00:46:59,750

mystery and as a matter of fact I've

1100

00:47:05,980 --> 00:47:03,920

been doing this show for seven years now

1101
00:47:08,350 --> 00:47:05,990
just about seven years now and I don't

1102
00:47:10,030 --> 00:47:08,360
know any more about it

1103
00:47:12,040 --> 00:47:10,040
what's going you know what people are

1104
00:47:13,900 --> 00:47:12,050
seeing that I did to begin with and I'm

1105
00:47:17,080 --> 00:47:13,910
not going to say that I do

1106
00:47:19,540 --> 00:47:17,090
but it's always interesting getting

1107
00:47:21,790 --> 00:47:19,550
someone like you know your your thoughts

1108
00:47:25,150 --> 00:47:21,800
on something like this and I realize

1109
00:47:27,700 --> 00:47:25,160
that I could never say hey look you know

1110
00:47:29,620 --> 00:47:27,710
maybe it's something you may want to

1111
00:47:31,570 --> 00:47:29,630
look into because you probably have no

1112
00:47:33,490 --> 00:47:31,580
interest at all but what would convince

1113
00:47:35,490 --> 00:47:33,500

you I don't have the I don't have the

1114

00:47:39,310 --> 00:47:35,500

capability to look into it

1115

00:47:42,610 --> 00:47:39,320

right I understand but all right well

1116

00:47:45,430 --> 00:47:42,620

let's just say let's say you're your

1117

00:47:46,810 --> 00:47:45,440

curiosity like it is in space in general

1118

00:47:49,420 --> 00:47:46,820

all of a sudden was sparked because you

1119

00:47:51,820 --> 00:47:49,430

saw something really really really

1120

00:47:54,100 --> 00:47:51,830

strange would you have a curiosity to

1121

00:47:55,510 --> 00:47:54,110

try to figure out what it was or would

1122

00:47:56,620 --> 00:47:55,520

it just be would you just say I don't

1123

00:48:02,320 --> 00:47:56,630

know what it wasn't that's it

1124

00:48:04,200 --> 00:48:02,330

yeah I mean I think my I'll give you

1125

00:48:06,520 --> 00:48:04,210

some examples of things that I think are

1126

00:48:07,960 --> 00:48:06,530

pretty fascinating like you think about

1127

00:48:09,940 --> 00:48:07,970

the SpaceX have you seen some of this

1128

00:48:14,290 --> 00:48:09,950

basic launches going over Los Angeles

1129

00:48:16,390 --> 00:48:14,300

and the really weird shapes that the

1130

00:48:18,580 --> 00:48:16,400

rocket plume makes spiral you know the

1131

00:48:22,540 --> 00:48:18,590

spirals and the and the really big

1132

00:48:25,210 --> 00:48:22,550

clouds they form and in those cases tens

1133

00:48:27,760 --> 00:48:25,220

of thousands of people with cell phone

1134

00:48:29,800 --> 00:48:27,770

cameras and DSLR cameras took pictures

1135

00:48:33,820 --> 00:48:29,810

and posted them to social media and you

1136

00:48:37,780 --> 00:48:33,830

saw this incredible flurry so that's the

1137

00:48:39,340 --> 00:48:37,790

kind of thing that that generated and it

1138

00:48:41,950 --> 00:48:39,350

had an answer right we knew what it was

1139

00:48:43,690 --> 00:48:41,960

it was an identified flying object so

1140

00:48:46,390 --> 00:48:43,700

yeah I don't know I mean I think that

1141

00:48:49,440 --> 00:48:46,400

that I can totally get that if a person

1142

00:48:53,470 --> 00:48:49,450

has a personal experience with something

1143

00:48:54,880 --> 00:48:53,480

then it becomes something that sort of

1144

00:48:59,920 --> 00:48:54,890

sticks in their craw and they want to

1145

00:49:01,300 --> 00:48:59,930

get to the bottom of it and and as you

1146

00:49:02,920 --> 00:49:01,310

said you know you've been going for

1147

00:49:05,080 --> 00:49:02,930

seven years I'm sure you've you've asked

1148

00:49:06,730 --> 00:49:05,090

every person that you can if they have

1149

00:49:09,670 --> 00:49:06,740

any idea what it is that you that you

1150

00:49:12,370 --> 00:49:09,680

saw and and nobody has an answer for you

1151

00:49:17,770 --> 00:49:12,380

so I would probably find it frustrating

1152

00:49:19,330 --> 00:49:17,780

and it would take over a chunk of my

1153

00:49:22,000 --> 00:49:19,340

brain every now and then kind of go what

1154

00:49:22,500 --> 00:49:22,010

was that thing that I saw so I don't

1155

00:49:24,420 --> 00:49:22,510

know I have

1156

00:49:27,210 --> 00:49:24,430

been there yet I haven't at no point has

1157

00:49:31,950 --> 00:49:27,220

has something appeared to me that I

1158

00:49:35,520 --> 00:49:31,960

haven't known what it was so far and so

1159

00:49:37,860 --> 00:49:35,530

I so you've got a genuine mystery on

1160

00:49:39,510 --> 00:49:37,870

your hands yeah and a lot of people do

1161

00:49:41,460 --> 00:49:39,520

and mm-hmm

1162

00:49:43,890 --> 00:49:41,470

you know the one thing I found when I

1163

00:49:46,200 --> 00:49:43,900

started doing this show is that there's

1164

00:49:48,540 --> 00:49:46,210

a lot of very intelligent people that

1165

00:49:50,970 --> 00:49:48,550

are fascinated with the topic and you

1166

00:49:53,340 --> 00:49:50,980

know you mentioned earlier that there

1167

00:49:56,460 --> 00:49:53,350

are people that are doing hoaxes and I

1168

00:49:59,040 --> 00:49:56,470

totally agree and I think it it it

1169

00:50:01,110 --> 00:49:59,050

muddies the water it really is hard for

1170

00:50:03,450 --> 00:50:01,120

anyone to take the topic seriously if

1171

00:50:05,940 --> 00:50:03,460

they're looking on YouTube and they know

1172

00:50:07,860 --> 00:50:05,950

all the CGI and you know all the work

1173

00:50:09,780 --> 00:50:07,870

that people do and there are some

1174

00:50:13,050 --> 00:50:09,790

channels of the three four channels that

1175

00:50:14,850 --> 00:50:13,060

have a huge amount of following that are

1176

00:50:16,800 --> 00:50:14,860

made I can think of some channels yeah

1177

00:50:18,030 --> 00:50:16,810

that I that I wish I had to kind of

1178

00:50:19,770 --> 00:50:18,040

follow you say I've got a lot of

1179

00:50:21,720 --> 00:50:19,780

followers they've got millions of

1180

00:50:24,270 --> 00:50:21,730

followers right I don't hold a candle to

1181

00:50:26,490 --> 00:50:24,280

them yeah and there they're making a ton

1182

00:50:29,070 --> 00:50:26,500

of money on hoaxing and so there is

1183

00:50:33,810 --> 00:50:29,080

there is unfortunately that's part of it

1184

00:50:35,220 --> 00:50:33,820

and there's really nothing I wouldn't

1185

00:50:37,110 --> 00:50:35,230

say that there that some of those

1186

00:50:38,880 --> 00:50:37,120

channels are making money on hoax and I

1187

00:50:40,710 --> 00:50:38,890

think that a lot of channels there there

1188

00:50:43,920 --> 00:50:40,720

are places where they are just they are

1189

00:50:46,620 --> 00:50:43,930

posing mysteries and they are kind of

1190

00:50:52,710 --> 00:50:46,630

making assertions about what is out

1191

00:50:55,230 --> 00:50:52,720

there and and then not providing the

1192

00:50:57,510 --> 00:50:55,240

evidence to match the conclusions that

1193

00:50:58,440 --> 00:50:57,520

they're stating and so you know some of

1194

00:51:00,240 --> 00:50:58,450

those channels aren't doing a very

1195

00:51:02,400 --> 00:51:00,250

rigorous job I think it's really

1196

00:51:03,750 --> 00:51:02,410

important to say I mean you listen to

1197

00:51:05,370 --> 00:51:03,760

astronomy cast and this is what we say

1198

00:51:07,470 --> 00:51:05,380

it's like it's like it's like what we

1199

00:51:11,820 --> 00:51:07,480

know and how we know what we know right

1200

00:51:13,680 --> 00:51:11,830

so if you make an assertion then then

1201
00:51:18,540 --> 00:51:13,690
you want to back up that assertion with

1202
00:51:21,660 --> 00:51:18,550
evidence and just say like the Sun is a

1203
00:51:23,280 --> 00:51:21,670
ball of hydrogen right then

1204
00:51:26,070 --> 00:51:23,290
then you want to show all the lines of

1205
00:51:28,880 --> 00:51:26,080
evidence that demonstrate that the thing

1206
00:51:30,840 --> 00:51:28,890
that you said is is a true thing and

1207
00:51:32,280 --> 00:51:30,850
otherwise you can just go back to I

1208
00:51:35,010 --> 00:51:32,290
don't know what the Sun is or I don't

1209
00:51:35,790 --> 00:51:35,020
know what came before the the universe

1210
00:51:37,560 --> 00:51:35,800
started

1211
00:51:41,460 --> 00:51:37,570
all this stuff right so that's all again

1212
00:51:44,940 --> 00:51:41,470
it's just like it's like if you if you

1213
00:51:49,080 --> 00:51:44,950

make if you make if you say something is

1214

00:51:51,570 --> 00:51:49,090

true then then how do you know that it's

1215

00:51:53,730 --> 00:51:51,580

true and that's the gap that's the step

1216

00:51:57,020 --> 00:51:53,740

that I think a lot of people don't don't

1217

00:51:59,670 --> 00:51:57,030

take yeah there are there are some shows

1218

00:52:01,620 --> 00:51:59,680

there are some channels as you say that

1219

00:52:03,570 --> 00:52:01,630

you know do that but there are there are

1220

00:52:06,690 --> 00:52:03,580

a couple there's two or three channels

1221

00:52:10,310 --> 00:52:06,700

that I have brought up the topic on this

1222

00:52:12,540 --> 00:52:10,320

show that actually do focus on hoaxing

1223

00:52:14,910 --> 00:52:12,550

you know to get there to get their

1224

00:52:17,340 --> 00:52:14,920

viewers you know and then that part is

1225

00:52:19,080 --> 00:52:17,350

unfortunate going back I said I'd talk

1226

00:52:20,880 --> 00:52:19,090

about Mars a little bit and we'll open

1227

00:52:25,170 --> 00:52:20,890

the lines up for calls in a little bit

1228

00:52:28,740 --> 00:52:25,180

here and no breaks today so anyway going

1229

00:52:33,740 --> 00:52:28,750

back to Mars Mars at one time most

1230

00:52:38,340 --> 00:52:33,750

likely had a magnetosphere and how how

1231

00:52:41,070 --> 00:52:38,350

would you say the odds are that there

1232

00:52:44,390 --> 00:52:41,080

could have been life on Mars at one time

1233

00:52:48,360 --> 00:52:44,400

there's definitely evidence of water

1234

00:52:51,480 --> 00:52:48,370

yeah well I mean we don't know right the

1235

00:52:56,600 --> 00:52:51,490

the search the the exploration of Mars

1236

00:52:58,950 --> 00:52:56,610

is really the search for for life and

1237

00:53:00,720 --> 00:52:58,960

and originally when you when there was

1238

00:53:04,050 --> 00:53:00,730

the Viking spacecraft that was sent in

1239

00:53:07,890 --> 00:53:04,060

back in the in the 1970s it had an

1240

00:53:09,990 --> 00:53:07,900

experiment onboard that uh that told

1241

00:53:12,990 --> 00:53:10,000

them that there was life there and now

1242

00:53:15,000 --> 00:53:13,000

other scientists looked at the way the

1243

00:53:16,770 --> 00:53:15,010

experiment was done essentially they had

1244

00:53:19,200 --> 00:53:16,780

like some they would take some soil they

1245

00:53:21,420 --> 00:53:19,210

would they would feed it and water it

1246

00:53:23,850 --> 00:53:21,430

and look for gases that we're gonna come

1247

00:53:25,200 --> 00:53:23,860

out and they saw gases that they thought

1248

00:53:26,250 --> 00:53:25,210

were evidence that there was life there

1249

00:53:28,230 --> 00:53:26,260

and other people said well you could

1250

00:53:30,000 --> 00:53:28,240

have that exact same reaction if there

1251
00:53:32,100 --> 00:53:30,010
wasn't life there and people still argue

1252
00:53:34,950 --> 00:53:32,110
about this to this day and what the

1253
00:53:37,950 --> 00:53:34,960
lesson that that taught NASA really was

1254
00:53:39,300 --> 00:53:37,960
if you're going to run these kinds of

1255
00:53:40,920 --> 00:53:39,310
experiments if you're going to search

1256
00:53:43,560 --> 00:53:40,930
for life on Mars you have to be really

1257
00:53:47,580 --> 00:53:43,570
really really careful about how you do

1258
00:53:48,780 --> 00:53:47,590
this and so the the search for life on

1259
00:53:49,350 --> 00:53:48,790
Mars has really been about the search

1260
00:53:52,950 --> 00:53:49,360
for water

1261
00:53:55,890 --> 00:53:52,960
Mars the the the spirit and opportunity

1262
00:53:58,950 --> 00:53:55,900
we're looking for the possibility there

1263
00:54:03,330 --> 00:53:58,960

was ever water on Mars at all curiosity

1264

00:54:08,700 --> 00:54:03,340

which is a very sophisticated robot its

1265

00:54:11,100 --> 00:54:08,710

job is to see how long water was on the

1266

00:54:13,170 --> 00:54:11,110

surface of Mars and now the next Rover

1267

00:54:15,930 --> 00:54:13,180

that's coming the 2020 Rover its job is

1268

00:54:19,440 --> 00:54:15,940

going to be to to search to find out if

1269

00:54:22,350 --> 00:54:19,450

the conditions were good for life on

1270

00:54:24,930 --> 00:54:22,360

Mars for any great period of time and if

1271

00:54:26,790 --> 00:54:24,940

there's any evidence of past life on

1272

00:54:28,710 --> 00:54:26,800

Mars so we're getting closer and closer

1273

00:54:30,210 --> 00:54:28,720

and then possibly the next step is going

1274

00:54:33,150 --> 00:54:30,220

to be some kind of sample return where

1275

00:54:35,910 --> 00:54:33,160

people bring bring stuff back and then

1276

00:54:37,350 --> 00:54:35,920

the other really fascinating path to

1277

00:54:39,330 --> 00:54:37,360

this is that I mentioned this earlier

1278

00:54:40,830 --> 00:54:39,340

that there's that methane has been found

1279

00:54:43,230 --> 00:54:40,840

in the atmosphere of Mars and the thing

1280

00:54:45,120 --> 00:54:43,240

with methane is that it is a it is a gas

1281

00:54:47,370 --> 00:54:45,130

that breaks down in sunlight very

1282

00:54:48,960 --> 00:54:47,380

quickly so if you see some if you see

1283

00:54:52,980 --> 00:54:48,970

methane then there must be some source

1284

00:54:56,010 --> 00:54:52,990

one source is volcanoes one source could

1285

00:54:57,180 --> 00:54:56,020

be life and and right now planetary

1286

00:54:59,190 --> 00:54:57,190

scientists are still trying to figure

1287

00:55:00,360 --> 00:54:59,200

out which one of those could be there's

1288

00:55:02,850 --> 00:55:00,370

no question there's methane in the

1289

00:55:05,910 --> 00:55:02,860

atmosphere of Mars the question is is

1290

00:55:09,330 --> 00:55:05,920

there is it is life being what's

1291

00:55:11,730 --> 00:55:09,340

producing the methane so it's a it's an

1292

00:55:12,900 --> 00:55:11,740

it's is as we stand right now we have no

1293

00:55:15,300 --> 00:55:12,910

definitive answer it's a fascinating

1294

00:55:17,550 --> 00:55:15,310

question there are really interesting

1295

00:55:19,170 --> 00:55:17,560

hints the fact that the water was

1296

00:55:21,570 --> 00:55:19,180

definitely on the surface of Mars a long

1297

00:55:23,100 --> 00:55:21,580

time ago for long periods of time that

1298

00:55:24,750 --> 00:55:23,110

this methane is being seen in the

1299

00:55:29,580 --> 00:55:24,760

atmosphere these these signs are

1300

00:55:32,130 --> 00:55:29,590

pointing to yes but we don't know if

1301

00:55:33,540 --> 00:55:32,140

life could have gotten started and if it

1302

00:55:36,300 --> 00:55:33,550

could have survived long enough and so

1303

00:55:37,350 --> 00:55:36,310

again it's an end this is why right back

1304

00:55:38,490 --> 00:55:37,360

to the thing like if you're gonna say

1305

00:55:40,710 --> 00:55:38,500

there's life on Mars you want to be

1306

00:55:43,770 --> 00:55:40,720

really sure and the way you do that is

1307

00:55:45,210 --> 00:55:43,780

use is you you find just absolute

1308

00:55:48,840 --> 00:55:45,220

overwhelming evidence that there's life

1309

00:55:50,760 --> 00:55:48,850

on Mars so it's wonderful to be in the

1310

00:55:52,230 --> 00:55:50,770

middle of this mystery right yeah so

1311

00:55:54,450 --> 00:55:52,240

many people there's so many mysteries

1312

00:56:00,080 --> 00:55:54,460

that we now look at them or like I don't

1313

00:56:02,970 --> 00:56:00,090

know but how does gravity work

1314

00:56:03,579 --> 00:56:02,980

what's inside the atom there's a lot of

1315

00:56:05,380 --> 00:56:03,589

questions

1316

00:56:07,479 --> 00:56:05,390

that we now have the answers who we are

1317

00:56:11,529 --> 00:56:07,489

the end of the controversy how did them

1318

00:56:12,819 --> 00:56:11,539

out of the continents form right we now

1319

00:56:15,069 --> 00:56:12,829

know that it's plate tectonics there's

1320

00:56:17,529 --> 00:56:15,079

so many these mysteries but we are in

1321

00:56:19,390 --> 00:56:17,539

the middle of a bunch of these watching

1322

00:56:21,069 --> 00:56:19,400

them unfold in real time watching the

1323

00:56:23,680 --> 00:56:21,079

scientists gather the evidence and try

1324

00:56:26,289 --> 00:56:23,690

to figure out one way or the other what

1325

00:56:29,019 --> 00:56:26,299

what the answer is and and we should

1326

00:56:31,870 --> 00:56:29,029

have definitive answers within within

1327

00:56:34,089 --> 00:56:31,880

our lifetimes yeah I hope so that would

1328

00:56:36,249 --> 00:56:34,099

be really fascinating I mean I would

1329

00:56:38,950 --> 00:56:36,259

love to hear someday that they have

1330

00:56:40,239 --> 00:56:38,960

definitive proof what do you think of

1331

00:56:44,229 --> 00:56:40,249

that what are your thoughts on the

1332

00:56:46,269 --> 00:56:44,239

panspermia it's I mean it's a

1333

00:56:49,509 --> 00:56:46,279

fascinating concept right this idea that

1334

00:56:51,969 --> 00:56:49,519

that I mean we know that or the fact

1335

00:56:53,529 --> 00:56:51,979

that all if there is life in the solar

1336

00:56:56,259 --> 00:56:53,539

system that were actually related to

1337

00:56:57,999 --> 00:56:56,269

each other and we know that asteroids

1338

00:56:59,880 --> 00:56:58,009

have crashed into both earth and Mars

1339

00:57:03,640 --> 00:56:59,890

and Venus and all of these in the past

1340

00:57:05,799 --> 00:57:03,650

that that these aspirin impacts have

1341

00:57:10,209 --> 00:57:05,809

thrown material out into space and this

1342

00:57:13,239 --> 00:57:10,219

material can travel from world the world

1343

00:57:14,979 --> 00:57:13,249

we have aster or meteorites that came

1344

00:57:17,680 --> 00:57:14,989

from Mars we have meteorites that came

1345

00:57:19,479 --> 00:57:17,690

from the moon that came from Vesta so we

1346

00:57:22,479 --> 00:57:19,489

know that this process is happening and

1347

00:57:25,209 --> 00:57:22,489

in fact it seems like it's relatively

1348

00:57:27,819 --> 00:57:25,219

gentle that you can have a space rock

1349

00:57:30,009 --> 00:57:27,829

crash into Mars throw debris into space

1350

00:57:32,410 --> 00:57:30,019

the debris can fly around the solar

1351
00:57:34,719 --> 00:57:32,420
system for a few hundred thousand few

1352
00:57:36,789 --> 00:57:34,729
million years one of these rocks can

1353
00:57:39,670 --> 00:57:36,799
impact the earth can actually survive

1354
00:57:41,349 --> 00:57:39,680
the re-entry through the atmosphere and

1355
00:57:44,339 --> 00:57:41,359
actually keep the interior of a cool

1356
00:57:46,660 --> 00:57:44,349
enough that life could survive and so

1357
00:57:48,489 --> 00:57:46,670
one of those first questions if if

1358
00:57:51,900 --> 00:57:48,499
there's any evidence of life found on

1359
00:57:55,120 --> 00:57:51,910
Mars that first question is going to be

1360
00:57:56,589 --> 00:57:55,130
are we related and began back you know

1361
00:58:00,579 --> 00:57:56,599
both of those answers are really

1362
00:58:03,089 --> 00:58:00,589
interesting if we are related when when

1363
00:58:06,849 --> 00:58:03,099

did we diverged from the life on Mars

1364

00:58:09,339 --> 00:58:06,859

how did life continue to change on Mars

1365

00:58:12,729 --> 00:58:09,349

as it and be different from Earth and if

1366

00:58:14,709 --> 00:58:12,739

if we are not related then that is a

1367

00:58:17,680 --> 00:58:14,719

even more interesting question because

1368

00:58:21,820 --> 00:58:17,690

then then life form twice

1369

00:58:23,380 --> 00:58:21,830

in one solar system which then makes the

1370

00:58:25,180 --> 00:58:23,390

question of where is everybody even

1371

00:58:26,290 --> 00:58:25,190

weirder because now you're like well

1372

00:58:28,830 --> 00:58:26,300

then there should be life everywhere

1373

00:58:32,350 --> 00:58:28,840

life can form twice in one solar system

1374

00:58:35,470 --> 00:58:32,360

then there should be life in every solar

1375

00:58:37,510 --> 00:58:35,480

system and and that would I think that

1376

00:58:40,990 --> 00:58:37,520

would be the more unsettling more

1377

00:58:44,860 --> 00:58:41,000

troubling question if if you found life

1378

00:58:47,070 --> 00:58:44,870

that wasn't related to earth life then

1379

00:58:51,870 --> 00:58:47,080

then you would have a very bizarre

1380

00:58:55,660 --> 00:58:51,880

mystery on your hands right right and

1381

00:58:57,640 --> 00:58:55,670

you know there's there's you know people

1382

00:59:00,670 --> 00:58:57,650

can speculate all kinds of things but I

1383

00:59:02,530 --> 00:59:00,680

mean I I always you know when I get to

1384

00:59:06,010 --> 00:59:02,540

thinking pretty deeply about the whole

1385

00:59:08,290 --> 00:59:06,020

topic the very first spark of life is

1386

00:59:11,140 --> 00:59:08,300

always fascinating how did that happen

1387

00:59:13,300 --> 00:59:11,150

and it was at just you know all random

1388

00:59:14,740 --> 00:59:13,310

things happening at once that actually

1389

00:59:16,750 --> 00:59:14,750

made it happen

1390

00:59:19,600 --> 00:59:16,760

yeah and where we don't know right right

1391

00:59:21,060 --> 00:59:19,610

like literally just a great big question

1392

00:59:24,010 --> 00:59:21,070

mark question mark question mark right

1393

00:59:25,840 --> 00:59:24,020

that there was a time when there was no

1394

00:59:29,770 --> 00:59:25,850

life and then there was a time there was

1395

00:59:33,190 --> 00:59:29,780

life and and what could have made that

1396

00:59:36,010 --> 00:59:33,200

happen and there obviously there's been

1397

00:59:37,660 --> 00:59:36,020

theories where people have have

1398

00:59:40,000 --> 00:59:37,670

attempted to take these primordial

1399

00:59:42,370 --> 00:59:40,010

elements and put them together in a jar

1400

00:59:44,710 --> 00:59:42,380

and and shake them up and apply

1401
00:59:47,320 --> 00:59:44,720
electricity and and interesting amino

1402
00:59:51,030 --> 00:59:47,330
acids seem to form so maybe that's part

1403
00:59:53,230 --> 00:59:51,040
of the puzzle there are the the the

1404
00:59:54,700 --> 00:59:53,240
volcanic vents down at the bottom of the

1405
00:59:56,920 --> 00:59:54,710
ocean and very interesting conditions

1406
00:59:58,360 --> 00:59:56,930
down there that could potentially have

1407
01:00:02,470 --> 00:59:58,370
been one of the places where life got

1408
01:00:04,300 --> 01:00:02,480
got started but it is it is a gigantic

1409
01:00:06,190 --> 01:00:04,310
question mark and I guess would lead to

1410
01:00:08,680 --> 01:00:06,200
potentially if you did find life on Mars

1411
01:00:10,090 --> 01:00:08,690
and it was related to Earth maybe the

1412
01:00:11,680 --> 01:00:10,100
life came from Mars but then of course

1413
01:00:13,270 --> 01:00:11,690

that just pushes the question back one

1414

01:00:15,610 --> 01:00:13,280

planet right and then you're like well

1415

01:00:17,170 --> 01:00:15,620

how do I get started on Mars maybe it

1416

01:00:18,820 --> 01:00:17,180

floated in from another solar system

1417

01:00:20,590 --> 01:00:18,830

entirely well how did it get started

1418

01:00:21,910 --> 01:00:20,600

over there like you you you at some

1419

01:00:26,650 --> 01:00:21,920

point have to get to the bottom of that

1420

01:00:28,030 --> 01:00:26,660

question and it might be and and and you

1421

01:00:29,590 --> 01:00:28,040

would know you've got the answer when

1422

01:00:31,240 --> 01:00:29,600

you put all the camera right chemicals

1423

01:00:34,900 --> 01:00:31,250

in the in a

1424

01:00:37,180 --> 01:00:34,910

in a you know in an experiment run the

1425

01:00:39,339 --> 01:00:37,190

right amount of electricity and you get

1426

01:00:40,839 --> 01:00:39,349

the first life form forming in there

1427

01:00:43,690 --> 01:00:40,849

then you'd know okay we're on the right

1428

01:00:48,580 --> 01:00:43,700

track but until someone can actually do

1429

01:00:50,230 --> 01:00:48,590

that right now the only responsible

1430

01:00:53,530 --> 01:00:50,240

answer is to say I don't know I don't

1431

01:00:55,150 --> 01:00:53,540

know and this is this this you know

1432

01:00:57,880 --> 01:00:55,160

people who watch what I do think this

1433

01:00:59,859 --> 01:00:57,890

comes up a lot like we talked about

1434

01:01:01,540 --> 01:00:59,869

open-mindedness and that's just like

1435

01:01:03,010 --> 01:01:01,550

open-minded is to say I don't know I

1436

01:01:04,450 --> 01:01:03,020

don't know let's find out I would love

1437

01:01:06,880 --> 01:01:04,460

to know the answer to this question

1438

01:01:08,890 --> 01:01:06,890

just like you I want to be sure so until

1439

01:01:13,510 --> 01:01:08,900

then I'm just gonna have to just say I

1440

01:01:16,780 --> 01:01:13,520

don't know right well I have the call

1441

01:01:18,460 --> 01:01:16,790

number up on the screen on YouTube for

1442

01:01:20,859 --> 01:01:18,470

those of you over there now that would

1443

01:01:22,210 --> 01:01:20,869

like to call in and ask our guest a

1444

01:01:25,390 --> 01:01:22,220

question feel free to dial that number

1445

01:01:28,990 --> 01:01:25,400

it's up there 603 nine six seven four OH

1446

01:01:30,040 --> 01:01:29,000

three oh I think I remembered I didn't

1447

01:01:31,540 --> 01:01:30,050

hear this on your show but I think I

1448

01:01:34,450 --> 01:01:31,550

remembered reading somewhere that our

1449

01:01:37,480 --> 01:01:34,460

magnetosphere seems to be weakening have

1450

01:01:40,150 --> 01:01:37,490

you heard anything I haven't heard that

1451

01:01:44,200 --> 01:01:40,160

it's weakening but the magnetosphere is

1452

01:01:47,500 --> 01:01:44,210

drifting so the the North Pole the

1453

01:01:53,770 --> 01:01:47,510

magnetic north pole of Earth wanders

1454

01:01:59,410 --> 01:01:53,780

around my country of Canada and and and

1455

01:02:02,290 --> 01:01:59,420

so like where a compass points north has

1456

01:02:04,510 --> 01:02:02,300

been changing over decades now it could

1457

01:02:06,160 --> 01:02:04,520

very well be that this is just gonna go

1458

01:02:09,359 --> 01:02:06,170

on and it just wanders around that what

1459

01:02:12,460 --> 01:02:09,369

we thought was one point was actually a

1460

01:02:14,710 --> 01:02:12,470

region and and and just over long

1461

01:02:17,829 --> 01:02:14,720

periods of time the magnetic north

1462

01:02:21,070 --> 01:02:17,839

shifts but we absolutely evidence of

1463

01:02:23,290 --> 01:02:21,080

that that in the past the magnetic field

1464

01:02:26,890 --> 01:02:23,300

has flipped and we see this on the Sun

1465

01:02:29,290 --> 01:02:26,900

every 11 years or so every 22 years is

1466

01:02:31,630 --> 01:02:29,300

the full cycle the magnetic the

1467

01:02:34,540 --> 01:02:31,640

magnetosphere on the Sun flips around

1468

01:02:36,579 --> 01:02:34,550

and so the north magnetic pole of the

1469

01:02:38,290 --> 01:02:36,589

Sun becomes the South Magnetic Pole and

1470

01:02:41,530 --> 01:02:38,300

and then vice versa and you get this

1471

01:02:46,359 --> 01:02:41,540

period where where it shifts over and

1472

01:02:49,349 --> 01:02:46,369

and geologists can see the direction of

1473

01:02:51,640 --> 01:02:49,359

the magnetic field in lava so you have

1474

01:02:53,410 --> 01:02:51,650

lava flows that are that are making

1475

01:02:55,750 --> 01:02:53,420

magnetized you can actually see they're

1476

01:02:57,670 --> 01:02:55,760

aligned to the magnetic field and then

1477

01:02:59,050 --> 01:02:57,680

shortly after that you can see the

1478

01:03:00,790 --> 01:02:59,060

magnetic field going in the opposite

1479

01:03:03,760 --> 01:03:00,800

direction so it's entirely possible that

1480

01:03:07,240 --> 01:03:03,770

that when we know that this magnetic

1481

01:03:10,210 --> 01:03:07,250

field reversal happens on a random but

1482

01:03:11,920 --> 01:03:10,220

regular basis who knows when the next

1483

01:03:13,570 --> 01:03:11,930

one could happen but the fact that we're

1484

01:03:15,090 --> 01:03:13,580

here the fact that life is here we know

1485

01:03:18,190 --> 01:03:15,100

that the impact of that is not

1486

01:03:20,440 --> 01:03:18,200

devastating we know that well it sure

1487

01:03:22,180 --> 01:03:20,450

doesn't seem like the any man oh yeah

1488

01:03:24,790 --> 01:03:22,190

there is any mass die-off that goes

1489

01:03:26,349 --> 01:03:24,800

along with with the magnetic field

1490

01:03:28,000 --> 01:03:26,359

reversal so it could very well be that

1491

01:03:30,340 --> 01:03:28,010

that we're all gonna have to buy new

1492

01:03:33,430 --> 01:03:30,350

compasses at some point at least yeah

1493

01:03:35,320 --> 01:03:33,440

yeah but the above the other opportunity

1494

01:03:37,240 --> 01:03:35,330

is the fact that you know again here in

1495

01:03:39,940 --> 01:03:37,250

Canada I get to see the the Northern

1496

01:03:41,710 --> 01:03:39,950

Lights the Aurora's and a lot of people

1497

01:03:44,080 --> 01:03:41,720

who live further to the south don't get

1498

01:03:47,500 --> 01:03:44,090

a chance to see it but if you got to a

1499

01:03:49,230 --> 01:03:47,510

point where the where the the fields

1500

01:03:51,520 --> 01:03:49,240

were flipping around you might have

1501

01:03:53,650 --> 01:03:51,530

access to Aurora's and in weird

1502

01:03:55,359 --> 01:03:53,660

locations as the magnetic fields

1503

01:03:57,099 --> 01:03:55,369

attorneys strange pockets around the

1504

01:03:58,540 --> 01:03:57,109

planet so it could be that opportunity

1505

01:04:01,480 --> 01:03:58,550

to finally see an Aurora if you haven't

1506

01:04:03,790 --> 01:04:01,490

had one yet yeah they're amazing so we

1507

01:04:07,420 --> 01:04:03,800

have a caller on the line caller your

1508

01:04:10,599 --> 01:04:07,430

first name where you calling from call

1509

01:04:11,170 --> 01:04:10,609

I'm Martin yeah it's your neighbor how

1510

01:04:15,040 --> 01:04:11,180

are ya

1511

01:04:17,320 --> 01:04:15,050

is this Donnie sure is you're not gonna

1512

01:04:18,970 --> 01:04:17,330

be my neighbor for long well we'll talk

1513

01:04:22,570 --> 01:04:18,980

about oh that's bad yeah

1514

01:04:24,510 --> 01:04:22,580

yeah oh well yeah anyway I'll leave

1515

01:04:27,370 --> 01:04:24,520

everyone in suspense so you have a

1516

01:04:31,240 --> 01:04:27,380

Donnie's a Boston police officer and he

1517

01:04:33,760 --> 01:04:31,250

has a I live up in Maine and near a lake

1518

01:04:35,620 --> 01:04:33,770

and he has a place on the lake up here

1519

01:04:37,630 --> 01:04:35,630

he comes up in visits he sits in studio

1520

01:04:40,540 --> 01:04:37,640

no and then so he's a retired Boston

1521

01:04:42,330 --> 01:04:40,550

police officer now works you're in South

1522

01:04:47,320 --> 01:04:42,340

America you work in South America right

1523

01:04:49,599 --> 01:04:47,330

well we work all over the globe okay so

1524

01:04:52,890 --> 01:04:49,609

how you doing darn you have a question

1525

01:04:55,300 --> 01:04:52,900

for the guest yeah I I put it on the

1526

01:04:57,370 --> 01:04:55,310

chat line I'm sorry

1527

01:04:58,930 --> 01:04:57,380

I can watch that I'm alone tonight so I

1528

01:05:03,300 --> 01:04:58,940

don't have help yeah I could see the

1529

01:05:05,950 --> 01:05:03,310

reflection in your glasses Martin okay

1530

01:05:09,060 --> 01:05:05,960

yeah one of the questions the question I

1531

01:05:13,600 --> 01:05:09,070

have for your guests being an astronomer

1532

01:05:16,360 --> 01:05:13,610

is would there was own substantial

1533

01:05:21,310 --> 01:05:16,370

conversation about outside of the solar

1534

01:05:24,070 --> 01:05:21,320

system and just recently about the earth

1535

01:05:27,850 --> 01:05:24,080

itself but what we haven't touched upon

1536

01:05:29,470 --> 01:05:27,860

really is the moon and recently it's

1537

01:05:33,070 --> 01:05:29,480

been announced while some gravely

1538

01:05:35,710 --> 01:05:33,080

mistaken that the People's Republic of

1539

01:05:38,890 --> 01:05:35,720

China is going to be exploring a dark

1540

01:05:41,260 --> 01:05:38,900

side of the Moon and my question is

1541

01:05:42,850 --> 01:05:41,270

actually twofold personally it's been my

1542

01:05:46,330 --> 01:05:42,860

understanding that the United States as

1543

01:05:48,670 --> 01:05:46,340

research as oxide one one and second

1544

01:05:50,470 --> 01:05:48,680

please correct me if I'm wrong but the

1545

01:05:52,720 --> 01:05:50,480

second part of it is why would they be

1546

01:05:55,000 --> 01:05:52,730

going there to the dark side of the moon

1547

01:05:58,060 --> 01:05:55,010

what is there to discover that hasn't

1548

01:06:02,170 --> 01:05:58,070

previously been discovered or divulged

1549

01:06:04,060 --> 01:06:02,180

to the public in general we know that it

1550

01:06:05,830 --> 01:06:04,070

probably can't be colonized it's it's

1551

01:06:08,700 --> 01:06:05,840

probably not sustainable or perhaps it

1552

01:06:13,030 --> 01:06:08,710

is but I'd like to get hang up and hear

1553

01:06:14,170 --> 01:06:13,040

phrases comments on that all right did

1554

01:06:15,730 --> 01:06:14,180

you say there was a two-part question

1555

01:06:18,340 --> 01:06:15,740

you'd add another part of that or was

1556

01:06:21,760 --> 01:06:18,350

that the two parts well no the first

1557

01:06:24,340 --> 01:06:21,770

part is is if it's a mistaken

1558

01:06:26,440 --> 01:06:24,350

assumption or not that the United

1559

01:06:28,210 --> 01:06:26,450

States's was explored the dark side when

1560

01:06:30,370 --> 01:06:28,220

I believe that we have all right so I'd

1561

01:06:32,800 --> 01:06:30,380

like to clear that up and secondly I

1562

01:06:34,870 --> 01:06:32,810

would like to know what is piqued the

1563

01:06:36,790 --> 01:06:34,880

Chinese the People's Republic of China's

1564

01:06:37,240 --> 01:06:36,800

interest in exploring the dark side of

1565

01:06:39,040 --> 01:06:37,250

the Moon

1566

01:06:41,680 --> 01:06:39,050

particularly at this phase of our

1567

01:06:44,430 --> 01:06:41,690

historical development all right hey

1568

01:06:49,720 --> 01:06:44,440

thanks for the call Tony thanks our call

1569

01:06:51,700 --> 01:06:49,730

mine yeah absolutely so what a couple if

1570

01:06:52,900 --> 01:06:51,710

those halves there so right so the I

1571

01:06:56,190 --> 01:06:52,910

mean there's no Dark Side of the Moon

1572

01:06:59,320 --> 01:06:56,200

it's the far side of the Moon the the

1573

01:07:01,360 --> 01:06:59,330

whole moon gets illuminated Pink Floyd

1574

01:07:04,900 --> 01:07:01,370

has sort of made our lives miserable

1575

01:07:07,540 --> 01:07:04,910

first for decades right but though but

1576

01:07:09,130 --> 01:07:07,550

the the moon is tidally locked to the

1577

01:07:11,080 --> 01:07:09,140

earth and so it's always

1578

01:07:12,340 --> 01:07:11,090

the same face to the earth you when you

1579

01:07:14,970 --> 01:07:12,350

look up at the moon you always see the

1580

01:07:17,980 --> 01:07:14,980

same side and of course the moon takes

1581

01:07:19,930 --> 01:07:17,990

27 and a half days to go all the way

1582

01:07:22,840 --> 01:07:19,940

around the earth and so it turns once

1583

01:07:24,910 --> 01:07:22,850

every month and always shows the same

1584

01:07:27,010 --> 01:07:24,920

face to us and this is thanks to gravity

1585

01:07:28,330 --> 01:07:27,020

from the earth so there is a near side

1586

01:07:29,950 --> 01:07:28,340

to the moon and there is a far side to

1587

01:07:32,710 --> 01:07:29,960

the moon and for the longest time

1588

01:07:35,290 --> 01:07:32,720

humanity had never seen the far side of

1589

01:07:37,540 --> 01:07:35,300

the moon we only saw what we could see

1590

01:07:39,280 --> 01:07:37,550

from here on earth in great detail but

1591

01:07:40,900 --> 01:07:39,290

we couldn't see the rest of it and it

1592

01:07:42,340 --> 01:07:40,910

wasn't really until the Space Age until

1593

01:07:44,170 --> 01:07:42,350

the first spacecraft were sent to

1594

01:07:47,110 --> 01:07:44,180

actually go and take a look at it and

1595

01:07:48,820 --> 01:07:47,120

what they found is that the far side of

1596

01:07:50,410 --> 01:07:48,830

the Moon actually looks dramatically

1597

01:07:53,440 --> 01:07:50,420

different from what the near side of the

1598

01:07:55,840 --> 01:07:53,450

moon looks like on the near side of the

1599

01:07:59,470 --> 01:07:55,850

moon we see these beautiful moire these

1600

01:08:02,080 --> 01:07:59,480

huge what were thought to be oceans in

1601
01:08:04,480 --> 01:08:02,090
the past and now we know our ancient

1602
01:08:06,250 --> 01:08:04,490
lava flows across the surface of the

1603
01:08:09,330 --> 01:08:06,260
Moon on the far side of the Moon you

1604
01:08:12,430 --> 01:08:09,340
don't see that you instead see this

1605
01:08:16,030 --> 01:08:12,440
pockmarked crater cratering that is a

1606
01:08:17,920 --> 01:08:16,040
lot more like densely crater than what

1607
01:08:19,840 --> 01:08:17,930
we see on not on the close segment it's

1608
01:08:21,340 --> 01:08:19,850
a lot more boring actually it's funny we

1609
01:08:22,900 --> 01:08:21,350
get the we get the really interesting

1610
01:08:26,140 --> 01:08:22,910
side of the moon to look at and not the

1611
01:08:26,920 --> 01:08:26,150
other side of the Moon so you call those

1612
01:08:29,980 --> 01:08:26,930
exactly right

1613
01:08:31,390 --> 01:08:29,990

NASA's the Lunar Reconnaissance Orbiter

1614

01:08:34,720 --> 01:08:31,400

has been orbiting around the moon now

1615

01:08:36,580 --> 01:08:34,730

for quite a while and taking really

1616

01:08:38,860 --> 01:08:36,590

high-resolution images of the entire

1617

01:08:41,440 --> 01:08:38,870

moon scanning the surface down to a

1618

01:08:43,360 --> 01:08:41,450

resolution of a couple of meters they

1619

01:08:45,130 --> 01:08:43,370

can see every crater they've they've

1620

01:08:46,840 --> 01:08:45,140

seen all of the apollo landers they've

1621

01:08:49,570 --> 01:08:46,850

seen all of the other Rovers that have

1622

01:08:52,000 --> 01:08:49,580

been on the surface of the Moon and the

1623

01:08:53,950 --> 01:08:52,010

Chinese as their first attempt to go to

1624

01:08:55,390 --> 01:08:53,960

the moon put down a rover on the near

1625

01:08:56,890 --> 01:08:55,400

side of the moon and the reason you do

1626

01:08:58,360 --> 01:08:56,900

that is because you can communicate with

1627

01:09:01,000 --> 01:08:58,370

them right you can send them signals and

1628

01:09:02,950 --> 01:09:01,010

go now turn left and then the spacecraft

1629

01:09:06,400 --> 01:09:02,960

can nor the rover can turn left and

1630

01:09:08,860 --> 01:09:06,410

drive right when you push it to the far

1631

01:09:11,860 --> 01:09:08,870

side of the Moon then you have no way to

1632

01:09:13,420 --> 01:09:11,870

directly contact your over so what the

1633

01:09:15,190 --> 01:09:13,430

Chinese have done is they have launched

1634

01:09:18,070 --> 01:09:15,200

a spacecraft a communications relay

1635

01:09:21,880 --> 01:09:18,080

satellite to the far side of the Moon to

1636

01:09:22,690 --> 01:09:21,890

the I2 Lagrange point which is you've

1637

01:09:26,080 --> 01:09:22,700

got sort of

1638

01:09:28,030 --> 01:09:26,090

I1 Lagrangian is this gravitationally

1639

01:09:30,790 --> 01:09:28,040

stable point in between the earth and

1640

01:09:32,380 --> 01:09:30,800

the and the moon then there's another

1641

01:09:33,910 --> 01:09:32,390

one on the far side of the moon and

1642

01:09:35,230 --> 01:09:33,920

there's one on the far side of the earth

1643

01:09:38,080 --> 01:09:35,240

but they're not using that one

1644

01:09:40,600 --> 01:09:38,090

so this relay satellite is already there

1645

01:09:43,330 --> 01:09:40,610

and waiting and its job is going to be

1646

01:09:46,270 --> 01:09:43,340

to relay information from this new

1647

01:09:47,710 --> 01:09:46,280

Chinese Rover when it arrives so later

1648

01:09:49,180 --> 01:09:47,720

this year Chinese are gonna send this

1649

01:09:50,590 --> 01:09:49,190

Rover it's gonna reach the far side of

1650

01:09:53,190 --> 01:09:50,600

the Moon it's gonna land and then it's

1651
01:09:56,770 --> 01:09:53,200
going to be able to analyze and study an

1652
01:09:59,470 --> 01:09:56,780
environment that we just have no no

1653
01:10:01,090 --> 01:09:59,480
samples have been extracted no none of

1654
01:10:03,640 --> 01:10:01,100
these places have been looked at closely

1655
01:10:05,260 --> 01:10:03,650
all of the Apollo landings all of the

1656
01:10:07,090 --> 01:10:05,270
previous Rovers they've all gone to the

1657
01:10:08,470 --> 01:10:07,100
near side of the moon this is the first

1658
01:10:10,480 --> 01:10:08,480
time that anyone's gone to the far side

1659
01:10:13,570 --> 01:10:10,490
so I think the best way to describe it

1660
01:10:16,150 --> 01:10:13,580
is they are they are stepping out into a

1661
01:10:18,070 --> 01:10:16,160
place that everybody has been that has

1662
01:10:20,680 --> 01:10:18,080
never considered to be important enough

1663
01:10:22,990 --> 01:10:20,690

to check out or never had the resources

1664

01:10:25,240 --> 01:10:23,000

or whatever the priority they're the

1665

01:10:26,800 --> 01:10:25,250

ones gonna be the first to Rove around

1666

01:10:29,550 --> 01:10:26,810

on the far side of the moon and that's a

1667

01:10:32,740 --> 01:10:29,560

way to stick up feather in their cap

1668

01:10:34,900 --> 01:10:32,750

interesting thank you I want to just

1669

01:10:37,660 --> 01:10:34,910

tell you about a quote that I had I had

1670

01:10:41,590 --> 01:10:37,670

an astrophysicist on this show

1671

01:10:45,280 --> 01:10:41,600

once that was a visiting senior

1672

01:10:47,200 --> 01:10:45,290

scientists at NASA for a few years I

1673

01:10:50,050 --> 01:10:47,210

think that's what he said his title was

1674

01:10:51,700 --> 01:10:50,060

a really interesting guy we have someone

1675

01:10:54,040 --> 01:10:51,710

else calling in I'll take the call

1676

01:10:55,960 --> 01:10:54,050

caller hang in there for a minute we'll

1677

01:11:00,280 --> 01:10:55,970

get right to you hang in there

1678

01:11:02,440 --> 01:11:00,290

so anyway his his message that he said

1679

01:11:04,240 --> 01:11:02,450

during the show kind of shocked me but I

1680

01:11:08,340 --> 01:11:04,250

thought it it was interesting probably

1681

01:11:10,750 --> 01:11:08,350

made a lot of sense and that was if a

1682

01:11:13,210 --> 01:11:10,760

civilization gets through the bottleneck

1683

01:11:15,850 --> 01:11:13,220

of Technology without blowing themselves

1684

01:11:17,770 --> 01:11:15,860

up then they will likely be traveling

1685

01:11:21,490 --> 01:11:17,780

the Stars and I just wondered what you

1686

01:11:23,070 --> 01:11:21,500

thought about that yeah there is and I

1687

01:11:25,420 --> 01:11:23,080

mentioned that earlier right there is no

1688

01:11:28,960 --> 01:11:25,430

reason according to the laws of physics

1689

01:11:30,790 --> 01:11:28,970

why you can't theoretically travel from

1690

01:11:33,340 --> 01:11:30,800

star to star I mean there was an

1691

01:11:35,649 --> 01:11:33,350

asteroid now thought to be a comet Aloha

1692

01:11:37,750 --> 01:11:35,659

MOA that had been found

1693

01:11:39,820 --> 01:11:37,760

traveling from some other star system

1694

01:11:42,340 --> 01:11:39,830

astronomers recently did an estimate

1695

01:11:44,560 --> 01:11:42,350

there are probably tens of thousands of

1696

01:11:46,780 --> 01:11:44,570

asteroids and comets here in the solar

1697

01:11:49,510 --> 01:11:46,790

system that came from other star systems

1698

01:11:53,890 --> 01:11:49,520

so if a rock can do it you would think

1699

01:11:57,250 --> 01:11:53,900

that a robot could make the journey at

1700

01:11:59,290 --> 01:11:57,260

the very least who knows whether we

1701

01:12:01,930 --> 01:11:59,300

would have the ability to send living

1702

01:12:03,640 --> 01:12:01,940

creatures to make that journey but but a

1703

01:12:07,390 --> 01:12:03,650

robot it seems like it should be

1704

01:12:08,830 --> 01:12:07,400

possible so so there is this concept I

1705

01:12:10,689 --> 01:12:08,840

don't know if you talked about it much

1706

01:12:14,590 --> 01:12:10,699

this idea called the great filter that

1707

01:12:16,270 --> 01:12:14,600

that that one of the possibilities why

1708

01:12:20,080 --> 01:12:16,280

the way we seem to be alone in the

1709

01:12:23,140 --> 01:12:20,090

universe is that there is some fate that

1710

01:12:27,669 --> 01:12:23,150

that all intelligent civilizations meet

1711

01:12:30,040 --> 01:12:27,679

which wraps up ends their ability to

1712

01:12:32,770 --> 01:12:30,050

become a spacefaring species and if

1713

01:12:34,840 --> 01:12:32,780

that's true we are just around the

1714

01:12:39,939 --> 01:12:34,850

corner from it yeah and if we're too far

1715

01:12:42,870 --> 01:12:39,949

from it and we can see potential things

1716

01:12:46,470 --> 01:12:42,880

that could be causing it nuclear war

1717

01:12:49,810 --> 01:12:46,480

artificial intelligence bioengineering

1718

01:12:53,410 --> 01:12:49,820

asteroid impacts global warming like we

1719

01:12:56,050 --> 01:12:53,420

can see a bunch of potential existential

1720

01:12:57,820 --> 01:12:56,060

threats that we could be facing but the

1721

01:13:00,790 --> 01:12:57,830

weird part about is that if you can see

1722

01:13:02,200 --> 01:13:00,800

them then you can try to predict and

1723

01:13:04,360 --> 01:13:02,210

prevent them and so it could very well

1724

01:13:06,640 --> 01:13:04,370

be that it's something that we can't

1725

01:13:11,260 --> 01:13:06,650

even predict that will that happens to

1726

01:13:15,040 --> 01:13:11,270

all civilizations 100% and and nips

1727

01:13:16,959 --> 01:13:15,050

there their exploration goals in the bud

1728

01:13:18,970 --> 01:13:16,969

which is a it's all it's a haunting

1729

01:13:22,229 --> 01:13:18,980

thought for sure yeah I definitely think

1730

01:13:24,910 --> 01:13:22,239

we're gonna be our own destructor myself

1731

01:13:27,250 --> 01:13:24,920

you know whether its nuclear or whatever

1732

01:13:30,399 --> 01:13:27,260

we have a caller on the line caller your

1733

01:13:32,740 --> 01:13:30,409

first name where you calling from Jim

1734

01:13:34,479 --> 01:13:32,750

from British Columbia Oh Jim you've been

1735

01:13:35,979 --> 01:13:34,489

on before I believe hi Jim welcome to

1736

01:13:36,729 --> 01:13:35,989

the show do you have a question for our

1737

01:13:40,930 --> 01:13:36,739

gang

1738

01:13:43,780 --> 01:13:40,940

yes I do Fraser you were talking about

1739

01:13:45,939 --> 01:13:43,790

the origin of life on Earth and there

1740

01:13:48,760 --> 01:13:45,949

was an article in Scientific American

1741

01:13:49,959 --> 01:13:48,770

back in the 1990's and the title of the

1742

01:13:53,500 --> 01:13:49,969

article

1743

01:13:57,490 --> 01:13:53,510

are in a hypothesis and it hypothesized

1744

01:14:00,190 --> 01:13:57,500

that the first thing to appear in the

1745

01:14:04,120 --> 01:14:00,200

world's oceans was a self-replicating

1746

01:14:08,850 --> 01:14:04,130

RNA molecule and this makes very good

1747

01:14:12,040 --> 01:14:08,860

sense in in organic chemistry because

1748

01:14:14,830 --> 01:14:12,050

the RNA molecule in life is in between

1749

01:14:18,400 --> 01:14:14,840

the DNA and the protein right so it's a

1750

01:14:21,930 --> 01:14:18,410

kind of a central primary molecule right

1751

01:14:24,550 --> 01:14:21,940

now if you look at the probability of an

1752

01:14:28,060 --> 01:14:24,560

self-replicating molecule RNA molecule

1753

01:14:30,970 --> 01:14:28,070

forming in the global ocean it might

1754

01:14:32,620 --> 01:14:30,980

look pretty unlikely but when you

1755

01:14:35,020 --> 01:14:32,630

consider the size of the global ocean

1756

01:14:40,240 --> 01:14:35,030

and the time period involved

1757

01:14:42,970 --> 01:14:40,250

you had these molecules bouncing off

1758

01:14:47,080 --> 01:14:42,980

each other at a tremendous rate you have

1759

01:14:48,910 --> 01:14:47,090

a huge number of molecules and fragments

1760

01:14:51,580 --> 01:14:48,920

of molecules bouncing off each other and

1761

01:14:55,060 --> 01:14:51,590

reacting into all kinds of forms and

1762

01:14:58,240 --> 01:14:55,070

shapes and almost everything would be

1763

01:15:00,459 --> 01:14:58,250

possible almost every combination and

1764

01:15:03,000 --> 01:15:00,469

permutation would be possible because

1765

01:15:05,350 --> 01:15:03,010

simply because of the numbers of

1766

01:15:06,640 --> 01:15:05,360

reactions going on simultaneously and

1767

01:15:09,640 --> 01:15:06,650

then you have in some parts of the

1768

01:15:12,040 --> 01:15:09,650

global ocean you have liquid rock lava

1769

01:15:13,600 --> 01:15:12,050

another place you have lightning etc so

1770

01:15:18,160 --> 01:15:13,610

you have varying conditions all of the

1771

01:15:21,430 --> 01:15:18,170

global ocean and chemical you know pH

1772

01:15:25,150 --> 01:15:21,440

and different properties chemical

1773

01:15:28,540 --> 01:15:25,160

properties so it seems to me that that's

1774

01:15:32,610 --> 01:15:28,550

a very good possibility that that could

1775

01:15:34,780 --> 01:15:32,620

happen it may seem unlikely but but the

1776

01:15:38,890 --> 01:15:34,790

probability of it can be compared to

1777

01:15:41,590 --> 01:15:38,900

let's say dealing a Royal Flush from a

1778

01:15:44,790 --> 01:15:41,600

discards now that's very unlikely but if

1779

01:15:47,380 --> 01:15:44,800

you have 10 to the 23rd decks of cards

1780

01:15:50,920 --> 01:15:47,390

yelling a hand every second you

1781

01:15:55,510 --> 01:15:50,930

understand the math of it well yeah I

1782

01:15:59,490 --> 01:15:55,520

mean I I mean whatever that first life

1783

01:16:03,280 --> 01:15:59,500

form was you can kind of imagine that it

1784

01:16:05,380 --> 01:16:03,290

all you needed was something that could

1785

01:16:08,080 --> 01:16:05,390

bootstrap into a more complicated

1786

01:16:12,040 --> 01:16:08,090

version of itself that that you needed

1787

01:16:13,810 --> 01:16:12,050

whatever it was somehow it was like

1788

01:16:16,150 --> 01:16:13,820

whatever is the simplest possible life

1789

01:16:18,760 --> 01:16:16,160

form that can make a copy of itself and

1790

01:16:20,380 --> 01:16:18,770

and that is what you would expect to

1791

01:16:22,180 --> 01:16:20,390

find and as you said that early

1792

01:16:25,120 --> 01:16:22,190

environment with all of these chemicals

1793

01:16:27,310 --> 01:16:25,130

and and and no competition

1794

01:16:30,190 --> 01:16:27,320

right and that's the part that's so

1795

01:16:32,830 --> 01:16:30,200

interesting as well as why did life not

1796

01:16:36,460 --> 01:16:32,840

start twice why don't we have two life

1797

01:16:38,500 --> 01:16:36,470

forms two separate trees of life here on

1798

01:16:41,310 --> 01:16:38,510

earth both of which have a mysterious

1799

01:16:45,190 --> 01:16:41,320

beginning that would tell you that life

1800

01:16:48,400 --> 01:16:45,200

was inevitable to form and so as much of

1801

01:16:51,280 --> 01:16:48,410

a mystery is is the fact that that we

1802

01:16:53,590 --> 01:16:51,290

that life formed at all right is that we

1803

01:16:55,930 --> 01:16:53,600

don't see multiple forms of life it's

1804

01:16:59,320 --> 01:16:55,940

again so weird life formed as soon as it

1805

01:17:01,720 --> 01:16:59,330

could and yet it only did it once and it

1806

01:17:06,250 --> 01:17:01,730

will create multicellular life once

1807

01:17:09,400 --> 01:17:06,260

which is even more of weird thing okay

1808

01:17:13,060 --> 01:17:09,410

but I'll test your hypothesis and that

1809

01:17:15,220 --> 01:17:13,070

is life maybe did form twice maybe one

1810

01:17:17,710 --> 01:17:15,230

was RNA based one was DNA base and they

1811

01:17:20,800 --> 01:17:17,720

combined into one and we have life forms

1812

01:17:24,940 --> 01:17:20,810

on earth where we have had those

1813

01:17:27,490 --> 01:17:24,950

combinations of single-celled organisms

1814

01:17:29,260 --> 01:17:27,500

with other kinds of single cells and

1815

01:17:33,730 --> 01:17:29,270

then weak so we have the mitochondria

1816

01:17:35,800 --> 01:17:33,740

inside the inside the inside a cell so

1817

01:17:37,450 --> 01:17:35,810

maybe maybe it did happen twice maybe

1818

01:17:40,240 --> 01:17:37,460

the evidence is there I haven't see how

1819

01:17:42,100 --> 01:17:40,250

further analysis of the biochemistry and

1820

01:17:44,230 --> 01:17:42,110

organic it's that but it would be very

1821

01:17:46,270 --> 01:17:44,240

interesting and it is absolutely the

1822

01:17:50,230 --> 01:17:46,280

other most interesting question you can

1823

01:17:52,240 --> 01:17:50,240

ask right like it's just it's like ever

1824

01:17:57,240 --> 01:17:52,250

again every permutation of it is

1825

01:18:01,090 --> 01:17:57,250

absolutely fascinating and and and I'm I

1826

01:18:03,340 --> 01:18:01,100

love this it's I'm less experienced with

1827

01:18:06,400 --> 01:18:03,350

this and I'm less able to make sense of

1828

01:18:08,290 --> 01:18:06,410

the of the biochemistry but I find the

1829

01:18:11,230 --> 01:18:08,300

search for it absolutely fascinating and

1830

01:18:13,960 --> 01:18:11,240

I can't wait for IO and I read every

1831

01:18:16,270 --> 01:18:13,970

little new insight with great interest

1832

01:18:17,540 --> 01:18:16,280

as people test this out and and this

1833

01:18:19,160 --> 01:18:17,550

whole discovery of

1834

01:18:21,290 --> 01:18:19,170

these volcanic vents at the bottom of

1835

01:18:23,960 --> 01:18:21,300

the oceans really added a lot of really

1836

01:18:25,100 --> 01:18:23,970

interesting fuel to the to the theories

1837

01:18:28,070 --> 01:18:25,110

because now you had this other

1838

01:18:29,240 --> 01:18:28,080

environment that was that had all the

1839

01:18:32,600 --> 01:18:29,250

right conditions for life and perhaps

1840

01:18:35,450 --> 01:18:32,610

perhaps even more protected and and more

1841

01:18:37,790 --> 01:18:35,460

extreme which is is the kind of place

1842

01:18:40,790 --> 01:18:37,800

that life could form so again it's still

1843

01:18:42,830 --> 01:18:40,800

it's still such a big mystery and then

1844

01:18:46,190 --> 01:18:42,840

there are the slimes the subsurface

1845

01:18:49,250 --> 01:18:46,200

little autotrophic ecosystems on earth

1846

01:18:51,380 --> 01:18:49,260

and I wouldn't be the least bit

1847

01:18:54,650 --> 01:18:51,390

surprised if they were found on Mars as

1848

01:18:57,290 --> 01:18:54,660

well because the conditions for slimes

1849

01:18:59,840 --> 01:18:57,300

are on Mars or in Mars I should say

1850

01:19:02,690 --> 01:18:59,850

they're in the rock right you have rocks

1851

01:19:04,460 --> 01:19:02,700

that contain chemical energy and you

1852

01:19:07,340 --> 01:19:04,470

have the organic molecules and the water

1853

01:19:10,730 --> 01:19:07,350

deeper in Mars so I think that's a very

1854

01:19:13,370 --> 01:19:10,740

good that my estimate is well over 50%

1855

01:19:15,760 --> 01:19:13,380

chance of living life on Mars now that's

1856

01:19:19,160 --> 01:19:15,770

my opinion you mean now right now

1857

01:19:22,580 --> 01:19:19,170

yes no living life on Mars now you mean

1858

01:19:24,710 --> 01:19:22,590

when the form of slimes yeah that that

1859

01:19:26,690 --> 01:19:24,720

methane mystery that I mentioned earlier

1860

01:19:32,810 --> 01:19:26,700

is a is a pretty compelling piece of

1861

01:19:35,030 --> 01:19:32,820

evidence and and and that it came that

1862

01:19:36,650 --> 01:19:35,040

the life that the methane came from life

1863

01:19:38,750 --> 01:19:36,660

or that the methane came from volcanoes

1864

01:19:41,570 --> 01:19:38,760

is is a question that can be answered

1865

01:19:43,790 --> 01:19:41,580

and and the answer is gonna be very

1866

01:19:45,380 --> 01:19:43,800

interesting I I I don't know if I give

1867

01:19:47,840 --> 01:19:45,390

it a 50 percent chance but I wouldn't

1868

01:19:49,160 --> 01:19:47,850

you know I would give it like a 30

1869

01:19:52,930 --> 01:19:49,170

percent chance I am but like we're in

1870

01:19:55,570 --> 01:19:52,940

the same couple of tens of percentages

1871

01:19:58,300 --> 01:19:55,580

hey Jim thanks so much for the call

1872

01:20:01,640 --> 01:19:58,310

thank you bye all right bye now

1873

01:20:04,610 --> 01:20:01,650

so when I am also in pink in in British

1874

01:20:07,400 --> 01:20:04,620

Columbia so oh yeah this your familiar

1875

01:20:09,800 --> 01:20:07,410

accent yeah got it

1876

01:20:11,990 --> 01:20:09,810

speaking of that you you have a lot of

1877

01:20:13,250 --> 01:20:12,000

cloudy weather there don't you I mean is

1878

01:20:16,130 --> 01:20:13,260

it hard to get out there with a

1879

01:20:19,370 --> 01:20:16,140

telescope a lot of the time yeah so I

1880

01:20:22,010 --> 01:20:19,380

don't bother I have I have a great

1881

01:20:24,350 --> 01:20:22,020

partnership with ocean side photo and

1882

01:20:26,060 --> 01:20:24,360

telescope which is a telescope shop out

1883

01:20:28,520 --> 01:20:26,070

of San Diego which has perfect weather

1884

01:20:30,040 --> 01:20:28,530

and they have their building remote

1885

01:20:31,540 --> 01:20:30,050

telescopes around the

1886

01:20:34,000 --> 01:20:31,550

and they let me use their remote

1887

01:20:36,160 --> 01:20:34,010

telescopes so a couple of times a week

1888

01:20:37,780 --> 01:20:36,170

actually if people are interested on my

1889

01:20:40,750 --> 01:20:37,790

twitch channel and on my youtube channel

1890

01:20:44,410 --> 01:20:40,760

I hook up these camp these telescopes to

1891

01:20:46,450 --> 01:20:44,420

the to the internet to a live stream and

1892

01:20:49,930 --> 01:20:46,460

then I just like take requests and just

1893

01:20:51,930 --> 01:20:49,940

observe stuff in the night sky so we

1894

01:20:55,900 --> 01:20:51,940

call these virtual star parties and

1895

01:20:57,850 --> 01:20:55,910

we'll go after 10 20 30 objects that are

1896

01:20:59,320 --> 01:20:57,860

in the night sky tonight and just take

1897

01:21:01,720 --> 01:20:59,330

pictures alive so you want to see

1898

01:21:04,959 --> 01:21:01,730

Andromeda galaxies you want to see the

1899

01:21:08,080 --> 01:21:04,969

helix nebula if there's comets we'll try

1900

01:21:09,820 --> 01:21:08,090

and observe them as well and and we have

1901

01:21:12,160 --> 01:21:09,830

a lot of fun so so that's the way I get

1902

01:21:13,690 --> 01:21:12,170

around it is is I use technology and I

1903

01:21:15,400 --> 01:21:13,700

use telescopes that are located in

1904

01:21:17,260 --> 01:21:15,410

places with much better weather than me

1905

01:21:19,209 --> 01:21:17,270

to be able to still do the observing

1906

01:21:22,450 --> 01:21:19,219

that makes sense total sense a couple

1907

01:21:26,350 --> 01:21:22,460

questions I have for you in in astronomy

1908

01:21:29,560 --> 01:21:26,360

in general and and I do want to get I do

1909

01:21:32,350 --> 01:21:29,570

want to talk about asteroids too but the

1910

01:21:35,709 --> 01:21:32,360

Big Bang the Big Bang is always just

1911

01:21:37,300 --> 01:21:35,719

it's so hard to conceive and it's so

1912

01:21:41,170 --> 01:21:37,310

hard to conceive what could possibly

1913

01:21:43,660 --> 01:21:41,180

have been before it do you think it's

1914

01:21:46,000 --> 01:21:43,670

possible that we may have some part of

1915

01:21:50,410 --> 01:21:46,010

that very wrong or do you think we have

1916

01:21:52,690 --> 01:21:50,420

it sewn up the evidence for the big bang

1917

01:21:55,209 --> 01:21:52,700

and like I think it's really important

1918

01:21:59,020 --> 01:21:55,219

to separate this right so the idea of

1919

01:22:04,030 --> 01:21:59,030

the Big Bang is is this discovery that

1920

01:22:07,180 --> 01:22:04,040

was made 80 years ago that galaxies in

1921

01:22:13,030 --> 01:22:07,190

the universe are moving away from us in

1922

01:22:14,740 --> 01:22:13,040

all directions and so if if you look in

1923

01:22:17,590 --> 01:22:14,750

in every direction you see these

1924

01:22:19,900 --> 01:22:17,600

galaxies and they are and and the the

1925

01:22:22,330 --> 01:22:19,910

methodology of measuring the distance

1926

01:22:24,550 --> 01:22:22,340

the the rate that these galaxies are

1927

01:22:27,610 --> 01:22:24,560

moving away from us is very is very

1928

01:22:29,380 --> 01:22:27,620

accurate very precise and so you know

1929

01:22:31,420 --> 01:22:29,390

you come to this conclusion that these

1930

01:22:32,920 --> 01:22:31,430

these galaxies are all moving away so

1931

01:22:35,260 --> 01:22:32,930

then you ask yourself well if you just

1932

01:22:37,240 --> 01:22:35,270

run the clock backwards was there time

1933

01:22:38,979 --> 01:22:37,250

when what are all these galaxies that

1934

01:22:41,950 --> 01:22:38,989

are moving away from us we're closer

1935

01:22:43,240 --> 01:22:41,960

together right and that is really at the

1936

01:22:46,360 --> 01:22:43,250

heart of it that's all the big

1937

01:22:49,180 --> 01:22:46,370

says the big bank says the universe is

1938

01:22:53,200 --> 01:22:49,190

less dense to today and it was more

1939

01:22:55,140 --> 01:22:53,210

dense in the past and and you can run

1940

01:22:57,670 --> 01:22:55,150

the clock back all the way back until

1941

01:23:00,010 --> 01:22:57,680

13.8 billion years ago at a time when

1942

01:23:04,270 --> 01:23:00,020

the universe was as dense as the heart

1943

01:23:06,220 --> 01:23:04,280

of a star and run the clock even further

1944

01:23:08,980 --> 01:23:06,230

back than that to a point when the

1945

01:23:12,790 --> 01:23:08,990

universe was so hot and so dense that

1946

01:23:17,920 --> 01:23:12,800

atoms themselves wouldn't form they were

1947

01:23:20,830 --> 01:23:17,930

just this soup of of hot energy and and

1948

01:23:23,710 --> 01:23:20,840

then you and then something caused this

1949

01:23:26,170 --> 01:23:23,720

expansion to happen what caused the

1950

01:23:29,110 --> 01:23:26,180

expansion we don't know what came before

1951

01:23:33,640 --> 01:23:29,120

the expansion we don't know the Big

1952

01:23:36,760 --> 01:23:33,650

Bang's job is to not tell you what came

1953

01:23:38,920 --> 01:23:36,770

before all the Big Bang says is huh this

1954

01:23:40,840 --> 01:23:38,930

is weird the universe is expanding that

1955

01:23:42,820 --> 01:23:40,850

means it was probably close together in

1956

01:23:44,650 --> 01:23:42,830

the past and astronomers have searched

1957

01:23:47,830 --> 01:23:44,660

for evidence that the universe was close

1958

01:23:49,180 --> 01:23:47,840

together in the past and they find it in

1959

01:23:53,800 --> 01:23:49,190

the cosmic microwave background

1960

01:23:56,680 --> 01:23:53,810

radiation this is time when when the

1961

01:23:58,690 --> 01:23:56,690

moment when the universe had cooled down

1962

01:24:00,910 --> 01:23:58,700

to the point that light was able to

1963

01:24:03,940 --> 01:24:00,920

escape into the universe when they look

1964

01:24:05,980 --> 01:24:03,950

at the quantities of hydrogen like the

1965

01:24:09,100 --> 01:24:05,990

ratio between hydrogen and helium

1966

01:24:11,020 --> 01:24:09,110

because for a certain amount of time the

1967

01:24:14,230 --> 01:24:11,030

entire universe was acting like a star

1968

01:24:16,390 --> 01:24:14,240

it was actively fusing hydrogen into

1969

01:24:18,610 --> 01:24:16,400

helium and so and so astronomers have

1970

01:24:20,620 --> 01:24:18,620

found this and and and many more other

1971

01:24:23,080 --> 01:24:20,630

lines of evidence that say yes indeed

1972

01:24:25,720 --> 01:24:23,090

the universe is expanding it was more

1973

01:24:28,480 --> 01:24:25,730

dense in the past and was really really

1974

01:24:32,620 --> 01:24:28,490

dense 13.8 billion years ago

1975

01:24:34,660 --> 01:24:32,630

but but and evolution is a great example

1976

01:24:36,310 --> 01:24:34,670

of a similar question that you ask

1977

01:24:40,270 --> 01:24:36,320

yourself right do we see bacteria

1978

01:24:44,320 --> 01:24:40,280

changing do we do we assume that thanks

1979

01:24:46,120 --> 01:24:44,330

to evolution natural selection different

1980

01:24:48,790 --> 01:24:46,130

bird species diverged from one another

1981

01:24:50,710 --> 01:24:48,800

yes the evidence is overwhelming on so

1982

01:24:52,990 --> 01:24:50,720

many levels where did that first life

1983

01:24:55,420 --> 01:24:53,000

form come from don't know yeah

1984

01:24:56,950 --> 01:24:55,430

evolutions job is not to answer that

1985

01:24:57,220 --> 01:24:56,960

question evolution just says look at all

1986

01:25:00,370 --> 01:24:57,230

this

1987

01:25:01,750 --> 01:25:00,380

changing its some other theories job to

1988

01:25:02,979 --> 01:25:01,760

figure out where that first life-form

1989

01:25:04,690 --> 01:25:02,989

came from Wow

1990

01:25:06,670 --> 01:25:04,700

we have a caller on the line hold on

1991

01:25:09,250 --> 01:25:06,680

just one moment I have one quick other

1992

01:25:11,920 --> 01:25:09,260

question do you I know you don't like to

1993

01:25:13,390 --> 01:25:11,930

guess about anything but I'm gonna ask

1994

01:25:17,040 --> 01:25:13,400

you to guess anyway do you think that

1995

01:25:22,240 --> 01:25:17,050

there was time before the Big Bang

1996

01:25:24,160 --> 01:25:22,250

well the one I mean this is now sort of

1997

01:25:27,310 --> 01:25:24,170

going to beyond my paygrade as a

1998

01:25:31,440 --> 01:25:27,320

journalist but the people that I have

1999

01:25:34,090 --> 01:25:31,450

talked to you know space and time are

2000

01:25:36,250 --> 01:25:34,100

connected and this is one of the the

2001

01:25:40,360 --> 01:25:36,260

things that Einstein helped us

2002

01:25:43,450 --> 01:25:40,370

understand with his with his theories of

2003

01:25:48,370 --> 01:25:43,460

relativity and so it really does seem

2004

01:25:51,040 --> 01:25:48,380

like you can't have time without without

2005

01:25:56,170 --> 01:25:51,050

the space without the universe and that

2006

01:25:59,590 --> 01:25:56,180

time is is part of it so so was there

2007

01:26:02,470 --> 01:25:59,600

time before the universe we don't know

2008

01:26:05,020 --> 01:26:02,480

yeah it's a huge are there other

2009

01:26:08,080 --> 01:26:05,030

universes where time exists in different

2010

01:26:09,850 --> 01:26:08,090

ways we don't know there are one example

2011

01:26:11,770 --> 01:26:09,860

there's this idea of inflation one of

2012

01:26:15,190 --> 01:26:11,780

the explanations like the Big Bang has a

2013

01:26:17,140 --> 01:26:15,200

bunch of of the in its current form has

2014

01:26:18,670 --> 01:26:17,150

some things that it doesn't explain very

2015

01:26:19,780 --> 01:26:18,680

well about observations that have been

2016

01:26:21,850 --> 01:26:19,790

made in the universe and so this

2017

01:26:23,320 --> 01:26:21,860

additional theory called inflation to

2018

01:26:25,510 --> 01:26:23,330

help explain what happened in the

2019

01:26:27,100 --> 01:26:25,520

earliest moments of the universe has

2020

01:26:28,210 --> 01:26:27,110

been proposed and now astronomers are

2021

01:26:30,640 --> 01:26:28,220

searching for evidence of this

2022

01:26:32,530 --> 01:26:30,650

inflationary period but one of the

2023

01:26:34,540 --> 01:26:32,540

things that it requires is the creation

2024

01:26:38,350 --> 01:26:34,550

literally that there are other universes

2025

01:26:39,850 --> 01:26:38,360

as well so you kind of can't have one

2026

01:26:42,670 --> 01:26:39,860

without the other and so it could very

2027

01:26:44,200 --> 01:26:42,680

well be that that time is there was time

2028

01:26:45,640 --> 01:26:44,210

and it could very well be that the time

2029

01:26:47,080 --> 01:26:45,650

is part of the universe but again this

2030

01:26:50,470 --> 01:26:47,090

is these are the questions you ask

2031

01:26:52,810 --> 01:26:50,480

cosmologists not space journalist ok

2032

01:26:55,479 --> 01:26:52,820

caller welcome to the show your first

2033

01:26:57,580 --> 01:26:55,489

name and where are you calling from this

2034

01:27:00,130 --> 01:26:57,590

is Bobby from North Carolina Oh Bobby

2035

01:27:02,470 --> 01:27:00,140

how you doing good good how are you

2036

01:27:05,380 --> 01:27:02,480

great great you have a question for our

2037

01:27:07,330 --> 01:27:05,390

guest actually I guess yeah two

2038

01:27:08,740 --> 01:27:07,340

observations um first of all I really

2039

01:27:10,720 --> 01:27:08,750

don't believe your guest I think you

2040

01:27:11,250 --> 01:27:10,730

really have seen an UFO and doesn't want

2041

01:27:14,439 --> 01:27:11,260

to mention

2042

01:27:16,390 --> 01:27:14,449

right now he pretty much looks like the

2043

01:27:18,040 --> 01:27:16,400

character that played Ronnie played

2044

01:27:19,959 --> 01:27:18,050

migration Dreyfuss on the Close

2045

01:27:21,040 --> 01:27:19,969

Encounters of the Third Kind he looked

2046

01:27:24,250 --> 01:27:21,050

like he's got some kind of severe

2047

01:27:29,049 --> 01:27:24,260

sunburn going yeah yeah I just came back

2048

01:27:32,189 --> 01:27:29,059

from two weeks in the Caribbean Sea say

2049

01:27:35,529 --> 01:27:32,199

that evidence that's evidence Bobby yeah

2050

01:27:36,669 --> 01:27:35,539

and the Caribbean dangerous we could

2051

01:27:38,919 --> 01:27:36,679

have missing time down there really

2052

01:27:42,790 --> 01:27:38,929

easily yeah I know it's a lot of

2053

01:27:45,850 --> 01:27:42,800

triangles going on there the other thing

2054

01:27:46,839 --> 01:27:45,860

you brought up the umayal mouth asteroid

2055

01:27:50,739 --> 01:27:46,849

that came by the earth

2056

01:27:52,479 --> 01:27:50,749

I find it real interesting that it came

2057

01:27:54,759 --> 01:27:52,489

in at a really perfect trajectory came

2058

01:27:56,770 --> 01:27:54,769

in between the Sun and mercury and came

2059

01:27:58,750 --> 01:27:56,780

up from the southern hemisphere of the

2060

01:28:01,959 --> 01:27:58,760

earth at a very high velocity really

2061

01:28:03,489 --> 01:28:01,969

fast it wasn't seen till actually it

2062

01:28:03,910 --> 01:28:03,499

didn't pass the earth because it was so

2063

01:28:07,689 --> 01:28:03,920

dark

2064

01:28:10,239 --> 01:28:07,699

they're saying it's a comet now because

2065

01:28:12,850 --> 01:28:10,249

apparently did it force projectory as it

2066

01:28:14,459 --> 01:28:12,860

was leaving the solar system and you

2067

01:28:17,049 --> 01:28:14,469

know an asteroid shouldn't do of course

2068

01:28:18,429 --> 01:28:17,059

trajectory but if it was a comet it

2069

01:28:19,629 --> 01:28:18,439

should have out gas when they passed by

2070

01:28:21,339 --> 01:28:19,639

the Sun and they would have seen it

2071

01:28:23,709 --> 01:28:21,349

meant the other thing that I find really

2072

01:28:26,739 --> 01:28:23,719

interesting about that is it was radar

2073

01:28:29,259 --> 01:28:26,749

imaged and zero images of it had been

2074

01:28:33,339 --> 01:28:29,269

released it's reported it was 15

2075

01:28:35,379 --> 01:28:33,349

kilometers wide and 77 vomited up the

2076

01:28:37,779 --> 01:28:35,389

cylindrical shape I just find it really

2077

01:28:40,120 --> 01:28:37,789

odd that no radar introduced at all it's

2078

01:28:42,429 --> 01:28:40,130

been released and I'll take my answer

2079

01:28:44,379 --> 01:28:42,439

off the air there all right important

2080

01:28:49,140 --> 01:28:44,389

thanks

2081

01:28:52,870 --> 01:28:49,150

yeah so that idea of a muumuu that was a

2082

01:28:56,259 --> 01:28:52,880

was discovered last year in a really

2083

01:28:58,179 --> 01:28:56,269

interesting trajectory one that

2084

01:29:01,449 --> 01:28:58,189

indicated that it that its source was

2085

01:29:04,089 --> 01:29:01,459

outside of the of the solar system as

2086

01:29:05,770 --> 01:29:04,099

soon as it was discovered I mean this is

2087

01:29:07,569 --> 01:29:05,780

the way these observations work there's

2088

01:29:09,549 --> 01:29:07,579

this network of astronomers and someone

2089

01:29:11,049 --> 01:29:09,559

says I'm seeing something weird can

2090

01:29:13,060 --> 01:29:11,059

anyone confirm this do you actually go

2091

01:29:16,509 --> 01:29:13,070

back and and watch these conversations

2092

01:29:18,699 --> 01:29:16,519

unfold between astronomers and more and

2093

01:29:20,859 --> 01:29:18,709

more people came online and and observe

2094

01:29:24,160 --> 01:29:20,869

the same object and saw the same kind of

2095

01:29:25,000 --> 01:29:24,170

motion that it was making the and as

2096

01:29:31,689 --> 01:29:25,010

your caller exact

2097

01:29:34,299 --> 01:29:31,699

we said as it moved through the past the

2098

01:29:36,250 --> 01:29:34,309

Sun it didn't create a coma didn't

2099

01:29:38,080 --> 01:29:36,260

didn't the in the way that a comet would

2100

01:29:40,750 --> 01:29:38,090

and so they made the assumption that it

2101
01:29:43,450 --> 01:29:40,760
was an asteroid but then the trajectory

2102
01:29:46,509 --> 01:29:43,460
that it took had the kind of random

2103
01:29:48,310 --> 01:29:46,519
drifting that comets tend to do as they

2104
01:29:50,250 --> 01:29:48,320
are outgassing and so the answer right

2105
01:29:54,700 --> 01:29:50,260
now is that it probably was a comment

2106
01:29:58,509 --> 01:29:54,710
and but why didn't demonstrate a coma is

2107
01:30:00,250 --> 01:29:58,519
still a mystery what you know exactly

2108
01:30:03,580 --> 01:30:00,260
how it's out casting is still a mystery

2109
01:30:05,919 --> 01:30:03,590
as well um I don't know of any radar

2110
01:30:08,470 --> 01:30:05,929
images that were that were attempted to

2111
01:30:10,810 --> 01:30:08,480
be taken of it a lot of times they do in

2112
01:30:13,839 --> 01:30:10,820
fact there's a really cool comet that's

2113
01:30:16,990 --> 01:30:13,849

gonna be passing the earth shortly they

2114

01:30:19,060 --> 01:30:17,000

call it the the Halloween comment it's

2115

01:30:21,970 --> 01:30:19,070

this really looks like a skull and you

2116

01:30:26,740 --> 01:30:21,980

know and so astronomers will actively

2117

01:30:29,200 --> 01:30:26,750

fire radar at one of these objects then

2118

01:30:30,850 --> 01:30:29,210

they see the images that bounce back and

2119

01:30:32,140 --> 01:30:30,860

then they can they can analyze them one

2120

01:30:34,540 --> 01:30:32,150

thing that's great talking about the the

2121

01:30:37,089 --> 01:30:34,550

SETI Institute they attempted they

2122

01:30:40,359 --> 01:30:37,099

turned the the telescopes of the

2123

01:30:41,740 --> 01:30:40,369

breakthrough listen array at omamo to

2124

01:30:43,779 --> 01:30:41,750

try and see if they could detect any

2125

01:30:45,520 --> 01:30:43,789

signal coming from it and apparently if

2126
01:30:48,310 --> 01:30:45,530
you were on the surface of a moo-moo

2127
01:30:53,649 --> 01:30:48,320
with a with a cellphone they would have

2128
01:31:00,819 --> 01:30:53,659
detected it so so I I was not I mean I

2129
01:31:06,040 --> 01:31:00,829
getting Google it was anyone had done

2130
01:31:10,540 --> 01:31:06,050
any radar images of it but I haven't

2131
01:31:14,140 --> 01:31:10,550
seen anything the the shape that they

2132
01:31:15,520 --> 01:31:14,150
knew of they used with they were simply

2133
01:31:16,330 --> 01:31:15,530
looked at the brightness of the object

2134
01:31:17,890 --> 01:31:16,340
and it could tell that it was

2135
01:31:19,359 --> 01:31:17,900
brightening and dimming in a way that

2136
01:31:21,549 --> 01:31:19,369
showed that it was tumbling and they

2137
01:31:23,560 --> 01:31:21,559
could tell what the what the dimensions

2138
01:31:25,209 --> 01:31:23,570

were that it was very cylindrical shaped

2139

01:31:26,890 --> 01:31:25,219

and the problem is that it's moving

2140

01:31:30,040 --> 01:31:26,900

through the solar system at 60

2141

01:31:33,370 --> 01:31:30,050

kilometers per second and is gone and

2142

01:31:35,020 --> 01:31:33,380

that was our shot and there's no way to

2143

01:31:38,029 --> 01:31:35,030

catch up with it and look at it any

2144

01:31:39,709 --> 01:31:38,039

better so so until the next one comes

2145

01:31:42,949 --> 01:31:39,719

along we're gonna have to say goodbye to

2146

01:31:45,229 --> 01:31:42,959

that one I I know on your astronomy cast

2147

01:31:47,209 --> 01:31:45,239

I've heard you and Pamela say a number

2148

01:31:47,599 --> 01:31:47,219

of times the universe is trying to kill

2149

01:31:50,179 --> 01:31:47,609

us

2150

01:31:52,939 --> 01:31:50,189

I believe that look one of your favorite

2151

01:31:54,139 --> 01:31:52,949

sayings right it definitely is it you

2152

01:32:00,859 --> 01:31:54,149

know could have tried harder with this

2153

01:32:03,169 --> 01:32:00,869

one because it wasn't very close but but

2154

01:32:05,359 --> 01:32:03,179

yeah absolutely the universe is the

2155

01:32:06,979 --> 01:32:05,369

universe is a large and hostile place

2156

01:32:09,619 --> 01:32:06,989

that doesn't care about us one bit

2157

01:32:11,349 --> 01:32:09,629

that's right yeah and we're you know

2158

01:32:13,939 --> 01:32:11,359

it's hard when you're walking around

2159

01:32:16,129 --> 01:32:13,949

everyday life and you're looking up at

2160

01:32:18,079 --> 01:32:16,139

the beautiful blue sky to know that it's

2161

01:32:20,209 --> 01:32:18,089

almost like The Truman Show it's open up

2162

01:32:21,709 --> 01:32:20,219

above anything can fall in you know like

2163

01:32:25,309 --> 01:32:21,719

I don't know if you ever saw that when a

2164

01:32:27,199 --> 01:32:25,319

light photon or something but so but

2165

01:32:29,119 --> 01:32:27,209

we're just so vulnerable we're

2166

01:32:31,159 --> 01:32:29,129

vulnerable because we're going through

2167

01:32:33,469 --> 01:32:31,169

space at whatever it is 40,000 miles an

2168

01:32:36,079 --> 01:32:33,479

hour I don't even know what it is you

2169

01:32:37,879 --> 01:32:36,089

know anything happen and this leads me

2170

01:32:40,069 --> 01:32:37,889

yeah the topic of asteroids because

2171

01:32:42,259 --> 01:32:40,079

we're on it right now

2172

01:32:45,379 --> 01:32:42,269

and I remember there was an astronaut

2173

01:32:48,829 --> 01:32:45,389

that started some type of foundation to

2174

01:32:50,989 --> 01:32:48,839

look into protecting us from asteroids

2175

01:32:53,000 --> 01:32:50,999

how important I think it's very

2176
01:32:56,299 --> 01:32:53,010
important myself what are your thoughts

2177
01:32:58,429 --> 01:32:56,309
on that yeah it's I'm sort of a little

2178
01:33:00,259 --> 01:32:58,439
bit mixed so it used to scare me more

2179
01:33:02,389 --> 01:33:00,269
than it does today and then maybe that's

2180
01:33:04,369 --> 01:33:02,399
because more these objects have been

2181
01:33:10,219 --> 01:33:04,379
discovered but you're talking about the

2182
01:33:13,309 --> 01:33:10,229
b612 foundation as which and and their

2183
01:33:15,889 --> 01:33:13,319
goal was to really push this idea that

2184
01:33:18,289 --> 01:33:15,899
we are just one bad space rock away from

2185
01:33:20,079 --> 01:33:18,299
from destruction and it's absolutely

2186
01:33:23,389 --> 01:33:20,089
true when you look back through history

2187
01:33:24,739 --> 01:33:23,399
many of the great extinction extinctions

2188
01:33:27,049 --> 01:33:24,749

that have happened here on earth were

2189

01:33:29,149 --> 01:33:27,059

caused by an asteroid there are it is

2190

01:33:31,279 --> 01:33:29,159

not a question of if it's a matter of

2191

01:33:33,649 --> 01:33:31,289

when another big space rock is gonna

2192

01:33:35,899 --> 01:33:33,659

crash into the earth and and and do a

2193

01:33:38,599 --> 01:33:35,909

lot of damage the last time one was

2194

01:33:42,889 --> 01:33:38,609

really destructive was 65 million years

2195

01:33:45,109 --> 01:33:42,899

ago so we've seen things like Tunguska

2196

01:33:47,929 --> 01:33:45,119

yeah and when we saw the Chelyabinsk

2197

01:33:50,929 --> 01:33:47,939

meteor that that crashed over Russia

2198

01:33:51,560 --> 01:33:50,939

back like ten years ago now it's a

2199

01:33:57,410 --> 01:33:51,570

better I think

2200

01:33:59,180 --> 01:33:57,420

yeah yeah it's been a long time so so so

2201
01:34:00,560 --> 01:33:59,190
we see that we are still in a shooting

2202
01:34:02,479 --> 01:34:00,570
gallery it turns out that probably

2203
01:34:04,720 --> 01:34:02,489
there's there's a dozen events like

2204
01:34:08,930 --> 01:34:04,730
jelly beans that happen every every

2205
01:34:11,540 --> 01:34:08,940
decade so if one of those like a

2206
01:34:16,490 --> 01:34:11,550
Tunguska hits a city then the loss of

2207
01:34:19,370 --> 01:34:16,500
life would be enormous so so that's

2208
01:34:22,010 --> 01:34:19,380
definitely a concern NASA has had had a

2209
01:34:24,560 --> 01:34:22,020
bit of a mandate to search for a large

2210
01:34:26,899 --> 01:34:24,570
percentage of the most dangerous

2211
01:34:30,319 --> 01:34:26,909
asteroids and they've completed that so

2212
01:34:35,450 --> 01:34:30,329
we now know that there are no more there

2213
01:34:37,939 --> 01:34:35,460

are no dangerous Yucatan Peninsula kind

2214

01:34:40,459 --> 01:34:37,949

of asteroid impacts coming our way

2215

01:34:45,770 --> 01:34:40,469

but there is still an enormous number in

2216

01:34:47,720 --> 01:34:45,780

that 10 meter 2 kilometer range and so

2217

01:34:50,899 --> 01:34:47,730

there's a couple of missions in the

2218

01:34:52,790 --> 01:34:50,909

works that will potentially try to track

2219

01:34:55,970 --> 01:34:52,800

these down both ground and space-based

2220

01:34:58,819 --> 01:34:55,980

there's one called neo cam nearer that a

2221

01:35:00,740 --> 01:34:58,829

near Earth object cam which is going to

2222

01:35:03,200 --> 01:35:00,750

be a space telescope that will scan the

2223

01:35:06,169 --> 01:35:03,210

skies in the infrared spectrum looking

2224

01:35:09,140 --> 01:35:06,179

for these cooler asteroids and then

2225

01:35:10,669 --> 01:35:09,150

there is the there's a there's a

2226

01:35:12,350 --> 01:35:10,679

ground-based Observatory that I'm really

2227

01:35:14,780 --> 01:35:12,360

excited about called the large synoptic

2228

01:35:17,720 --> 01:35:14,790

survey telescope and it is going to be

2229

01:35:19,399 --> 01:35:17,730

this amazing instrument that scans the

2230

01:35:22,100 --> 01:35:19,409

entire night sky at a really high

2231

01:35:24,109 --> 01:35:22,110

resolution every couple of days so every

2232

01:35:26,060 --> 01:35:24,119

couple of nights it's it's gonna be out

2233

01:35:27,979 --> 01:35:26,070

of Chile oh yeah with all of the other

2234

01:35:31,609 --> 01:35:27,989

big observatories down in Chile yes guys

2235

01:35:33,470 --> 01:35:31,619

so it clear there yeah yeah and and you

2236

01:35:35,510 --> 01:35:33,480

can kind of get up into the high Andes

2237

01:35:37,010 --> 01:35:35,520

and get in the desert and and there's a

2238

01:35:38,240 --> 01:35:37,020

lot of space for observatories down

2239

01:35:39,859 --> 01:35:38,250

there it's kind of a shame there isn't

2240

01:35:42,080 --> 01:35:39,869

there won't be a version in the northern

2241

01:35:45,189 --> 01:35:42,090

hemisphere so so the southern hemisphere

2242

01:35:47,180 --> 01:35:45,199

will know but the North is a mystery um

2243

01:35:48,770 --> 01:35:47,190

and that's actually a bigger problem in

2244

01:35:50,240 --> 01:35:48,780

astronomy right now is there's a lot

2245

01:35:51,560 --> 01:35:50,250

more observatories getting built into

2246

01:35:54,649 --> 01:35:51,570

the southern hemisphere and not as many

2247

01:35:55,790 --> 01:35:54,659

in the North but um but yeah and so so

2248

01:35:58,669 --> 01:35:55,800

the LSST

2249

01:35:59,959 --> 01:35:58,679

on its own as part of it in as part of

2250

01:36:02,689 --> 01:35:59,969

all the other things that it does

2251

01:36:05,150 --> 01:36:02,699

discovering dwarf planets and finding

2252

01:36:08,750 --> 01:36:05,160

supernovae and and all that is

2253

01:36:12,230 --> 01:36:08,760

could be the instrument that finds 90%

2254

01:36:15,200 --> 01:36:12,240

of the dangerous space rocks within a

2255

01:36:16,940 --> 01:36:15,210

decade so so we are now around the

2256

01:36:18,830 --> 01:36:16,950

corner of being able to do that now once

2257

01:36:20,570 --> 01:36:18,840

you have found them then you need to

2258

01:36:22,190 --> 01:36:20,580

find out whether you can stop them and

2259

01:36:23,750 --> 01:36:22,200

so there's a bunch of other missions

2260

01:36:25,250 --> 01:36:23,760

that are in the works and the one that

2261

01:36:28,970 --> 01:36:25,260

NASA is working on right now is called

2262

01:36:31,430 --> 01:36:28,980

dart and and I figured the acronym

2263

01:36:34,310 --> 01:36:31,440

stands for but the gist is that they're

2264

01:36:37,220 --> 01:36:34,320

going to try to redirect an asteroid so

2265

01:36:39,770 --> 01:36:37,230

they're graphics they're gonna slam an

2266

01:36:41,870 --> 01:36:39,780

impactor into an asteroid and then find

2267

01:36:43,820 --> 01:36:41,880

out how much that they were able to

2268

01:36:46,850 --> 01:36:43,830

change the trajectory of the asteroid

2269

01:36:51,650 --> 01:36:46,860

and then use that as a way to figure out

2270

01:36:53,210 --> 01:36:51,660

whether what it'll take if we do find a

2271

01:36:56,210 --> 01:36:53,220

potentially dangerous asteroid down the

2272

01:36:58,370 --> 01:36:56,220

road so it's it's work that's overdue in

2273

01:37:02,360 --> 01:36:58,380

my opinion and I'm glad that this is

2274

01:37:04,310 --> 01:37:02,370

being done and to just the only way to

2275

01:37:06,110 --> 01:37:04,320

know if there's anything we can do about

2276

01:37:08,750 --> 01:37:06,120

these things to try to do things about

2277

01:37:10,580 --> 01:37:08,760

them and until we have done this we

2278

01:37:12,440 --> 01:37:10,590

won't know what's the best way peoples

2279

01:37:13,850 --> 01:37:12,450

ask me what's the best way to stop an

2280

01:37:15,260 --> 01:37:13,860

asteroid and the answer is I don't know

2281

01:37:17,120 --> 01:37:15,270

we don't know we haven't done the

2282

01:37:18,830 --> 01:37:17,130

experiments yet right we haven't tried

2283

01:37:20,450 --> 01:37:18,840

moving them with a gravity tractor we

2284

01:37:21,620 --> 01:37:20,460

haven't tried banging into them we

2285

01:37:23,390 --> 01:37:21,630

haven't tried shooting them with a laser

2286

01:37:25,460 --> 01:37:23,400

we haven't tried painting them we

2287

01:37:29,300 --> 01:37:25,470

haven't tried attaching a solar sail we

2288

01:37:31,640 --> 01:37:29,310

haven't tried detaching of a maglev mass

2289

01:37:33,230 --> 01:37:31,650

driver to them and try firing debris off

2290

01:37:34,520 --> 01:37:33,240

of them we haven't tried hitting them

2291

01:37:38,060 --> 01:37:34,530

with a nuclear weapon like just so many

2292

01:37:39,890 --> 01:37:38,070

things that we can do to asteroids and

2293

01:37:42,110 --> 01:37:39,900

we don't know which one is gonna be the

2294

01:37:44,450 --> 01:37:42,120

one that helps us protect earth so I

2295

01:37:46,910 --> 01:37:44,460

want to want to try them all I think we

2296

01:37:48,080 --> 01:37:46,920

should now you mentioned earlier and I

2297

01:37:50,660 --> 01:37:48,090

don't remember if you said it was an

2298

01:37:52,610 --> 01:37:50,670

asteroid or what it was but had actually

2299

01:37:54,350 --> 01:37:52,620

there was evidence that it had traveled

2300

01:37:56,240 --> 01:37:54,360

through another solar system besides

2301

01:37:58,280 --> 01:37:56,250

ours do you remember that

2302

01:38:00,290 --> 01:37:58,290

that was the old mumu that I was talkin

2303

01:38:03,740 --> 01:38:00,300

okay so that was that so in particular

2304

01:38:06,880 --> 01:38:03,750

is it this is just a type of thing

2305

01:38:11,420 --> 01:38:06,890

either hypothetical is it possible that

2306

01:38:14,210 --> 01:38:11,430

we may someday encounter say a cluster

2307

01:38:16,310 --> 01:38:14,220

of asteroids that were just plain

2308

01:38:18,470 --> 01:38:16,320

unknown because we had never seen them

2309

01:38:22,910 --> 01:38:18,480

before or they were in a part where

2310

01:38:26,390 --> 01:38:22,920

our lifetime our are as far as we've

2311

01:38:28,750 --> 01:38:26,400

been had the ability to look the last

2312

01:38:32,060 --> 01:38:28,760

time it came close was way beyond that

2313

01:38:33,950 --> 01:38:32,070

well I mean there there are the comets

2314

01:38:35,930 --> 01:38:33,960

the long period comets that that come

2315

01:38:37,850 --> 01:38:35,940

from the Oort cloud and they when they

2316

01:38:39,979 --> 01:38:37,860

make their journey down into the middle

2317

01:38:43,370 --> 01:38:39,989

of the solar system they're making their

2318

01:38:47,810 --> 01:38:43,380

first journey from me from the edges of

2319

01:38:50,210 --> 01:38:47,820

of space and so from the solar system so

2320

01:38:51,680 --> 01:38:50,220

so those guys and it made me take them a

2321

01:38:53,600 --> 01:38:51,690

million years or a hundred thousand

2322

01:38:55,640 --> 01:38:53,610

years to fall in from the Oort cloud

2323

01:38:57,920 --> 01:38:55,650

down into this into the inner solar

2324

01:39:01,610 --> 01:38:57,930

system and and make a close flyby of the

2325

01:39:02,780 --> 01:39:01,620

Sun and then back out so those are the

2326

01:39:04,700 --> 01:39:02,790

ones and there's really no way to

2327

01:39:06,350 --> 01:39:04,710

predict or prevent them they come out of

2328

01:39:08,990 --> 01:39:06,360

nowhere they're coming at tremendous

2329

01:39:10,790 --> 01:39:09,000

velocities they zip through the inner

2330

01:39:14,300 --> 01:39:10,800

solar system and they fly back out again

2331

01:39:16,880 --> 01:39:14,310

and you may have months to prepare for

2332

01:39:19,040 --> 01:39:16,890

the impact of a comet like that those

2333

01:39:22,250 --> 01:39:19,050

are the ones these these interstellar

2334

01:39:24,729 --> 01:39:22,260

objects that are moving 60 you know 60

2335

01:39:27,680 --> 01:39:24,739

kilometres a second on a hyperbolic

2336

01:39:30,440 --> 01:39:27,690

orbit you would have no way to prevent

2337

01:39:32,600 --> 01:39:30,450

them as well if one was on a direct

2338

01:39:34,250 --> 01:39:32,610

impact with earth it would just come out

2339

01:39:35,990 --> 01:39:34,260

of nowhere and hit the earth and you

2340

01:39:41,510 --> 01:39:36,000

would have really no warning beyond it

2341

01:39:43,310 --> 01:39:41,520

maybe a couple of weeks at most but oh I

2342

01:39:45,380 --> 01:39:43,320

should say but but the but the ones that

2343

01:39:47,810 --> 01:39:45,390

were most concerned with are the are the

2344

01:39:49,850 --> 01:39:47,820

ones that we see all the time the earth

2345

01:39:53,090 --> 01:39:49,860

objects that jostle each other and

2346

01:39:56,930 --> 01:39:53,100

constantly pass over the Earth's orbit

2347

01:39:58,460 --> 01:39:56,940

and and and smaller ones slant are

2348

01:40:01,100 --> 01:39:58,470

slamming into our atmosphere all the

2349

01:40:03,140 --> 01:40:01,110

time like like there are those really

2350

01:40:04,310 --> 01:40:03,150

rare events that could happen but most

2351

01:40:06,080 --> 01:40:04,320

likely it's going to be from one of

2352

01:40:08,330 --> 01:40:06,090

these objects that we see all the time

2353

01:40:10,130 --> 01:40:08,340

that we're constantly but that are

2354

01:40:15,110 --> 01:40:10,140

buzzing around the the Earth's orbit

2355

01:40:18,260 --> 01:40:15,120

right right and the do you think it'd be

2356

01:40:20,030 --> 01:40:18,270

like in the movies if there was a killer

2357

01:40:21,200 --> 01:40:20,040

asteroid coming to earth and there was

2358

01:40:22,760 --> 01:40:21,210

nothing that could be done do you think

2359

01:40:24,710 --> 01:40:22,770

would be like in the movies that the

2360

01:40:27,459 --> 01:40:24,720

governments of the world would not say

2361

01:40:30,350 --> 01:40:27,469

anything I mean what could I do this

2362

01:40:32,060 --> 01:40:30,360

yeah well I mean things you can't hide

2363

01:40:35,990 --> 01:40:32,070

an asteroid

2364

01:40:37,400 --> 01:40:36,000

so yes doesn't matter that that I mean

2365

01:40:38,090 --> 01:40:37,410

this is what happened with oh

2366

01:40:39,910 --> 01:40:38,100

mooie-mooie

2367

01:40:41,960 --> 01:40:39,920

right is that an astronomer found it

2368

01:40:43,610 --> 01:40:41,970

communicated with other people said can

2369

01:40:46,370 --> 01:40:43,620

you confirm this is a thing other people

2370

01:40:48,110 --> 01:40:46,380

confirmed it and and everybody then

2371

01:40:52,100 --> 01:40:48,120

began making their observations the

2372

01:40:55,960 --> 01:40:52,110

night sky is being scanned by tens of

2373

01:40:59,890 --> 01:40:55,970

thousands of people every night and and

2374

01:41:03,500 --> 01:40:59,900

every object is is visible and seen so

2375

01:41:05,420 --> 01:41:03,510

it's not like there's like one shadowy

2376

01:41:07,640 --> 01:41:05,430

group with access to the most powerful

2377

01:41:10,550 --> 01:41:07,650

telescope and they and they're the ones

2378

01:41:14,180 --> 01:41:10,560

who decide what what gets told the night

2379

01:41:16,850 --> 01:41:14,190

sky is available to all of us and we can

2380

01:41:18,800 --> 01:41:16,860

all look at it and a lot of really

2381

01:41:20,240 --> 01:41:18,810

interesting discoveries come from and

2382

01:41:22,490 --> 01:41:20,250

from amateur astronomers that's how

2383

01:41:23,900 --> 01:41:22,500

comets get their names is that people

2384

01:41:26,660 --> 01:41:23,910

get to find them and then they get to

2385

01:41:28,220 --> 01:41:26,670

name them so right so I don't think

2386

01:41:31,690 --> 01:41:28,230

there's any possible way that you could

2387

01:41:34,670 --> 01:41:31,700

hide that any one group could control

2388

01:41:37,370 --> 01:41:34,680

what's being seen because anybody can do

2389

01:41:38,900 --> 01:41:37,380

the math right you find an object you do

2390

01:41:40,820 --> 01:41:38,910

the math you're like huh that's gonna

2391

01:41:43,130 --> 01:41:40,830

hit the earth right and then you tell

2392

01:41:44,150 --> 01:41:43,140

people so so it's not the kind of thing

2393

01:41:46,130 --> 01:41:44,160

that there would be any sort of

2394

01:41:48,830 --> 01:41:46,140

centralized control over that

2395

01:41:49,880 --> 01:41:48,840

information it's only in the movies yeah

2396

01:41:53,780 --> 01:41:49,890

it's only in the movie yes

2397

01:41:58,010 --> 01:41:53,790

so you mentioned super nova or supernova

2398

01:41:59,690 --> 01:41:58,020

is however you say it if there was and i

2399

01:42:01,850 --> 01:41:59,700

do want to talk a little more about what

2400

01:42:04,760 --> 01:42:01,860

can kill us because I think it's

2401

01:42:09,140 --> 01:42:04,770

interesting but so if there was a

2402

01:42:12,800 --> 01:42:09,150

supernova in our galaxy are we toast

2403

01:42:16,070 --> 01:42:12,810

no no supernova would need to go off

2404

01:42:18,920 --> 01:42:16,080

within really just a dozen a few dozen

2405

01:42:22,600 --> 01:42:18,930

light-years from us to cause us any kind

2406

01:42:26,270 --> 01:42:22,610

of damage so there are definitely no

2407

01:42:28,280 --> 01:42:26,280

stars that are that are gonna go

2408

01:42:32,270 --> 01:42:28,290

supernova that are close enough to us so

2409

01:42:35,480 --> 01:42:32,280

so from that we are pretty safe yeah and

2410

01:42:38,320 --> 01:42:35,490

gamma-ray bursts on the other hand they

2411

01:42:42,500 --> 01:42:38,330

can reach out across an entire galaxy

2412

01:42:44,120 --> 01:42:42,510

but we we do again it doesn't look like

2413

01:42:44,980 --> 01:42:44,130

there's any stars that we know of that

2414

01:42:47,440 --> 01:42:44,990

are

2415

01:42:50,350 --> 01:42:47,450

close enough or pointing their poles at

2416

01:42:52,150 --> 01:42:50,360

us that if the if the start did detonate

2417

01:42:54,700 --> 01:42:52,160

and generate a gamma-ray burst we would

2418

01:42:56,140 --> 01:42:54,710

we would have a problem so now it's

2419

01:42:58,390 --> 01:42:56,150

entirely possible that those are the

2420

01:43:01,240 --> 01:42:58,400

causes of mass extinction events in the

2421

01:43:03,430 --> 01:43:01,250

past but right now it doesn't seem like

2422

01:43:06,640 --> 01:43:03,440

it's a really big big concern I mean

2423

01:43:09,040 --> 01:43:06,650

there are I mean a black hole could pass

2424

01:43:11,440 --> 01:43:09,050

through the solar system and cause could

2425

01:43:14,080 --> 01:43:11,450

wreak a mate in you know enormous havoc

2426

01:43:15,970 --> 01:43:14,090

but then the solar system has been

2427

01:43:17,740 --> 01:43:15,980

moving along for four-and-a-half billion

2428

01:43:20,520 --> 01:43:17,750

years so far so the chances of that

2429

01:43:24,270 --> 01:43:20,530

happening seem pretty pretty remote the

2430

01:43:27,070 --> 01:43:24,280

the the existential crises that we face

2431

01:43:27,640 --> 01:43:27,080

feel like they are the ones of our own

2432

01:43:29,460 --> 01:43:27,650

making

2433

01:43:32,020 --> 01:43:29,470

they are the nuclear war they are the

2434

01:43:34,900 --> 01:43:32,030

the threat from artificial intelligence

2435

01:43:37,930 --> 01:43:34,910

of bioengineering from from climate

2436

01:43:40,450 --> 01:43:37,940

change things like that we those that's

2437

01:43:41,980 --> 01:43:40,460

the wild card and that's you know if you

2438

01:43:44,170 --> 01:43:41,990

had me think about the things that I'm

2439

01:43:46,740 --> 01:43:44,180

most concerned about I'm not at all

2440

01:43:49,690 --> 01:43:46,750

concerned about natural threats and and

2441

01:43:52,450 --> 01:43:49,700

100% concerned about what human beings

2442

01:43:53,890 --> 01:43:52,460

are doing and what we're working on and

2443

01:43:55,600 --> 01:43:53,900

think that we haven't really thought

2444

01:43:59,020 --> 01:43:55,610

through the consequences of what those

2445

01:44:02,500 --> 01:43:59,030

could cause yeah I've had discussions

2446

01:44:05,170 --> 01:44:02,510

about AI second yeah gets really scary

2447

01:44:07,150 --> 01:44:05,180

it gets really scary really fast yeah

2448

01:44:09,520 --> 01:44:07,160

and that's my I mean my background is in

2449

01:44:13,330 --> 01:44:09,530

computer science and oh that's right

2450

01:44:17,020 --> 01:44:13,340

yeah and I you know I know how badly

2451

01:44:19,180 --> 01:44:17,030

computers can behave so you know I mean

2452

01:44:21,490 --> 01:44:19,190

they're replicating things and you know

2453

01:44:23,530 --> 01:44:21,500

I mean the commands and yeah all that

2454

01:44:25,360 --> 01:44:23,540

yeah it just gets creepier you know

2455

01:44:27,520 --> 01:44:25,370

every year that goes by as our as our

2456

01:44:30,160 --> 01:44:27,530

artificial intelligence gets better and

2457

01:44:32,370 --> 01:44:30,170

more capable and things that we used to

2458

01:44:35,620 --> 01:44:32,380

think we're impossible are now done by

2459

01:44:37,780 --> 01:44:35,630

by technology it gets it you know you

2460

01:44:40,060 --> 01:44:37,790

kind of you start to go someone should

2461

01:44:42,010 --> 01:44:40,070

really look at what's going on and try

2462

01:44:44,890 --> 01:44:42,020

and figure out a way to minimize the

2463

01:44:46,810 --> 01:44:44,900

impact of it right just to remind the

2464

01:44:48,340 --> 01:44:46,820

listener on YouTube I'm solo tonight so

2465

01:44:51,700 --> 01:44:48,350

I don't have any way to check into the

2466

01:44:54,010 --> 01:44:51,710

chat room so if anyone wants to pose a

2467

01:44:57,190 --> 01:44:54,020

question you can call in that numbers up

2468

01:44:58,330 --> 01:44:57,200

on the screen so I want to talk a little

2469

01:45:00,459 --> 01:44:58,340

bit

2470

01:45:02,229 --> 01:45:00,469

see we have that it looks like about 10

2471

01:45:05,800 --> 01:45:02,239

or 12 minutes left here can we talk a

2472

01:45:07,419 --> 01:45:05,810

little bit another mystery there there

2473

01:45:09,790 --> 01:45:07,429

are so many mysteries when it comes to

2474

01:45:14,560 --> 01:45:09,800

space and you know it's dark matter I

2475

01:45:17,260 --> 01:45:14,570

mean that then is such a mystery and do

2476

01:45:19,270 --> 01:45:17,270

you think I don't know in your lifetime

2477

01:45:23,439 --> 01:45:19,280

but do you think that mystery can be

2478

01:45:27,220 --> 01:45:23,449

solved someday ah hmm

2479

01:45:28,540 --> 01:45:27,230

we don't know again the mean dark matter

2480

01:45:30,070 --> 01:45:28,550

is one of those really fascinating

2481

01:45:32,140 --> 01:45:30,080

mysteries that we you know we mentioned

2482

01:45:33,760 --> 01:45:32,150

earlier that there are mysteries that we

2483

01:45:36,270 --> 01:45:33,770

are in the middle of and dark matter is

2484

01:45:38,560 --> 01:45:36,280

absolutely one of these right that that

2485

01:45:41,229 --> 01:45:38,570

there is an enormous amount of evidence

2486

01:45:43,390 --> 01:45:41,239

that that we are not seeing the whole

2487

01:45:46,270 --> 01:45:43,400

universe that there that the vast

2488

01:45:48,640 --> 01:45:46,280

majority of the mass that's out there is

2489

01:45:52,419 --> 01:45:48,650

some kind of invisible matter that we

2490

01:45:54,580 --> 01:45:52,429

can't detect now astronomers have gotten

2491

01:45:57,220 --> 01:45:54,590

better and better at at figuring out

2492

01:45:58,780 --> 01:45:57,230

where this stuff is they can detect the

2493

01:46:01,740 --> 01:45:58,790

effect of its gravity and are able to

2494

01:46:05,800 --> 01:46:01,750

map out with incredible precision the

2495

01:46:07,149 --> 01:46:05,810

the concentrations of it and I always I

2496

01:46:08,680 --> 01:46:07,159

always laugh that you know we don't know

2497

01:46:12,250 --> 01:46:08,690

what this stuff is but we can use it as

2498

01:46:13,600 --> 01:46:12,260

a telescope which is so bizarre we can

2499

01:46:14,890 --> 01:46:13,610

use it to focus the light from more

2500

01:46:19,390 --> 01:46:14,900

distant objects but we don't know what

2501

01:46:21,459 --> 01:46:19,400

it is but and and so up until of you

2502

01:46:24,070 --> 01:46:21,469

know weight even it's still in a sort of

2503

01:46:26,379 --> 01:46:24,080

an undecided mystery about whether

2504

01:46:28,209 --> 01:46:26,389

there's some invisible mass or gravity

2505

01:46:32,200 --> 01:46:28,219

doesn't work the way we expected the

2506

01:46:34,149 --> 01:46:32,210

largest scales but there are a lot of

2507

01:46:36,910 --> 01:46:34,159

experiments in the works right now there

2508

01:46:40,959 --> 01:46:36,920

is there are particle detectors at the

2509

01:46:44,560 --> 01:46:40,969

bottom of old nickel mines in Sudbury

2510

01:46:46,510 --> 01:46:44,570

there is a cosmic ray detector onboard

2511

01:46:50,350 --> 01:46:46,520

the International Space Station there's

2512

01:46:54,310 --> 01:46:50,360

a gigantic neutrino Observatory if the

2513

01:46:56,830 --> 01:46:54,320

that is a cubic kilometer of ice in me

2514

01:46:59,439 --> 01:46:56,840

at the South Pole called Ice Cube there

2515

01:47:01,600 --> 01:46:59,449

are Japanese detectors there are so

2516

01:47:04,030 --> 01:47:01,610

there are there are probably the CERN

2517

01:47:06,399 --> 01:47:04,040

they're trying to make dark matter at

2518

01:47:08,350 --> 01:47:06,409

CERN they've got another idea there

2519

01:47:10,670 --> 01:47:08,360

they're looking for called accion's at

2520

01:47:12,980 --> 01:47:10,680

CERN so there are

2521

01:47:14,420 --> 01:47:12,990

I would say there are dozens of

2522

01:47:17,660 --> 01:47:14,430

experiments right now dozens of

2523

01:47:19,400 --> 01:47:17,670

detectors dozens of different ways that

2524

01:47:21,590 --> 01:47:19,410

people are trying to search for some

2525

01:47:23,120 --> 01:47:21,600

kind of evidence of dark matter it's

2526

01:47:24,950 --> 01:47:23,130

it's weird to be living in this universe

2527

01:47:26,900 --> 01:47:24,960

that we don't know what the vast

2528

01:47:28,970 --> 01:47:26,910

majority of it is made of and dark

2529

01:47:32,660 --> 01:47:28,980

energies and even bigger mystery me know

2530

01:47:36,590 --> 01:47:32,670

what that is so yeah yeah and so it's

2531

01:47:38,360 --> 01:47:36,600

great to just be again like people are

2532

01:47:42,710 --> 01:47:38,370

it's funny how that guy I always find

2533

01:47:44,900 --> 01:47:42,720

this really weird that people it bothers

2534

01:47:45,920 --> 01:47:44,910

people that that this mystery hasn't

2535

01:47:51,170 --> 01:47:45,930

been solved yet

2536

01:47:52,940 --> 01:47:51,180

and yet we we stand at the at the at the

2537

01:47:57,530 --> 01:47:52,950

conclusion of so many other mysteries

2538

01:48:00,830 --> 01:47:57,540

that have been solved and and so this

2539

01:48:02,810 --> 01:48:00,840

feeling that you have of not knowing the

2540

01:48:05,120 --> 01:48:02,820

route forward of not knowing what the

2541

01:48:07,600 --> 01:48:05,130

final destination is going to be to what

2542

01:48:11,120 --> 01:48:07,610

the answer is that discomfort and

2543

01:48:13,220 --> 01:48:11,130

curiosity is is what is how you know

2544

01:48:15,830 --> 01:48:13,230

that you have a genuine mystery on your

2545

01:48:17,390 --> 01:48:15,840

hands and the only way to to find out

2546

01:48:19,040 --> 01:48:17,400

what the answer is just keep digging

2547

01:48:21,050 --> 01:48:19,050

around and searching for evidence and

2548

01:48:23,420 --> 01:48:21,060

trying to find answers and and see where

2549

01:48:26,170 --> 01:48:23,430

you get and will it be happen at all I

2550

01:48:29,360 --> 01:48:26,180

do I think dark matter

2551

01:48:31,070 --> 01:48:29,370

astronomers I feel that they will have

2552

01:48:33,170 --> 01:48:31,080

gotten to the bottom of this mystery or

2553

01:48:35,630 --> 01:48:33,180

particle physicists they will know

2554

01:48:40,640 --> 01:48:35,640

better what it is within my lifetime I

2555

01:48:44,300 --> 01:48:40,650

hope dark energy I'm not so sure but but

2556

01:48:45,890 --> 01:48:44,310

I think every year that goes by people

2557

01:48:48,140 --> 01:48:45,900

there they are at least figuring out

2558

01:48:48,650 --> 01:48:48,150

what it isn't which is a good place to

2559

01:48:51,050 --> 01:48:48,660

start

2560

01:48:53,480 --> 01:48:51,060

yeah so they are a nation yeah yeah

2561

01:48:56,120 --> 01:48:53,490

they're eliminating the crazy ideas that

2562

01:48:58,130 --> 01:48:56,130

that aren't panning out and eventually

2563

01:49:00,260 --> 01:48:58,140

you really start to narrow down what

2564

01:49:01,400 --> 01:49:00,270

you're looking for and and you can get a

2565

01:49:03,410 --> 01:49:01,410

better set you'll start to see more

2566

01:49:06,100 --> 01:49:03,420

subtle hints so I hope within the next

2567

01:49:08,570 --> 01:49:06,110

couple of decades we figure out at least

2568

01:49:11,240 --> 01:49:08,580

we have a better idea but what it isn't

2569

01:49:14,510 --> 01:49:11,250

right now does this have does this have

2570

01:49:18,680 --> 01:49:14,520

to do with the theory of relativity part

2571

01:49:20,840 --> 01:49:18,690

of it any part of it and how that works

2572

01:49:23,510 --> 01:49:20,850

nothing I'm aware must be thinking of

2573

01:49:24,170 --> 01:49:23,520

something else totally okay now I want

2574

01:49:26,030 --> 01:49:24,180

to

2575

01:49:28,270 --> 01:49:26,040

say I've I have a friend who's an

2576

01:49:31,940 --> 01:49:28,280

astronomer and I told him that I had

2577

01:49:35,000 --> 01:49:31,950

Pluto planet separation anxiety so now

2578

01:49:36,230 --> 01:49:35,010

is Pluto back to being a planet or what

2579

01:49:38,360 --> 01:49:36,240

what is going through some type of

2580

01:49:40,730 --> 01:49:38,370

debate I didn't really read much about

2581

01:49:42,470 --> 01:49:40,740

it but I saw something yeah um I mean

2582

01:49:44,780 --> 01:49:42,480

obviously you know the Pluto was the

2583

01:49:47,570 --> 01:49:44,790

planet 'add about that was like our

2584

01:49:49,340 --> 01:49:47,580

first show of astronomy cast I was us

2585

01:49:50,660 --> 01:49:49,350

explaining why Pluto had gotten deep

2586

01:49:52,460 --> 01:49:50,670

planted it and we just did another

2587

01:49:55,730 --> 01:49:52,470

episode where like nope still not a

2588

01:50:00,350 --> 01:49:55,740

planet so that's you know that's

2589

01:50:04,130 --> 01:50:00,360

unfortunate or it's the right answer but

2590

01:50:06,370 --> 01:50:04,140

no I there are proposals the IAEA you

2591

01:50:09,470 --> 01:50:06,380

the International Astronomical Union

2592

01:50:11,870 --> 01:50:09,480

needs to make a decision about maybe it

2593

01:50:15,050 --> 01:50:11,880

is or isn't a planet I heard pamela talk

2594

01:50:17,390 --> 01:50:15,060

about yeah that they need to vote and

2595

01:50:18,560 --> 01:50:17,400

not not not in person yeah so it could

2596

01:50:19,460 --> 01:50:18,570

very well be that'll come up to a vote

2597

01:50:21,860 --> 01:50:19,470

and there's been some interesting

2598

01:50:28,870 --> 01:50:21,870

proposals where people said well maybe

2599

01:50:31,970 --> 01:50:28,880

it's the some other you know maybe

2600

01:50:33,230 --> 01:50:31,980

change the definition of what it is so

2601
01:50:34,850 --> 01:50:33,240
that any object you can really hold

2602
01:50:38,810 --> 01:50:34,860
itself into a sphere is good enough to

2603
01:50:39,920 --> 01:50:38,820
be a planet so right now so then you

2604
01:50:41,150 --> 01:50:39,930
would end even the moon would be a

2605
01:50:43,870 --> 01:50:41,160
planets you'd have a hundred plus

2606
01:50:46,820 --> 01:50:43,880
planets in the solar system I I

2607
01:50:49,640 --> 01:50:46,830
personally don't really find the debate

2608
01:50:54,710 --> 01:50:49,650
very interesting because it's like it's

2609
01:50:58,430 --> 01:50:54,720
all just subjective and and each world

2610
01:51:00,500 --> 01:50:58,440
is interesting its own right and and we

2611
01:51:02,480 --> 01:51:00,510
are finding more like like the whole

2612
01:51:04,430 --> 01:51:02,490
reason why Pluto is no longer planets

2613
01:51:07,850 --> 01:51:04,440

because an object the same size as Pluto

2614

01:51:10,070 --> 01:51:07,860

Eris was found farther up in solar

2615

01:51:11,780 --> 01:51:10,080

systems so so you were never gonna go

2616

01:51:13,490 --> 01:51:11,790

like now you've got another plus now you

2617

01:51:15,950 --> 01:51:13,500

got ten planets but so we were never

2618

01:51:19,190 --> 01:51:15,960

gonna have the nine planets including

2619

01:51:21,890 --> 01:51:19,200

Pluto ever again and as more and more of

2620

01:51:23,390 --> 01:51:21,900

these objects are found these numbers

2621

01:51:25,670 --> 01:51:23,400

are gonna have to change science is this

2622

01:51:28,700 --> 01:51:25,680

living thing as new evidence is

2623

01:51:31,400 --> 01:51:28,710

discovered people's opinions change and

2624

01:51:33,230 --> 01:51:31,410

and so if anyone was like you know it's

2625

01:51:35,390 --> 01:51:33,240

eight planets ours if it's nine planets

2626

01:51:37,370 --> 01:51:35,400

including Pluto like what about Aris

2627

01:51:38,450 --> 01:51:37,380

like does an heiress get to be a planet

2628

01:51:42,140 --> 01:51:38,460

to if Pluto

2629

01:51:45,410 --> 01:51:42,150

same size so I don't know if you've done

2630

01:51:46,850 --> 01:51:45,420

a show in the past about this topic and

2631

01:51:49,910 --> 01:51:46,860

we only you know we have five minutes

2632

01:51:51,709 --> 01:51:49,920

left here is basically what about space

2633

01:51:55,069 --> 01:51:51,719

travel what do you think the future of

2634

01:51:56,689 --> 01:51:55,079

space travel with technology do you

2635

01:51:58,220 --> 01:51:56,699

think that's going to improve to the

2636

01:52:01,160 --> 01:51:58,230

point where we can actually do more of

2637

01:52:02,870 --> 01:52:01,170

it oh yeah um you know when you look at

2638

01:52:05,660 --> 01:52:02,880

what's happening with SpaceX with the

2639

01:52:07,100 --> 01:52:05,670

development of their spacecraft and

2640

01:52:09,709 --> 01:52:07,110

especially the new one they're working

2641

01:52:13,640 --> 01:52:09,719

on the bfr the big Falcon rocket the big

2642

01:52:16,520 --> 01:52:13,650

freakin rocket the big you know this is

2643

01:52:18,439 --> 01:52:16,530

a spacecraft that is fully reusable this

2644

01:52:20,390 --> 01:52:18,449

was thought to be impossible and now

2645

01:52:22,280 --> 01:52:20,400

they're in the process we hope of

2646

01:52:24,620 --> 01:52:22,290

creating a spacecraft where both the

2647

01:52:26,689 --> 01:52:24,630

first stage and the top stage are both

2648

01:52:29,030 --> 01:52:26,699

fully reusable and suddenly for the

2649

01:52:30,500 --> 01:52:29,040

first time you can launch cargo into

2650

01:52:34,129 --> 01:52:30,510

space without having to throw away your

2651
01:52:36,500 --> 01:52:34,139
rocket that when this system gets

2652
01:52:39,680 --> 01:52:36,510
operating the bfr is going to be the

2653
01:52:41,629 --> 01:52:39,690
least inexpensive rocket that has ever

2654
01:52:43,129 --> 01:52:41,639
been launched it's just the price of

2655
01:52:44,510 --> 01:52:43,139
fuel it's a couple of million dollars of

2656
01:52:46,310 --> 01:52:44,520
fuel and you launch this thing and

2657
01:52:49,850 --> 01:52:46,320
recover it and fill it with cargo and

2658
01:52:52,459 --> 01:52:49,860
launch it again when you're dropping the

2659
01:52:56,780 --> 01:52:52,469
price of access to space down by a

2660
01:52:58,640 --> 01:52:56,790
factor of a hundred you the kinds of

2661
01:53:00,350 --> 01:52:58,650
things that are possible are just

2662
01:53:02,000 --> 01:53:00,360
mind-bending in theory to be a far

2663
01:53:04,040 --> 01:53:02,010

should be able to take off fly to the

2664

01:53:05,689 --> 01:53:04,050

moon land on the moon people can get out

2665

01:53:08,149 --> 01:53:05,699

explore the moon get back in the

2666

01:53:10,280 --> 01:53:08,159

spacecraft fly back to earth like just

2667

01:53:11,990 --> 01:53:10,290

as one of the things that it does you

2668

01:53:15,979 --> 01:53:12,000

know it should be it should be capable

2669

01:53:18,859 --> 01:53:15,989

of flying to Mars with refueling so I

2670

01:53:23,390 --> 01:53:18,869

think that we are we are about to enter

2671

01:53:30,979 --> 01:53:23,400

an age where where what it is possible

2672

01:53:33,350 --> 01:53:30,989

to launch is dramatically widened where

2673

01:53:35,720 --> 01:53:33,360

where there where makes sense to launch

2674

01:53:37,069 --> 01:53:35,730

a constellation of 5,000 satellites to

2675

01:53:39,680 --> 01:53:37,079

provide better internet for the entire

2676
01:53:41,030 --> 01:53:39,690
planet that that it makes sense to start

2677
01:53:42,740 --> 01:53:41,040
thinking about things like let's put our

2678
01:53:47,180 --> 01:53:42,750
heavy manufacturing up in space let's

2679
01:53:50,919 --> 01:53:47,190
put solar power generating factories out

2680
01:53:55,060 --> 01:53:50,929
in space like what comes next

2681
01:53:57,009 --> 01:53:55,070
is exciting and revolutionary and we

2682
01:53:59,859 --> 01:53:57,019
haven't seen the implications of it of

2683
01:54:03,879 --> 01:53:59,869
it yet and so I feel pretty confident

2684
01:54:07,029 --> 01:54:03,889
that within the next hundred years we

2685
01:54:09,910 --> 01:54:07,039
should see a pretty vibrant community of

2686
01:54:11,649 --> 01:54:09,920
human beings living in places that

2687
01:54:13,600 --> 01:54:11,659
aren't just earth we don't blow

2688
01:54:14,439 --> 01:54:13,610

ourselves up if we don't blow ourselves

2689

01:54:16,509 --> 01:54:14,449

up first

2690

01:54:18,729 --> 01:54:16,519

right yeah and I wanted to ask about

2691

01:54:21,489 --> 01:54:18,739

helium-3 and all that in the moon but I

2692

01:54:23,469 --> 01:54:21,499

think I think I misjudge the time I

2693

01:54:25,419 --> 01:54:23,479

believe that we're just right at the end

2694

01:54:27,339 --> 01:54:25,429

right now I know we started a little bit

2695

01:54:27,819 --> 01:54:27,349

late but I think that's about right

2696

01:54:30,160 --> 01:54:27,829

timing

2697

01:54:32,859 --> 01:54:30,170

so Frasier I want to thank you so much

2698

01:54:35,229 --> 01:54:32,869

for being generous enough to come on the

2699

01:54:37,600 --> 01:54:35,239

show I really do appreciate it and I

2700

01:54:41,589 --> 01:54:37,610

want to give a good plug to you first of

2701

01:54:46,020 --> 01:54:41,599

all if you go to youtube type in of just

2702

01:54:49,629 --> 01:54:46,030

his name Fraser Cain that's f AR a s er

2703

01:54:53,080 --> 01:54:49,639

capital C AI n I think I spelled it

2704

01:54:56,830 --> 01:54:53,090

right and for a ser CAI n yeah and also

2705

01:54:59,109 --> 01:54:56,840

astronomy cast check that podcasts out

2706

01:55:05,080 --> 01:54:59,119

anything else you'd like to plug well I

2707

01:55:07,359 --> 01:55:05,090

just today we just got our new book has

2708

01:55:09,669 --> 01:55:07,369

has come out I've gotten an advance copy

2709

01:55:11,500 --> 01:55:09,679

of it right the Universe Today ultimate

2710

01:55:13,739 --> 01:55:11,510

guide to viewing the cosmos which was

2711

01:55:18,339 --> 01:55:13,749

written by David Dickenson who is the

2712

01:55:20,259 --> 01:55:18,349

who's the amateur astronomy writer of

2713

01:55:23,169 --> 01:55:20,269

Universe Today and the book is going to

2714

01:55:25,089 --> 01:55:23,179

be coming out in about two weeks so if

2715

01:55:27,370 --> 01:55:25,099

you're looking to get into amateur

2716

01:55:30,870 --> 01:55:27,380

astronomy definitely check out the new

2717

01:55:33,459 --> 01:55:30,880

book um it's really exciting we've got

2718

01:55:35,949 --> 01:55:33,469

more than a hundred photographs in it

2719

01:55:37,989 --> 01:55:35,959

which nobody has ever seen before

2720

01:55:41,850 --> 01:55:37,999

there's more very few people have seen

2721

01:55:44,259 --> 01:55:41,860

it's all I tried to get as many amateur

2722

01:55:46,419 --> 01:55:44,269

astrophotographers involved in the in

2723

01:55:47,979 --> 01:55:46,429

the book so it's not the same old

2724

01:55:50,709 --> 01:55:47,989

pictures from the Hubble Space Telescope

2725

01:55:54,429 --> 01:55:50,719

that you've all seen it's a it's a whole

2726

01:55:57,040 --> 01:55:54,439

bunch of work by people with telescopes

2727

01:55:58,209 --> 01:55:57,050

and and gear that that the regular

2728

01:56:00,669 --> 01:55:58,219

person can get so I'm pretty excited

2729

01:56:02,089 --> 01:56:00,679

about it and available in a couple of

2730

01:56:04,640 --> 01:56:02,099

weeks

2731

01:56:06,910 --> 01:56:04,650

all right make sure your now all right

2732

01:56:09,620 --> 01:56:06,920

pre-order now on Amazon all right and

2733

01:56:13,040 --> 01:56:09,630

make sure you give your my best to

2734

01:56:14,959 --> 01:56:13,050

Pamela I always enjoy her a lot anyway

2735

01:56:16,250 --> 01:56:14,969

thanks so much I really do all right

2736

01:56:16,669 --> 01:56:16,260

thanks for having me all right you take

2737

01:56:20,239 --> 01:56:16,679

care

2738

01:56:23,419 --> 01:56:20,249

buh-bye bye alright everyone so that is

2739

01:56:26,839 --> 01:56:23,429

it thank you so much for listening today

2740

01:56:29,239 --> 01:56:26,849

I hope you enjoyed the show and it's

2741

01:56:31,489 --> 01:56:29,249

always interesting to understand and

2742

01:56:34,819 --> 01:56:31,499

listen to what people think about the

2743

01:56:37,160 --> 01:56:34,829

UFO topic on the outside so I was glad

2744

01:56:41,929 --> 01:56:37,170

to be able to do that next week we have

2745

01:56:45,890 --> 01:56:41,939

Paul Stark he is a he was the director I

2746

01:56:47,439 --> 01:56:45,900

think and producer of Vatican UFOs he

2747

01:56:49,729 --> 01:56:47,449

will be on next week's show

2748

01:56:53,330 --> 01:56:49,739

thanks so much if you support the show

2749

01:56:54,830 --> 01:56:53,340

and I think that's about it for me I

2750

01:56:57,669 --> 01:56:54,840

want to thank everyone that does help

2751

01:57:00,620 --> 01:56:57,679

out with the show and Alejandro Rojas

2752

01:57:03,799 --> 01:57:00,630

our guest and most importantly her

2753

01:57:18,570 --> 01:57:03,809

listeners thank you so much and we'll be