



MARC D'ANTONIO

1
00:00:02,360 --> 00:00:01,250
you know there's explanation for

2
00:00:03,710 --> 00:00:02,370
everything that occurred in the

3
00:00:06,170 --> 00:00:03,720
Rendlesham forest incident

4
00:00:09,049 --> 00:00:06,180
it doesn't involve aliens at all it was

5
00:00:12,379 --> 00:00:09,059
completely silent it comes right over

6
00:00:14,209 --> 00:00:12,389
our head it's so classic flying-saucer

7
00:00:15,829 --> 00:00:14,219
really standing in the clearing he

8
00:00:17,450 --> 00:00:15,839
turned over to my father and held his

9
00:00:23,960 --> 00:00:17,460
hand and he looked in his eyes and said

10
00:00:26,810 --> 00:00:23,970
we're not alone welcome to podcast UFO

11
00:00:28,640 --> 00:00:26,820
for our live show during the show feel

12
00:00:31,279 --> 00:00:28,650
free to participate live in our chat

13
00:00:36,170 --> 00:00:31,289

room and don't forget to Like us on our

14

00:00:37,610 --> 00:00:36,180

very active Facebook page hello and

15

00:00:40,610 --> 00:00:37,620

welcome to the show on Martin Willis

16

00:00:42,979 --> 00:00:40,620

your host and this is a place you can go

17

00:00:45,830 --> 00:00:42,989

to forget about things for a while I

18

00:00:47,029 --> 00:00:45,840

think there's a song like that but I'm

19

00:00:50,930 --> 00:00:47,039

not going to break into it don't worry

20

00:00:53,860 --> 00:00:50,940

about that I we have a well he's a

21

00:00:56,389 --> 00:00:53,870

personal friend and an entertaining

22

00:00:58,760 --> 00:00:56,399

astronomer for tonight's show

23

00:01:01,069 --> 00:00:58,770

mark D Antonio and we're gonna be

24

00:01:03,529 --> 00:01:01,079

talking about all types of cosmic

25

00:01:06,109 --> 00:01:03,539

mysteries and we'll probably touch on

26
00:01:08,510 --> 00:01:06,119
UFOs he has a book and we're going to be

27
00:01:10,250 --> 00:01:08,520
talking about that and it's called it's

28
00:01:12,920 --> 00:01:10,260
about the probability of life and it's

29
00:01:16,039 --> 00:01:12,930
called the populated universe life in

30
00:01:17,810 --> 00:01:16,049
the universe may be very well be the

31
00:01:19,190 --> 00:01:17,820
rule and not the exception I think I

32
00:01:22,039 --> 00:01:19,200
kind of screwed that up a little bit but

33
00:01:23,660 --> 00:01:22,049
anyway so we'll get into that we're

34
00:01:26,570 --> 00:01:23,670
gonna be taking calls in the last

35
00:01:28,700 --> 00:01:26,580
half-hour of the show I do want to thank

36
00:01:31,069 --> 00:01:28,710
everyone that supports the show without

37
00:01:33,620 --> 00:01:31,079
your support wouldn't be able to do this

38
00:01:34,490 --> 00:01:33,630

and anyone can if you're not supporting

39

00:01:37,060 --> 00:01:34,500

the show and you want to

40

00:01:39,710 --> 00:01:37,070

we're on patreon and that link is over

41

00:01:41,780 --> 00:01:39,720

you can actually do that on YouTube in

42

00:01:43,490 --> 00:01:41,790

the super chat as well and I want to

43

00:01:47,120 --> 00:01:43,500

thanks to Kevin for chipping in many

44

00:01:49,249 --> 00:01:47,130

times thank you very much and you can go

45

00:01:52,580 --> 00:01:49,259

over to podcast UFO com

46

00:01:55,280 --> 00:01:52,590

we have a blog called when UFOs collide

47

00:01:59,090 --> 00:01:55,290

and there's some actually some great

48

00:02:02,149 --> 00:01:59,100

cases a very good read and thanks to

49

00:02:05,719 --> 00:02:02,159

Charles Lear for our weekly blogs a

50

00:02:10,160 --> 00:02:05,729

little housekeeping I am very excited

51

00:02:11,930 --> 00:02:10,170

about well a lot of people have

52

00:02:13,910 --> 00:02:11,940

complained many times about all the

53

00:02:17,000 --> 00:02:13,920

technical problems I've had

54

00:02:19,430 --> 00:02:17,010

and that's using a software and and

55

00:02:20,750 --> 00:02:19,440

Skype and all that and I'm going to say

56

00:02:22,880 --> 00:02:20,760

good hopefully say goodbye to that

57

00:02:25,460 --> 00:02:22,890

forever and we're on stream yard

58

00:02:27,350 --> 00:02:25,470

it's a streaming service and hopefully

59

00:02:29,300 --> 00:02:27,360

everything will go just this is a debut

60

00:02:30,080 --> 00:02:29,310

with it so hopefully everything will go

61

00:02:34,130 --> 00:02:30,090

just fine

62

00:02:37,190 --> 00:02:34,140

and that is enough for me and without

63

00:02:38,870 --> 00:02:37,200

further ado I want to bring him on you

64
00:02:40,520 --> 00:02:38,880
may have seen him on TV the one and only

65
00:02:42,740 --> 00:02:40,530
Mark Dantonio

66
00:02:44,330 --> 00:02:42,750
welcome to the show mark hey yeah you

67
00:02:46,670 --> 00:02:44,340
doing Martin thank you for having me

68
00:02:49,370 --> 00:02:46,680
you've had always good to see you you're

69
00:02:50,990 --> 00:02:49,380
in your your you have like the ultimate

70
00:02:55,100 --> 00:02:51,000
man cave because it's like a submarine

71
00:02:58,280 --> 00:02:55,110
right well actually it's a more like a

72
00:03:02,000 --> 00:02:58,290
destroyer I've got I've got portholes

73
00:03:05,059 --> 00:03:02,010
for windows and a hatch to come in and

74
00:03:06,920 --> 00:03:05,069
out but it wasn't made as a man cave it

75
00:03:08,600 --> 00:03:06,930
was just made as my business office

76

00:03:10,670 --> 00:03:08,610

because since I have to work here I

77

00:03:12,770 --> 00:03:10,680

wanted to look as good as possible and

78

00:03:15,590 --> 00:03:12,780

if I was gonna work here I didn't want

79

00:03:17,570 --> 00:03:15,600

to be bored here so it'd look cool so I

80

00:03:20,270 --> 00:03:17,580

got rivets and rust which is awful you

81

00:03:22,130 --> 00:03:20,280

know I love it I was when I visited

82

00:03:24,470 --> 00:03:22,140

there I just thought that was such a

83

00:03:28,670 --> 00:03:24,480

cool setup you had it's really great I'm

84

00:03:30,770 --> 00:03:28,680

glad you liked it yeah so we I think

85

00:03:32,420 --> 00:03:30,780

last time we talked was uh maybe like a

86

00:03:34,610 --> 00:03:32,430

year ago year and a half something like

87

00:03:37,670 --> 00:03:34,620

that I can't really remember there's

88

00:03:39,140 --> 00:03:37,680

some astronomy in the news lately I

89

00:03:39,500 --> 00:03:39,150

wanted to talk a little bit about that

90

00:03:41,780 --> 00:03:39,510

tonight

91

00:03:45,050 --> 00:03:41,790

sure let's go yeah but for the person

92

00:03:46,699 --> 00:03:45,060

quickly there's a few out there there

93

00:03:48,080 --> 00:03:46,709

there are new listeners here just a

94

00:03:52,699 --> 00:03:48,090

little bit about your background quickly

95

00:03:54,920 --> 00:03:52,709

if you would oh sure um I I think I'm an

96

00:03:58,130 --> 00:03:54,930

astronomer last I checked that was what

97

00:04:01,970 --> 00:03:58,140

I got a degree in and I

98

00:04:03,349 --> 00:04:01,980

I believe that science is available to

99

00:04:05,870 --> 00:04:03,359

the masses everybody should be able to

100

00:04:08,030 --> 00:04:05,880

understand science you just have to make

101
00:04:11,300 --> 00:04:08,040
it understandable to those that don't

102
00:04:12,890 --> 00:04:11,310
have a scientific background so I bring

103
00:04:16,400 --> 00:04:12,900
science of the masses that's what I do

104
00:04:18,800 --> 00:04:16,410
now with my astronomy I'm an exoplanet

105
00:04:21,469 --> 00:04:18,810
guy in the astronomy world I like to

106
00:04:23,330 --> 00:04:21,479
enjoy and look at research about

107
00:04:26,060 --> 00:04:23,340
exoplanets around others on the other

108
00:04:28,620 --> 00:04:26,070
stars and I'm the mutual UFO network

109
00:04:31,170 --> 00:04:28,630
Steve photon video and

110
00:04:34,740 --> 00:04:31,180
and have done a lot of you know

111
00:04:37,409 --> 00:04:34,750
interesting television shows because I'm

112
00:04:40,830 --> 00:04:37,419
sort of a voice of reason I would guess

113
00:04:42,510 --> 00:04:40,840

is the right way to put it you know I I

114

00:04:44,370 --> 00:04:42,520

fully believe that in that

115

00:04:45,810 --> 00:04:44,380

extraterrestrial life can exist I fully

116

00:04:48,600 --> 00:04:45,820

believe that intelligent

117

00:04:51,270 --> 00:04:48,610

extraterrestrial life may exist but I do

118

00:04:56,129 --> 00:04:51,280

think that they could also have made it

119

00:04:59,520 --> 00:04:56,139

here and so that's kind of my background

120

00:05:00,930 --> 00:04:59,530

you know and you know I've done like I

121

00:05:03,810 --> 00:05:00,940

said I've done things all over the place

122

00:05:06,510 --> 00:05:03,820

book is a lot of conferences not right

123

00:05:14,159 --> 00:05:06,520

now because of covin you know but

124

00:05:17,520 --> 00:05:14,169

that'll change yeah so when you when did

125

00:05:20,550 --> 00:05:17,530

you like feel it was okay to you know

126

00:05:24,779 --> 00:05:20,560

kind of look into the UFO topic was it

127

00:05:26,460 --> 00:05:24,789

early on yeah actually I was I was nine

128

00:05:29,129 --> 00:05:26,470

years old when I realized I was gonna be

129

00:05:34,860 --> 00:05:29,139

an astronomer Wow that's a change

130

00:05:37,790 --> 00:05:34,870

I never wavered so either very boring or

131

00:05:40,800 --> 00:05:37,800

it means that I was committed and it and

132

00:05:43,140 --> 00:05:40,810

how does it how does a nine year old get

133

00:05:49,460 --> 00:05:43,150

committed to anything I mean besides an

134

00:05:51,899 --> 00:05:49,470

asylum yeah so the way that happens is

135

00:05:55,409 --> 00:05:51,909

you go outside you look up at the night

136

00:05:57,779 --> 00:05:55,419

sky and you feel something when you look

137

00:06:01,620 --> 00:05:57,789

at a nice guy and for me that something

138

00:06:03,810 --> 00:06:01,630

was I actually felt homesick looking up

139

00:06:07,439 --> 00:06:03,820

in the night sky and when I looked up

140

00:06:09,300 --> 00:06:07,449

and saw these myriad stars over my head

141

00:06:12,980 --> 00:06:09,310

I was like wow and then we'd go on

142

00:06:16,260 --> 00:06:12,990

family trips to Maine in the summers and

143

00:06:20,850 --> 00:06:16,270

Port Clyde Maine a small fishing village

144

00:06:22,830 --> 00:06:20,860

up on the down east as they say you know

145

00:06:29,040 --> 00:06:22,840

that you can't get there from here

146

00:06:32,399 --> 00:06:29,050

location I was stunned at the beauty of

147

00:06:36,060 --> 00:06:32,409

the night sky up there and you know what

148

00:06:39,570 --> 00:06:36,070

it never left me and I wanted a dark sky

149

00:06:41,310 --> 00:06:39,580

my entire life so every house I've ever

150

00:06:43,920 --> 00:06:41,320

owned and I've owned

151

00:06:48,420 --> 00:06:43,930

one two this will be the third actually

152

00:06:49,740 --> 00:06:48,430

so not many but um every house I had to

153

00:06:50,880 --> 00:06:49,750

be able to see the Milky Way up in this

154

00:06:52,530 --> 00:06:50,890

guy Wow

155

00:06:54,390 --> 00:06:52,540

when I before I bought the house if I

156

00:06:55,890 --> 00:06:54,400

couldn't see the Milky Way I wasn't

157

00:06:58,470 --> 00:06:55,900

gonna buy that house I don't care how

158

00:07:01,170 --> 00:06:58,480

nice the house looked so the house I'm

159

00:07:02,940 --> 00:07:01,180

in now I really hoped I'd see the Milky

160

00:07:05,430 --> 00:07:02,950

Way and when I pulled into the driveway

161

00:07:07,200 --> 00:07:05,440

at night with the owner's permission

162

00:07:10,170 --> 00:07:07,210

because we hadn't bought the house yet I

163

00:07:15,240 --> 00:07:10,180

looked up I saw the Milky Way and I said

164

00:07:19,920 --> 00:07:15,250

okay this house is now a candidate Wow

165

00:07:22,440 --> 00:07:19,930

now and I live as I we've talked about

166

00:07:24,510 --> 00:07:22,450

this I live right around the corner from

167

00:07:25,680 --> 00:07:24,520

where you used to summer you lit you

168

00:07:29,370 --> 00:07:25,690

used to go to a tenant's harbor and

169

00:07:31,860 --> 00:07:29,380

that's am it's for me right now and it

170

00:07:35,100 --> 00:07:31,870

is beautiful up here and I also had a

171

00:07:38,160 --> 00:07:35,110

conversation with you when we lost power

172

00:07:40,800 --> 00:07:38,170

up here and I could actually see the

173

00:07:42,660 --> 00:07:40,810

Milky Way so clear but it's not that

174

00:07:45,630 --> 00:07:42,670

clear because of the there is a little

175

00:07:48,750 --> 00:07:45,640

bit of light pollution yeah yeah you're

176
00:07:51,000 --> 00:07:48,760
you're you've got Rockland on one side

177
00:07:53,040 --> 00:07:51,010
Portland on the other you're gonna see

178
00:07:54,900 --> 00:07:53,050
the light from work from that location

179
00:07:59,300 --> 00:07:54,910
you know when Tenants Harbor location

180
00:08:03,440 --> 00:07:59,310
actually which is not where you are but

181
00:08:06,420 --> 00:08:03,450
from my point of view that's not so bad

182
00:08:08,490 --> 00:08:06,430
because I look at it in terms of how

183
00:08:10,860 --> 00:08:08,500
bright the night sky is on what's called

184
00:08:14,550 --> 00:08:10,870
the bordel scale that's a portal as Bo

185
00:08:16,290 --> 00:08:14,560
RTL e not bottle because you know the

186
00:08:18,360 --> 00:08:16,300
bottle scale well that'll make any night

187
00:08:20,550 --> 00:08:18,370
sky look wonderful you know for some

188
00:08:22,530 --> 00:08:20,560

people if you tip it a little too much

189

00:08:24,270 --> 00:08:22,540

yeah yeah the board will scale on the

190

00:08:26,970 --> 00:08:24,280

other hand that's a measure of the

191

00:08:29,340 --> 00:08:26,980

brightness of the night sky okay and if

192

00:08:31,890 --> 00:08:29,350

you have a portal sky of zero it's

193

00:08:33,780 --> 00:08:31,900

absolutely dark so like you can't see

194

00:08:38,790 --> 00:08:33,790

your hand if in your face a portal sky

195

00:08:40,110 --> 00:08:38,800

of nine okay is like downtown Phoenix or

196

00:08:44,070 --> 00:08:40,120

downtown New York City you know

197

00:08:46,140 --> 00:08:44,080

Manhattan alright and the observatory

198

00:08:48,930 --> 00:08:46,150

here in Connecticut where I run my

199

00:08:50,400 --> 00:08:48,940

Observatory astronomy outreach programs

200

00:08:53,450 --> 00:08:50,410

on YouTube you know the sky to

201
00:08:57,470 --> 00:08:53,460
livestream this

202
00:09:00,650 --> 00:08:57,480
these guys are bordel five skies and so

203
00:09:02,750 --> 00:09:00,660
on some nights I can see really really

204
00:09:04,070 --> 00:09:02,760
nice Milky Way and other nights with

205
00:09:07,750 --> 00:09:04,080
there's too much water vapor in the air

206
00:09:11,240 --> 00:09:07,760
I might not see them and see it at all

207
00:09:13,280 --> 00:09:11,250
but we have a second observatory we're

208
00:09:13,880 --> 00:09:13,290
building out in the Sonoran Desert in

209
00:09:17,120 --> 00:09:13,890
Arizona

210
00:09:19,430 --> 00:09:17,130
well you must Wow

211
00:09:21,980 --> 00:09:19,440
that's when do you expect that to be

212
00:09:25,940 --> 00:09:21,990
completed and operational well what's

213
00:09:30,050 --> 00:09:25,950

today today is May 12th and I'm gonna be

214

00:09:31,940 --> 00:09:30,060

going out there on June 22nd and we're

215

00:09:33,920 --> 00:09:31,950

building the observatory building

216

00:09:35,860 --> 00:09:33,930

I've got there's gonna be a crew coming

217

00:09:40,250 --> 00:09:35,870

out they're gonna erect that building

218

00:09:41,750 --> 00:09:40,260

and the building is gonna have a regular

219

00:09:43,130 --> 00:09:41,760

peaked roof and the whole roof is gonna

220

00:09:44,300 --> 00:09:43,140

roll off the building it's gonna be

221

00:09:44,960 --> 00:09:44,310

what's called a roll off roof or

222

00:09:48,650 --> 00:09:44,970

observatory

223

00:09:50,269 --> 00:09:48,660

however I'm big I'm making it so that it

224

00:09:50,840 --> 00:09:50,279

can be remotely controlled from anywhere

225

00:09:54,380 --> 00:09:50,850

in the world

226

00:09:56,900 --> 00:09:54,390

Wow oh I have like the one here my

227

00:09:59,960 --> 00:09:56,910

Observatory here is remote I run it from

228

00:10:04,910 --> 00:09:59,970

here I'm inside my office I run it from

229

00:10:06,769 --> 00:10:04,920

here okay and it's actually very nice it

230

00:10:08,329 --> 00:10:06,779

works very well so I've been working

231

00:10:11,720 --> 00:10:08,339

with it like that for several years now

232

00:10:15,280 --> 00:10:11,730

and I'm gonna be able to translate what

233

00:10:20,060 --> 00:10:15,290

I learned here into a permanent more

234

00:10:22,880 --> 00:10:20,070

robust system out there so that's great

235

00:10:25,490 --> 00:10:22,890

now you actually do something on Sunday

236

00:10:28,540 --> 00:10:25,500

nights well there's some type of stream

237

00:10:30,740 --> 00:10:28,550

you do as well that has to do with your

238

00:10:33,829 --> 00:10:30,750

Observatory when you talked about that

239

00:10:36,319 --> 00:10:33,839

you're on Sunday nights on K GRA hey who

240

00:10:39,410 --> 00:10:36,329

would have thought video the best

241

00:10:41,870 --> 00:10:39,420

listeners on earth right um they from

242

00:10:45,170 --> 00:10:41,880

8:00 to 10:00 p.m. on Sunday nights we

243

00:10:48,410 --> 00:10:45,180

have sky tour radio and my co-host is

244

00:10:50,300 --> 00:10:48,420

Amanda Curran and we have Daryl Mason

245

00:10:53,210 --> 00:10:50,310

with us Daryl Mason is I call him the

246

00:10:55,579 --> 00:10:53,220

astronomers astronomer he's he's a very

247

00:10:57,860 --> 00:10:55,589

very knowledgeable amateur astronomer

248

00:11:02,000 --> 00:10:57,870

who brings a different perspective than

249

00:11:04,190 --> 00:11:02,010

the professional astronomers and so it's

250

00:11:05,720 --> 00:11:04,200

really good to have him on because he

251
00:11:06,110 --> 00:11:05,730
knows the night sky like the back of his

252
00:11:07,730 --> 00:11:06,120
hand

253
00:11:10,070 --> 00:11:07,740
and

254
00:11:12,620 --> 00:11:10,080
you know that is something that that

255
00:11:14,210 --> 00:11:12,630
people that are learning astronomy will

256
00:11:16,490 --> 00:11:14,220
want to do or want to learn you know and

257
00:11:18,380 --> 00:11:16,500
so he's great to have on a man that's

258
00:11:22,010 --> 00:11:18,390
great she knew absolutely no astronomy

259
00:11:23,510 --> 00:11:22,020
when we started together and now you

260
00:11:25,220 --> 00:11:23,520
know she'll actually cut me off when I'm

261
00:11:27,860 --> 00:11:25,230
talking to finish my sentences with the

262
00:11:29,900 --> 00:11:27,870
right thing I in astronomy and I don't

263
00:11:31,310 --> 00:11:29,910

get mad I'm proud of her you know

264

00:11:34,040 --> 00:11:31,320

because he's come a long way and it's

265

00:11:35,720 --> 00:11:34,050

really cool to hear her knowledge or

266

00:11:37,190 --> 00:11:35,730

she'll I'll say now we have all these

267

00:11:38,570 --> 00:11:37,200

different types of stellar types and

268

00:11:39,950 --> 00:11:38,580

you'll hear her go oh I know I know I

269

00:11:41,510 --> 00:11:39,960

know because she wants to tell everybody

270

00:11:44,780 --> 00:11:41,520

what they are it's right letter you know

271

00:11:47,990 --> 00:11:44,790

we go through that so yeah she's really

272

00:11:51,830 --> 00:11:48,000

amazing as is Daryl so I say this guy to

273

00:11:54,350 --> 00:11:51,840

a radio is us not me okay and and that's

274

00:11:56,560 --> 00:11:54,360

I think that's true you know you you've

275

00:11:59,600 --> 00:11:56,570

got a you've got to basically

276

00:12:02,900 --> 00:11:59,610

acknowledge the people that have you

277

00:12:04,250 --> 00:12:02,910

know make your show a success right you

278

00:12:06,230 --> 00:12:04,260

know you do it for the people that have

279

00:12:08,000 --> 00:12:06,240

helped you I do it for people have

280

00:12:11,270 --> 00:12:08,010

helped me you know to keep this show

281

00:12:13,400 --> 00:12:11,280

going yeah so I want to talk about a

282

00:12:16,100 --> 00:12:13,410

couple things that are kind of hot in

283

00:12:18,770 --> 00:12:16,110

the news and one of them is there's that

284

00:12:21,470 --> 00:12:18,780

the black hole that's about a thousand

285

00:12:25,340 --> 00:12:21,480

light years away they they just

286

00:12:29,360 --> 00:12:25,350

discovered an unusual thing for them to

287

00:12:32,060 --> 00:12:29,370

find something like that because this

288

00:12:36,650 --> 00:12:32,070

black hole is actually in our backyard

289

00:12:38,930 --> 00:12:36,660

if you want to go down the path of what

290

00:12:41,540 --> 00:12:38,940

constitutes a backyard and astronomy

291

00:12:44,740 --> 00:12:41,550

where the nearest star is 12,000 years

292

00:12:48,260 --> 00:12:44,750

away at the fastest speed we can go a

293

00:12:50,540 --> 00:12:48,270

thousand light years is actually right

294

00:12:55,550 --> 00:12:50,550

in our backyard and this particular

295

00:12:57,500 --> 00:12:55,560

black hole is really it's in it so it's

296

00:13:01,100 --> 00:12:57,510

in a constellation called telescope ium

297

00:13:04,490 --> 00:13:01,110

which is the telescope and it it it was

298

00:13:07,520 --> 00:13:04,500

found through a study of the star HR 68

299

00:13:10,880 --> 00:13:07,530

19 and this particular star a nice

300

00:13:14,720 --> 00:13:10,890

romantic name for That star this star

301
00:13:16,730 --> 00:13:14,730
has actually is more than one there's

302
00:13:18,620 --> 00:13:16,740
two stars at least that's what they

303
00:13:20,090 --> 00:13:18,630
thought there's a primary and a

304
00:13:22,130 --> 00:13:20,100
secondary star

305
00:13:26,360 --> 00:13:22,140
well the secondary had a weird orbit

306
00:13:30,140 --> 00:13:26,370
that didn't match what was expected for

307
00:13:31,940 --> 00:13:30,150
a binary star okay just because this one

308
00:13:33,080 --> 00:13:31,950
star turned out to be to write a binary

309
00:13:35,210 --> 00:13:33,090
and then that second star would

310
00:13:38,330 --> 00:13:35,220
typically just orbit around the main

311
00:13:42,110 --> 00:13:38,340
star well it's doing so but something is

312
00:13:45,920 --> 00:13:42,120
weird is going on it turns out that this

313
00:13:49,130 --> 00:13:45,930

secondary star alright is surrounded by

314

00:13:51,710 --> 00:13:49,140

or next to it another object that can't

315

00:13:54,260 --> 00:13:51,720

be seen that's affecting its orbit so

316

00:13:58,220 --> 00:13:54,270

they've guessed that and I think rightly

317

00:14:02,390 --> 00:13:58,230

that this whole system this trinary

318

00:14:05,470 --> 00:14:02,400

system it has a black hole in it and the

319

00:14:08,300 --> 00:14:05,480

star that was considered the primary is

320

00:14:10,720 --> 00:14:08,310

actually the secondary because the black

321

00:14:13,250 --> 00:14:10,730

hole is pretty heavy pretty massive okay

322

00:14:15,410 --> 00:14:13,260

when I say primary versus secondary the

323

00:14:18,320 --> 00:14:15,420

primary is usually the more massive star

324

00:14:20,870 --> 00:14:18,330

or the brighter and a secondary usually

325

00:14:24,350 --> 00:14:20,880

the dimmer and the least less massive

326

00:14:27,290 --> 00:14:24,360

you know either those things well the

327

00:14:29,210 --> 00:14:27,300

primary in this case has a black hole

328

00:14:31,220 --> 00:14:29,220

going around it and that secondary is

329

00:14:33,920 --> 00:14:31,230

orbiting the two of them at a much

330

00:14:37,070 --> 00:14:33,930

greater distance and it takes only 40

331

00:14:40,760 --> 00:14:37,080

days for that that black hole and start

332

00:14:44,060 --> 00:14:40,770

to orbit each other and that process is

333

00:14:46,460 --> 00:14:44,070

something that was deciphered of when

334

00:14:47,780 --> 00:14:46,470

they looked at the data and by looking

335

00:14:50,420 --> 00:14:47,790

at the data they can see this black

336

00:14:53,030 --> 00:14:50,430

holes out there now you know if you

337

00:14:55,490 --> 00:14:53,040

think about it you say well how do black

338

00:14:57,410 --> 00:14:55,500

holes form I mean black holes don't just

339

00:15:00,320 --> 00:14:57,420

like show up hi I'm a black hole I'm

340

00:15:02,480 --> 00:15:00,330

here now they don't what happens is they

341

00:15:04,430 --> 00:15:02,490

the stars go through stellar revolution

342

00:15:08,680 --> 00:15:04,440

they actually use up all their hydrogen

343

00:15:12,170 --> 00:15:08,690

fuel and then swell into a red giant and

344

00:15:14,210 --> 00:15:12,180

if they're smaller than a certain size a

345

00:15:16,220 --> 00:15:14,220

certain you know certain mass then

346

00:15:18,410 --> 00:15:16,230

they'll just shrink down to a little

347

00:15:20,390 --> 00:15:18,420

white dwarfs leaving a little fuzzy

348

00:15:22,340 --> 00:15:20,400

nebula around the remaining white dwarf

349

00:15:25,880 --> 00:15:22,350

but if they're bigger than a certain

350

00:15:27,650 --> 00:15:25,890

size then the stars can actually explode

351

00:15:30,110 --> 00:15:27,660

in what we call a supernova which is a

352

00:15:32,540 --> 00:15:30,120

greatest cataclysmic explosion that the

353

00:15:33,990 --> 00:15:32,550

universe knows other than what's called

354

00:15:36,330 --> 00:15:34,000

a killer nova or a high

355

00:15:38,160 --> 00:15:36,340

for Nova but if you think about or as it

356

00:15:41,400 --> 00:15:38,170

turns out fast radio bursts it might be

357

00:15:44,100 --> 00:15:41,410

the the explosion of a supernova would

358

00:15:47,520 --> 00:15:44,110

leave the Bri and you'd see something in

359

00:15:51,000 --> 00:15:47,530

the area left over well this particular

360

00:15:53,120 --> 00:15:51,010

star system this trainer he doesn't have

361

00:15:55,650 --> 00:15:53,130

any of this stuff there's none of this

362

00:15:58,380 --> 00:15:55,660

wreckage from a previous exploded star

363

00:16:01,670 --> 00:15:58,390

hanging out so what does that mean it

364

00:16:04,830 --> 00:16:01,680

means that perhaps there's another

365

00:16:07,350 --> 00:16:04,840

phenomena of foot and that phenomena

366

00:16:10,920 --> 00:16:07,360

that could be a foot is that some

367

00:16:12,480 --> 00:16:10,930

massive stars can actually just begin to

368

00:16:14,580 --> 00:16:12,490

collapse and instead of going supernova

369

00:16:16,590 --> 00:16:14,590

they can just go into this catastrophic

370

00:16:19,410 --> 00:16:16,600

collapse and these are called direct

371

00:16:21,090 --> 00:16:19,420

collapse black holes they can actually

372

00:16:24,890 --> 00:16:21,100

go right from being a star right down to

373

00:16:29,910 --> 00:16:24,900

a black hole and it's theorized that

374

00:16:32,520 --> 00:16:29,920

maybe this could have happened here but

375

00:16:34,380 --> 00:16:32,530

it's also possible going back to the

376

00:16:37,260 --> 00:16:34,390

supernova front that it might have

377

00:16:39,000 --> 00:16:37,270

happened so long ago that all of the

378

00:16:40,710 --> 00:16:39,010

material from the supernova has moved

379

00:16:42,480 --> 00:16:40,720

out and expanded because once the star

380

00:16:43,860 --> 00:16:42,490

explodes you go boom you know the stuff

381

00:16:46,230 --> 00:16:43,870

just goes on and on

382

00:16:48,750 --> 00:16:46,240

and then what's left in the center might

383

00:16:51,450 --> 00:16:48,760

not have so much stuff and that that

384

00:16:55,710 --> 00:16:51,460

could be what we see here - but it's a

385

00:16:58,380 --> 00:16:55,720

really neat thing yeah and so it's part

386

00:17:03,120 --> 00:16:58,390

of it's part of a binary system no

387

00:17:07,559 --> 00:17:03,130

trinary system I guess so there's no

388

00:17:10,860 --> 00:17:07,569

danger of us the other binary stars like

389

00:17:13,050 --> 00:17:10,870

being drawn into it unless somehow they

390

00:17:15,030 --> 00:17:13,060

it shifts or something like that I

391

00:17:17,699 --> 00:17:15,040

mean it just has the gravity of a of

392

00:17:20,910 --> 00:17:17,709

another Sun basically right and actually

393

00:17:21,890 --> 00:17:20,920

for other Suns it's actually the mass of

394

00:17:27,360 --> 00:17:21,900

four Suns

395

00:17:29,820 --> 00:17:27,370

yeah and so it means that this probably

396

00:17:33,330 --> 00:17:29,830

was a much more massive star to begin

397

00:17:35,160 --> 00:17:33,340

with and then when it collapsed either

398

00:17:37,080 --> 00:17:35,170

it were the supernova was gonna blow off

399

00:17:39,450 --> 00:17:37,090

a huge amount of mass from this star

400

00:17:41,490 --> 00:17:39,460

bomb it all goes away but what's left in

401

00:17:44,370 --> 00:17:41,500

the middle all right is gonna have a

402

00:17:47,190 --> 00:17:44,380

certain mass left over if it had a four

403

00:17:47,940 --> 00:17:47,200

solar masses left over it means it had

404

00:17:50,760 --> 00:17:47,950

to be a big star

405

00:17:52,740 --> 00:17:50,770

to begin with so then you would say well

406

00:17:56,820 --> 00:17:52,750

wait why didn't the other stars in that

407

00:17:58,440 --> 00:17:56,830

system gets destroyed you know why

408

00:18:00,270 --> 00:17:58,450

didn't the other stars gonna get

409

00:18:03,920 --> 00:18:00,280

destroyed in the system from this and

410

00:18:08,490 --> 00:18:03,930

the answer to that is that these stars

411

00:18:11,040 --> 00:18:08,500

many times do survive supernovae because

412

00:18:13,770 --> 00:18:11,050

as close as they are there are sometimes

413

00:18:16,200 --> 00:18:13,780

not close enough to be destroyed or on

414

00:18:18,990 --> 00:18:16,210

what we call disrupted by another

415

00:18:21,660 --> 00:18:19,000

stellar event nearby stars are actually

416

00:18:24,330 --> 00:18:21,670

pretty cohesive things it's it takes a

417

00:18:26,390 --> 00:18:24,340

lot to destroy them but this one this

418

00:18:29,010 --> 00:18:26,400

also being a thousand light years away

419

00:18:31,550 --> 00:18:29,020

never it will never have an issue with

420

00:18:35,010 --> 00:18:31,560

it it's not gonna be a problem for us

421

00:18:37,020 --> 00:18:35,020

well yeah I know and I have brought this

422

00:18:39,540 --> 00:18:37,030

up to another astronomer that was on

423

00:18:41,850 --> 00:18:39,550

here basically that you don't really

424

00:18:45,120 --> 00:18:41,860

have any more draw well when this has

425

00:18:48,270 --> 00:18:45,130

the the mass of four Suns it it

426

00:18:50,190 --> 00:18:48,280

basically has that type of gravity pull

427

00:18:51,870 --> 00:18:50,200

but it's not going to bother you unless

428

00:18:54,780 --> 00:18:51,880

you know it's not going to come after

429

00:18:56,580 --> 00:18:54,790

you so to speak no it's it's in orbit

430

00:18:58,290 --> 00:18:56,590

like like our Sun right now if it went

431

00:19:00,600 --> 00:18:58,300

if our Sun could be magically turned

432

00:19:02,520 --> 00:19:00,610

into a black hole we'd see the Sun go

433

00:19:05,490 --> 00:19:02,530

out and the planets would continue to

434

00:19:07,610 --> 00:19:05,500

orbit just like they do forever they

435

00:19:12,930 --> 00:19:07,620

just get a lot colder and a lot better

436

00:19:14,820 --> 00:19:12,940

okay but you know it orbits you know it

437

00:19:18,540 --> 00:19:14,830

doesn't change the the mass doesn't

438

00:19:20,940 --> 00:19:18,550

change once it's a black hole it'll be a

439

00:19:22,490 --> 00:19:20,950

one our Sun would be a one solar mass

440

00:19:24,300 --> 00:19:22,500

black hole like now our Sun is

441

00:19:26,370 --> 00:19:24,310

impossible it can't become a black hole

442

00:19:28,370 --> 00:19:26,380

just for argument's sake I'm saying

443

00:19:30,690 --> 00:19:28,380

alright or if it would have come right

444

00:19:32,820 --> 00:19:30,700

our Sun will become a white dwarf you

445

00:19:34,470 --> 00:19:32,830

know it would become a red giant after

446

00:19:36,390 --> 00:19:34,480

it uses up a bridge and it goes through

447

00:19:38,130 --> 00:19:36,400

using other stuff to fuse into other

448

00:19:40,260 --> 00:19:38,140

materials and that would make it bloat

449

00:19:42,720 --> 00:19:40,270

into this bigger thing and then as those

450

00:19:44,940 --> 00:19:42,730

things progressively waned and went away

451
00:19:47,970 --> 00:19:44,950
it would shrink down more and more and

452
00:19:49,500 --> 00:19:47,980
it did pulsate it would start to shrink

453
00:19:51,660 --> 00:19:49,510
and then say oh hey I got some more

454
00:19:53,460 --> 00:19:51,670
stuff and it bloats up again then it

455
00:19:55,770 --> 00:19:53,470
goes down once it loses that and then oh

456
00:19:58,620 --> 00:19:55,780
I found more stuff to fuse you know and

457
00:20:00,600 --> 00:19:58,630
when that happens basically it'll blow

458
00:20:01,680 --> 00:20:00,610
and do that kind of that cycle that

459
00:20:03,570 --> 00:20:01,690
variable

460
00:20:05,700 --> 00:20:03,580
cycle like that puffing and and and

461
00:20:07,909 --> 00:20:05,710
shrinking multiple times and it'll

462
00:20:14,100 --> 00:20:07,919
become a white dwarf and the white dwarf

463
00:20:16,649 --> 00:20:14,110

is a really odd character just like well

464

00:20:18,060 --> 00:20:16,659

you know with bigger stars they could

465

00:20:22,950 --> 00:20:18,070

leave behind black holes or neutron

466

00:20:26,009 --> 00:20:22,960

stars so it's a really these cores of

467

00:20:27,389 --> 00:20:26,019

all stars at the end are really odd

468

00:20:31,430 --> 00:20:27,399

places

469

00:20:35,129 --> 00:20:31,440

none of them conducive to life yeah

470

00:20:36,720 --> 00:20:35,139

right I know that I think a Sun has to

471

00:20:38,970 --> 00:20:36,730

be 2 and 1/2 times the size of ours

472

00:20:40,200 --> 00:20:38,980

before it could become a black hole I

473

00:20:41,970 --> 00:20:40,210

believe something like that

474

00:20:44,159 --> 00:20:41,980

well yeah black holes have to have a

475

00:20:48,810 --> 00:20:44,169

certain minimum mass okay and like for

476

00:20:52,049 --> 00:20:48,820

our Sun if we there's a certain limit

477

00:20:55,049 --> 00:20:52,059

okay our Sun when it goes to a white

478

00:20:57,649 --> 00:20:55,059

dwarf stars up to one point four four

479

00:21:01,460 --> 00:20:57,659

solar masses would go to a white dwarf

480

00:21:04,919 --> 00:21:01,470

above that then they have a chance of

481

00:21:07,499 --> 00:21:04,929

becoming a going supernova and possibly

482

00:21:11,210 --> 00:21:07,509

leaving behind a neutron star all right

483

00:21:15,450 --> 00:21:11,220

yeah which is another dead star remnant

484

00:21:17,490 --> 00:21:15,460

and above that still the larger ones

485

00:21:20,610 --> 00:21:17,500

when they explode they could actually

486

00:21:22,320 --> 00:21:20,620

leave behind a black hole which when I

487

00:21:25,379 --> 00:21:22,330

first heard about black holes I thought

488

00:21:27,350 --> 00:21:25,389

it was just baloney I thought it was

489

00:21:31,080 --> 00:21:27,360

really I just thought was baloney until

490

00:21:33,090 --> 00:21:31,090

you know and not not until I actually

491

00:21:35,490 --> 00:21:33,100

heard from people that talked about the

492

00:21:37,860 --> 00:21:35,500

physics of the black holes and how they

493

00:21:40,110 --> 00:21:37,870

operated and I realized that we're

494

00:21:43,049 --> 00:21:40,120

talking about a force of gravity that's

495

00:21:47,580 --> 00:21:43,059

actually bending not light but the

496

00:21:49,590 --> 00:21:47,590

fabric of space itself and bending space

497

00:21:51,210 --> 00:21:49,600

is a concept that is hard for people to

498

00:21:54,509 --> 00:21:51,220

understand because they think space is

499

00:21:57,990 --> 00:21:54,519

nothing it's empty you know and it's

500

00:22:00,509 --> 00:21:58,000

it's not you know and so when when when

501
00:22:01,799 --> 00:22:00,519
the fabric of space gets bent well just

502
00:22:04,139 --> 00:22:01,809
like a car on a hill

503
00:22:08,909 --> 00:22:04,149
okay following the contours of a hill

504
00:22:10,830 --> 00:22:08,919
light follows the contour of space so if

505
00:22:13,440 --> 00:22:10,840
the if the if space is getting bent

506
00:22:14,980 --> 00:22:13,450
around by a black hole well the light is

507
00:22:16,330 --> 00:22:14,990
gonna go benter get around

508
00:22:18,549 --> 00:22:16,340
get bent around by this black hole

509
00:22:20,350 --> 00:22:18,559
because it's following space it follows

510
00:22:21,880 --> 00:22:20,360
space it doesn't know that there's a

511
00:22:24,490 --> 00:22:21,890
band it's just going straight as far as

512
00:22:26,410 --> 00:22:24,500
its concerned you know and so when they

513
00:22:28,540 --> 00:22:26,420

say a black hole's gravity is so strong

514

00:22:31,540 --> 00:22:28,550

and not even light can escape it what

515

00:22:34,000 --> 00:22:31,550

they're really saying is that the

516

00:22:37,000 --> 00:22:34,010

gravitational force of the black hole is

517

00:22:39,669 --> 00:22:37,010

bending space so much that the light

518

00:22:43,210 --> 00:22:39,679

that is now let's say orbiting the black

519

00:22:45,640 --> 00:22:43,220

hole if it ends up getting into the

520

00:22:47,919 --> 00:22:45,650

black hole the the gravity is so strong

521

00:22:49,510 --> 00:22:47,929

that and the curvature of space is so

522

00:22:51,100 --> 00:22:49,520

tight that you'll that light beam can

523

00:22:53,620 --> 00:22:51,110

never get out again that particle that

524

00:22:56,919 --> 00:22:53,630

photon of light will never get out so

525

00:23:01,090 --> 00:22:56,929

that's why they say that it's not that

526

00:23:03,310 --> 00:23:01,100

light is bent by gravity it's not space

527

00:23:05,830 --> 00:23:03,320

is bent by gravity and light follows

528

00:23:09,610 --> 00:23:05,840

space it's sort of a two-step thing well

529

00:23:11,620 --> 00:23:09,620

you know it is and I've heard it's kind

530

00:23:15,190 --> 00:23:11,630

of like putting a a bowling ball on a

531

00:23:18,070 --> 00:23:15,200

mattress it's a good way to put it yeah

532

00:23:19,780 --> 00:23:18,080

or a big rubber sheet you know and and

533

00:23:22,030 --> 00:23:19,790

and you know we've done that actually in

534

00:23:23,950 --> 00:23:22,040

physics we've actually taken a ball

535

00:23:26,470 --> 00:23:23,960

bearing and put it on a large rubber

536

00:23:28,450 --> 00:23:26,480

sheet and it makes it well in the middle

537

00:23:31,180 --> 00:23:28,460

and if the if you get enough people to

538

00:23:32,260 --> 00:23:31,190

hold that thing and stretch it you know

539

00:23:34,540 --> 00:23:32,270

the ball bearing will make like a little

540

00:23:36,070 --> 00:23:34,550

dent in the middle but as the people

541

00:23:38,410 --> 00:23:36,080

start to walk forward a little bit

542

00:23:39,610 --> 00:23:38,420

it stays taut but the ball bearing shots

543

00:23:42,220 --> 00:23:39,620

will sink deeper and deeper and deeper

544

00:23:44,230 --> 00:23:42,230

making it deeper and deeper well and you

545

00:23:47,710 --> 00:23:44,240

can simulate for instance the different

546

00:23:49,870 --> 00:23:47,720

depths of a gravitational well this way

547

00:23:51,370 --> 00:23:49,880

and then if you can think take other

548

00:23:53,230 --> 00:23:51,380

like marbles and start rolling them

549

00:23:55,169 --> 00:23:53,240

around on this thing you'll see the

550

00:23:57,880 --> 00:23:55,179

marbles will orbit these things and

551

00:24:00,880 --> 00:23:57,890

spiral in faster and faster and faster

552

00:24:02,919 --> 00:24:00,890

till they go down the middle wheel in a

553

00:24:05,049 --> 00:24:02,929

way it was clinking then you got that

554

00:24:07,570 --> 00:24:05,059

then the marbles now hit the ball

555

00:24:09,250 --> 00:24:07,580

bearing in the middle yeah yeah we got

556

00:24:12,490 --> 00:24:09,260

just a minute here we're gonna be going

557

00:24:13,720 --> 00:24:12,500

into a break and I just want to touch on

558

00:24:15,610 --> 00:24:13,730

some of the other things we're going to

559

00:24:17,560 --> 00:24:15,620

talk about course we'll hit the UFO

560

00:24:19,960 --> 00:24:17,570

topic sooner or later we're gonna be

561

00:24:22,330 --> 00:24:19,970

talking about your book and we're also

562

00:24:23,890 --> 00:24:22,340

going to be talking about well we're

563

00:24:27,250 --> 00:24:23,900

going to talk about your book at this

564

00:24:29,290 --> 00:24:27,260

coming break coming right up

565

00:24:33,640 --> 00:24:29,300

I also want to talk about the near miss

566

00:24:35,320 --> 00:24:33,650

asteroid and what of you know how can we

567

00:24:37,870 --> 00:24:35,330

actually be protected from that because

568

00:24:40,870 --> 00:24:37,880

that's that's always a little bit scary

569

00:24:43,930 --> 00:24:40,880

that whole thing yeah anyway we are

570

00:24:46,330 --> 00:24:43,940

ready to go into a break and we'll be

571

00:24:49,180 --> 00:24:46,340

right back right after these messages

572

00:24:52,600 --> 00:24:49,190

and hang in there in YouTube we got a

573

00:24:54,640 --> 00:24:52,610

commercial for you hi everyone this is

574

00:24:56,350 --> 00:24:54,650

actually my first youtube commercial and

575

00:25:00,730 --> 00:24:56,360

it's about me that's actually about my

576
00:25:02,560 --> 00:25:00,740
artwork but I am really excited because

577
00:25:06,220 --> 00:25:02,570
in going stir-crazy

578
00:25:08,020 --> 00:25:06,230
I actually have time to paint which you

579
00:25:10,180 --> 00:25:08,030
know I've put the brush down for many

580
00:25:13,570 --> 00:25:10,190
years so check out my website martin

581
00:25:15,640 --> 00:25:13,580
willis art.com it's a great shopping

582
00:25:16,270 --> 00:25:15,650
experience over there and why am I

583
00:25:18,280 --> 00:25:16,280
telling you this

584
00:25:21,490 --> 00:25:18,290
because if there's anything over there

585
00:25:26,260 --> 00:25:21,500
that you kind of fancy all you have to

586
00:25:27,130 --> 00:25:26,270
do is put in the coupon code UFO and

587
00:25:32,880 --> 00:25:27,140
you're good to go

588
00:25:36,460 --> 00:25:32,890

for 50% off of the typical gallery price

589

00:25:39,820 --> 00:25:36,470

so check it out over there at Martin

590

00:25:43,330 --> 00:25:39,830

Willis art.com I used to have a gallery

591

00:25:45,610 --> 00:25:43,340

you know years ago for many years

592

00:25:48,940 --> 00:25:45,620

actually in Portsmouth New Hampshire I

593

00:25:50,260 --> 00:25:48,950

sold a lot of artwork there I started at

594

00:25:52,120 --> 00:25:50,270

age

595

00:25:56,170 --> 00:25:52,130

well actually gonna say I started in my

596

00:25:57,810 --> 00:25:56,180

early 40s totally bored on a Saturday my

597

00:26:01,810 --> 00:25:57,820

son and I went to a craft store I bought

598

00:26:04,810 --> 00:26:01,820

yes paint-by-numbers and I was

599

00:26:08,580 --> 00:26:04,820

immediately frustrated right away with

600

00:26:11,530 --> 00:26:08,590

that I could not handle that so I

601
00:26:14,170 --> 00:26:11,540
flipped the canvas over and painted what

602
00:26:17,140 --> 00:26:14,180
actually looked like an apple and that

603
00:26:19,300 --> 00:26:17,150
started me on my way actually painted

604
00:26:22,240 --> 00:26:19,310
with a well-known artist for about a

605
00:26:24,280 --> 00:26:22,250
year this you're seeing right now on the

606
00:26:27,730 --> 00:26:24,290
screen is part of a series called life

607
00:26:30,130 --> 00:26:27,740
on Planet X so check that out

608
00:26:32,380 --> 00:26:30,140
my first influence was actually my dad

609
00:26:36,720 --> 00:26:32,390
many years ago this is one of his

610
00:26:40,150 --> 00:26:36,730
paintings I I used to sit in his gallery

611
00:26:43,030 --> 00:26:40,160
and just watch him paint and he

612
00:26:44,770 --> 00:26:43,040
- give me the wonderful chore of

613
00:26:48,600 --> 00:26:44,780

cleaning the brushes there's another

614

00:26:51,310 --> 00:26:48,610

painting that he did a still-life anyway

615

00:26:53,470 --> 00:26:51,320

it kind of influenced me also I

616

00:26:56,710 --> 00:26:53,480

mentioned many times on this show that

617

00:26:59,740 --> 00:26:56,720

I'm a you know fine art appraiser so

618

00:27:02,740 --> 00:26:59,750

there's been many influences of art over

619

00:27:06,400 --> 00:27:02,750

the years I'm enjoying what I'm doing I

620

00:27:11,710 --> 00:27:06,410

hope you enjoy the website again check

621

00:27:15,370 --> 00:27:11,720

out a Martin Willis art.com and don't

622

00:27:19,510 --> 00:27:15,380

forget the code that will save you 50%

623

00:27:21,670 --> 00:27:19,520

off and that is a UFO so hang in there

624

00:27:28,420 --> 00:27:21,680

we'll be right back with the show thanks

625

00:27:31,510 --> 00:27:28,430

for listening actually you don't have to

626

00:27:36,400 --> 00:27:31,520

hang in all that long I think we're

627

00:27:38,080 --> 00:27:36,410

gonna I'm gonna bring us back mark or

628

00:27:41,440 --> 00:27:38,090

are you getting used to this new this

629

00:27:43,270 --> 00:27:41,450

new program I love it so mark let's talk

630

00:27:46,500 --> 00:27:43,280

about your book during this break we got

631

00:27:50,350 --> 00:27:46,510

we got about two minutes or so here okay

632

00:27:55,330 --> 00:27:50,360

well the book is was born out of a

633

00:27:58,930 --> 00:27:55,340

conversation I had back in 1988 no 1983

634

00:28:04,600 --> 00:27:58,940

I was getting my degree in astronomy yes

635

00:28:06,370 --> 00:28:04,610

I'm that old and during that time I was

636

00:28:08,200 --> 00:28:06,380

talking to the director of the

637

00:28:11,830 --> 00:28:08,210

observatory and I had a conversation

638

00:28:16,300 --> 00:28:11,840

with him and said hey I believe that the

639

00:28:17,860 --> 00:28:16,310

universe is full of life and he goes you

640

00:28:22,240 --> 00:28:17,870

have to explain that what are you what

641

00:28:25,150 --> 00:28:22,250

are you talking about and I said I think

642

00:28:29,440 --> 00:28:25,160

that the universe is full of life I

643

00:28:33,340 --> 00:28:29,450

think it's a populated universe and I

644

00:28:35,080 --> 00:28:33,350

have no idea you know why I think that I

645

00:28:37,210 --> 00:28:35,090

just have some logic behind it and he

646

00:28:38,560 --> 00:28:37,220

goes well you're gonna have to explain

647

00:28:40,180 --> 00:28:38,570

that logic so I actually told them I

648

00:28:42,670 --> 00:28:40,190

said look we're carbon-based creatures

649

00:28:44,650 --> 00:28:42,680

we're bilaterally symmetric everything

650

00:28:50,470 --> 00:28:44,660

on this planet is based on carbon every

651
00:28:52,030 --> 00:28:50,480
life-form and so you know to me that's a

652
00:28:53,980 --> 00:28:52,040
template that the universe has produced

653
00:28:58,120 --> 00:28:53,990
you know a template for

654
00:29:01,720 --> 00:28:58,130
life and so that that being the case I

655
00:29:04,180 --> 00:29:01,730
think that maybe we're talking about the

656
00:29:06,580 --> 00:29:04,190
fact that life in the universe is the

657
00:29:09,910 --> 00:29:06,590
rule not the exception

658
00:29:12,310 --> 00:29:09,920
and he said you finished I said yeah he

659
00:29:14,470 --> 00:29:12,320
says go back in the observatory and get

660
00:29:16,750 --> 00:29:14,480
back in the project alright your

661
00:29:22,450 --> 00:29:16,760
research project you meant and leave

662
00:29:24,730 --> 00:29:22,460
Captain Kirk to us now in 89 I went back

663
00:29:28,960 --> 00:29:24,740

because the first exoplanet had been

664

00:29:30,850 --> 00:29:28,970

confirmed and he was on the phone it

665

00:29:35,169 --> 00:29:30,860

walked into his office he's on the phone

666

00:29:37,150 --> 00:29:35,179

I leaned in like this they go hey I got

667

00:29:40,620 --> 00:29:37,160

a isn't he's on the phone he covers up

668

00:29:44,919 --> 00:29:40,630

receiver he says it was only one planet

669

00:29:48,940 --> 00:29:44,929

and thus began the flood of over 4000

670

00:29:53,080 --> 00:29:48,950

confirmed planets now with suggestions

671

00:29:57,490 --> 00:29:53,090

that there are potentially minimally 25

672

00:29:59,350 --> 00:29:57,500

million and as many as I got a rap

673

00:30:07,030 --> 00:29:59,360

gentle makers were coming back stand by

674

00:30:08,799 --> 00:30:07,040

you bet in three two one go alright

675

00:30:12,150 --> 00:30:08,809

welcome back to the show I'm Martin

676

00:30:15,790 --> 00:30:12,160

Willis your host my guest tonight is the

677

00:30:18,130 --> 00:30:15,800

great one and only mark the Antonio and

678

00:30:22,090 --> 00:30:18,140

we were talking where I think we kind of

679

00:30:24,580 --> 00:30:22,100

can finish up on the the black hole that

680

00:30:26,380 --> 00:30:24,590

whole situation although it's such a

681

00:30:29,260 --> 00:30:26,390

still so many mysteries and the

682

00:30:31,600 --> 00:30:29,270

different things that happen to sons you

683

00:30:34,570 --> 00:30:31,610

know and and does this whole thing you

684

00:30:37,060 --> 00:30:34,580

know fall apart and then come back

685

00:30:39,760 --> 00:30:37,070

together someday you know I I understand

686

00:30:41,530 --> 00:30:39,770

there's certain stars it in a certain

687

00:30:44,799 --> 00:30:41,540

state that can last a trillion years

688

00:30:46,510 --> 00:30:44,809

with the fuel they have yeah those are

689

00:30:47,860 --> 00:30:46,520

the little percolators I call know

690

00:30:50,710 --> 00:30:47,870

they're there the red dwarfs there

691

00:30:52,210 --> 00:30:50,720

they're m-type stars not to be confused

692

00:30:53,650 --> 00:30:52,220

with m-class planets and star trek

693

00:30:57,580 --> 00:30:53,660

because that wasn't the thing but

694

00:31:00,370 --> 00:30:57,590

m-class stars are very cool stars

695

00:31:04,630 --> 00:31:00,380

meaning they're only 3000 Kelvin on

696

00:31:06,480 --> 00:31:04,640

their surfaces okay just a few thousand

697

00:31:08,110 --> 00:31:06,490

degrees fahrenheit in other words and

698

00:31:10,780 --> 00:31:08,120

the

699

00:31:13,240 --> 00:31:10,790

stars can live literally last for

700

00:31:15,670 --> 00:31:13,250

trillions of years potentially and and

701
00:31:17,620 --> 00:31:15,680
they are the most numerous star in the

702
00:31:21,040 --> 00:31:17,630
entire universe there's more of those

703
00:31:23,170 --> 00:31:21,050
types of stars than any other and as it

704
00:31:25,540 --> 00:31:23,180
turns out in looking at the data and

705
00:31:28,770 --> 00:31:25,550
looking at all the science it seems

706
00:31:35,040 --> 00:31:28,780
we're not off when we suggest that maybe

707
00:31:38,290 --> 00:31:35,050
maybe there's a strong likelihood I

708
00:31:40,480 --> 00:31:38,300
should say that there's more planets

709
00:31:43,330 --> 00:31:40,490
than there are stars in the universe and

710
00:31:47,890 --> 00:31:43,340
that's not unfounded based on the

711
00:31:51,250 --> 00:31:47,900
science that's right and how many have

712
00:31:54,060 --> 00:31:51,260
they discovered a certain amount of what

713
00:31:56,440 --> 00:31:54,070

they call planets in the Goldilocks zone

714

00:31:57,910 --> 00:31:56,450

yeah the habitable planets that's right

715

00:32:01,300 --> 00:31:57,920

I mean there's a certain percentage of

716

00:32:04,180 --> 00:32:01,310

these that have been discovered that we

717

00:32:06,150 --> 00:32:04,190

can extrapolate to the population of our

718

00:32:08,110 --> 00:32:06,160

galaxy as a whole for instance however

719

00:32:11,230 --> 00:32:08,120

the search for planets around other

720

00:32:15,460 --> 00:32:11,240

stars you know it it's limited only to

721

00:32:17,500 --> 00:32:15,470

our galaxy now but we can also there's

722

00:32:20,350 --> 00:32:17,510

there's some research that shows extra

723

00:32:24,220 --> 00:32:20,360

galactic planets that might be

724

00:32:25,690 --> 00:32:24,230

detectable based on the way we're seeing

725

00:32:28,270 --> 00:32:25,700

the light change because you know

726

00:32:30,340 --> 00:32:28,280

dimming light can be seen for you know a

727

00:32:33,700 --> 00:32:30,350

long way away many millions of light

728

00:32:35,670 --> 00:32:33,710

years even so in our neighborhood well

729

00:32:40,330 --> 00:32:35,680

in our galaxy those is our neighborhood

730

00:32:42,010 --> 00:32:40,340

right yeah our galaxy is 100,000 light

731

00:32:43,570 --> 00:32:42,020

years across or so it's gonna take light

732

00:32:45,220 --> 00:32:43,580

a hundred thousand years to cross it in

733

00:32:46,900 --> 00:32:45,230

lights the fastest thing we know in the

734

00:32:48,490 --> 00:32:46,910

universe and it still is gonna take a

735

00:32:50,890 --> 00:32:48,500

hundred thousand years to cross just our

736

00:32:53,560 --> 00:32:50,900

galaxy and there's over two trillion

737

00:32:56,140 --> 00:32:53,570

other galaxies potentially so that said

738

00:32:59,230 --> 00:32:56,150

all that said that understanding in our

739

00:33:02,890 --> 00:32:59,240

galaxy alone there is anywhere from 25

740

00:33:07,630 --> 00:33:02,900

million at the low end to maybe as high

741

00:33:10,120 --> 00:33:07,640

as 20 billion earth-like planets that

742

00:33:11,380 --> 00:33:10,130

means planets that have the capability

743

00:33:13,210 --> 00:33:11,390

of having liquid water on their surface

744

00:33:16,210 --> 00:33:13,220

that means they're in the not too hot

745

00:33:17,410 --> 00:33:16,220

not too cold Goldilocks zone and where

746

00:33:19,810 --> 00:33:17,420

those numbers come from those numbers

747

00:33:22,770 --> 00:33:19,820

come from you know not my head those

748

00:33:26,490 --> 00:33:22,780

numbers come from studies that have

749

00:33:29,160 --> 00:33:26,500

by Italian teams and other other teams

750

00:33:32,040 --> 00:33:29,170

and they're actually looking at the

751
00:33:34,110 --> 00:33:32,050
famous Drake Equation Frank Drake had an

752
00:33:36,360 --> 00:33:34,120
equation that he used to calculate the

753
00:33:38,580 --> 00:33:36,370
probability of life in the universe and

754
00:33:42,450 --> 00:33:38,590
without being able to plug in any data

755
00:33:44,670 --> 00:33:42,460
for the modern understanding of planets

756
00:33:47,250 --> 00:33:44,680
around other stars it was a very

757
00:33:51,660 --> 00:33:47,260
pessimistic view however now with the

758
00:33:54,210 --> 00:33:51,670
new data the numbers turn out and churn

759
00:33:56,280 --> 00:33:54,220
out a different value for the potential

760
00:33:58,200 --> 00:33:56,290
planets around other stars and potential

761
00:34:02,850 --> 00:33:58,210
life-bearing planets potential

762
00:34:05,010 --> 00:34:02,860
intelligence possibly and there's like I

763
00:34:07,590 --> 00:34:05,020

said looking at just the planets that

764

00:34:09,720 --> 00:34:07,600

can support life like us carbon-based

765

00:34:14,510 --> 00:34:09,730

bilateral symmetric used oxygen to make

766

00:34:17,610 --> 00:34:14,520

energy for our cells that particular

767

00:34:22,310 --> 00:34:17,620

conundrum leads us to that those numbers

768

00:34:27,120 --> 00:34:22,320

I mentioned those are 25 million to say

769

00:34:28,830 --> 00:34:27,130

to say 20 billion other planets just

770

00:34:32,250 --> 00:34:28,840

like the earth and that's just in our

771

00:34:34,800 --> 00:34:32,260

galaxy and then there are those one or

772

00:34:37,700 --> 00:34:34,810

two trillion other galaxies so it's

773

00:34:40,410 --> 00:34:37,710

stupendous it's colossal it's fantastic

774

00:34:42,540 --> 00:34:40,420

it's all those words we make up to

775

00:34:45,270 --> 00:34:42,550

describe really cool things we're

776

00:34:46,620 --> 00:34:45,280

getting that digital noise again you did

777

00:34:49,370 --> 00:34:46,630

so I don't know whatever you did can you

778

00:34:52,800 --> 00:34:49,380

do that again so it doesn't come across

779

00:34:55,230 --> 00:34:52,810

well that's actually you know you're

780

00:34:56,850 --> 00:34:55,240

hearing leapers not that little sound

781

00:34:59,550 --> 00:34:56,860

you're hearing is the USB kicking in

782

00:35:02,400 --> 00:34:59,560

saying hey I'm detaching a USB thing hey

783

00:35:04,860 --> 00:35:02,410

I'm attaching a USB thing except that

784

00:35:07,350 --> 00:35:04,870

it's based on electric charges that are

785

00:35:10,350 --> 00:35:07,360

errantly flowing through my desk here

786

00:35:12,540 --> 00:35:10,360

and through the air probably because

787

00:35:14,010 --> 00:35:12,550

this is Connecticut it's still chilly

788

00:35:15,840 --> 00:35:14,020

here and I actually have a heater

789

00:35:17,610 --> 00:35:15,850

running in here which dries the air and

790

00:35:21,600 --> 00:35:17,620

makes everything a little bit more

791

00:35:26,250 --> 00:35:21,610

staticky I'll try to sit sit still no

792

00:35:28,170 --> 00:35:26,260

that's why well and so let's listen to

793

00:35:31,350 --> 00:35:28,180

talk about a couple of things well

794

00:35:32,820 --> 00:35:31,360

getting back to the the planets that

795

00:35:35,400 --> 00:35:32,830

could support life and possibly

796

00:35:35,820 --> 00:35:35,410

intelligent life I've asked this

797

00:35:38,270 --> 00:35:35,830

question

798

00:35:42,480 --> 00:35:38,280

a number of people a speculating

799

00:35:45,180 --> 00:35:42,490

question of course that is why if we are

800

00:35:48,000 --> 00:35:45,190

being visited and they are coming from

801
00:35:50,370 --> 00:35:48,010
out there let's just I'm just gonna

802
00:35:52,560 --> 00:35:50,380
throw a lot of things out here because I

803
00:35:54,690 --> 00:35:52,570
never say that I I know what things are

804
00:35:57,180 --> 00:35:54,700
that are showing up here I'm never gonna

805
00:35:58,350 --> 00:35:57,190
say there's aliens inside but it's a

806
00:36:00,930 --> 00:35:58,360
possibility it's one of the

807
00:36:04,680 --> 00:36:00,940
possibilities and so let's just say we

808
00:36:05,730 --> 00:36:04,690
are being visited by an intelligent life

809
00:36:08,760 --> 00:36:05,740
from another planet

810
00:36:14,190 --> 00:36:08,770
why here if there are so many other

811
00:36:17,280 --> 00:36:14,200
possibilities of planets well there's a

812
00:36:20,880 --> 00:36:17,290
logical answer to that and it comes down

813
00:36:22,290 --> 00:36:20,890

to the fact that when we talked to or

814

00:36:24,180 --> 00:36:22,300

when you when you heard from Stephen

815

00:36:27,690 --> 00:36:24,190

Hawking some years ago he suggested that

816

00:36:29,490 --> 00:36:27,700

we keep a low profile don't expose

817

00:36:31,290 --> 00:36:29,500

ourselves to alien life just sort of

818

00:36:35,010 --> 00:36:31,300

hide keep earth quiet out of the way

819

00:36:36,560 --> 00:36:35,020

because we very rightly could fear what

820

00:36:40,320 --> 00:36:36,570

they may bring to us right

821

00:36:43,740 --> 00:36:40,330

well is it turns out Stephen Hawking

822

00:36:47,580 --> 00:36:43,750

didn't account for the fact that the

823

00:36:51,050 --> 00:36:47,590

earth has an oxygen atmosphere and the

824

00:36:56,280 --> 00:36:51,060

oxygen atmosphere started to build up

825

00:37:00,060 --> 00:36:56,290

2.7 billion years ago so at some point

826

00:37:03,480 --> 00:37:00,070

along the way a civilizations gonna say

827

00:37:06,240 --> 00:37:03,490

hey we're carbon-based if they are and

828

00:37:08,070 --> 00:37:06,250

we need oxygen so let's look for planets

829

00:37:11,820 --> 00:37:08,080

that have oxygen in their atmospheres

830

00:37:14,880 --> 00:37:11,830

and we're doing that now that's what we

831

00:37:16,980 --> 00:37:14,890

want to do the James Webb telescope is

832

00:37:18,690 --> 00:37:16,990

going to infer that there's oxygen in an

833

00:37:21,090 --> 00:37:18,700

atmosphere by looking for carbon dioxide

834

00:37:23,310 --> 00:37:21,100

and methane and if it can see it because

835

00:37:25,560 --> 00:37:23,320

oxygen you know the the spectrum of

836

00:37:27,060 --> 00:37:25,570

oxygen would show up is in the visible

837

00:37:28,680 --> 00:37:27,070

part of the spectrum and the James Webb

838

00:37:31,020 --> 00:37:28,690

doesn't do that the James Webb looks at

839

00:37:33,390 --> 00:37:31,030

infrared but they can infer that there's

840

00:37:36,530 --> 00:37:33,400

oxygen present based on the quantities

841

00:37:39,720 --> 00:37:36,540

of these other materials so that said

842

00:37:41,940 --> 00:37:39,730

we're doing this now and we're in our

843

00:37:43,890 --> 00:37:41,950

infancy when it comes to finding other

844

00:37:46,310 --> 00:37:43,900

worlds we can't even leave this planet

845

00:37:49,470 --> 00:37:46,320

and go to another world with any kind of

846

00:37:53,940 --> 00:37:49,480

speed or any kind of

847

00:37:57,780 --> 00:37:53,950

capability so if another civilization is

848

00:37:59,539 --> 00:37:57,790

only safe 500 years ahead of us and it's

849

00:38:02,549 --> 00:37:59,549

ludicrous to think that they're not

850

00:38:04,559 --> 00:38:02,559

they're probably gonna be say half a

851

00:38:07,530 --> 00:38:04,569

million years ahead of us maybe or a

852

00:38:10,140 --> 00:38:07,540

billion years even can work ahead of us

853

00:38:11,940 --> 00:38:10,150

if that's the case they would have

854

00:38:13,710 --> 00:38:11,950

discovered that oxygen in an atmosphere

855

00:38:16,470 --> 00:38:13,720

is a very important thing to look for

856

00:38:18,990 --> 00:38:16,480

and they would probably have done a

857

00:38:21,930 --> 00:38:19,000

survey of all the stars they can see in

858

00:38:22,980 --> 00:38:21,940

the galaxy and said give us all the

859

00:38:25,020 --> 00:38:22,990

candidates to go

860

00:38:26,490 --> 00:38:25,030

you know torque is the guy that gets a

861

00:38:29,190 --> 00:38:26,500

sign that see in the alien world

862

00:38:31,680 --> 00:38:29,200

so torque has to go and make a

863

00:38:34,589 --> 00:38:31,690

compendium for the High Council whatever

864

00:38:36,359 --> 00:38:34,599

it is on their planet and that council

865

00:38:38,280 --> 00:38:36,369

is going to look at all these oxygen

866

00:38:39,870 --> 00:38:38,290

atmosphere planets and then they have to

867

00:38:44,880 --> 00:38:39,880

go and figure out if they're gonna go to

868

00:38:46,859 --> 00:38:44,890

them so you say why us well we have a

869

00:38:51,030 --> 00:38:46,869

very very high abundance of oxygen in

870

00:38:53,430 --> 00:38:51,040

our atmosphere and you would go to a

871

00:38:55,230 --> 00:38:53,440

planet that has oxygen for one reason

872

00:38:58,799 --> 00:38:55,240

not because it might be able to support

873

00:39:02,370 --> 00:38:58,809

you but because it's already supporting

874

00:39:05,730 --> 00:39:02,380

something alive and the reason is

875

00:39:07,799 --> 00:39:05,740

because oxygen doesn't like to stay in

876

00:39:09,390 --> 00:39:07,809

the air and just sort of float around hi

877

00:39:11,670 --> 00:39:09,400

I'm an oxygen atom yeah me too you know

878

00:39:13,470 --> 00:39:11,680

I mean they don't like that they want to

879

00:39:14,880 --> 00:39:13,480

go down into the crust they want to bind

880

00:39:17,400 --> 00:39:14,890

with other things you want to bind with

881

00:39:21,990 --> 00:39:17,410

iron and become Fe_2O_3 which is rust

882

00:39:25,049 --> 00:39:22,000

okay they want to go and become other

883

00:39:26,490 --> 00:39:25,059

materials to form carbonate ions or

884

00:39:29,069 --> 00:39:26,500

carbonate compounds you know like

885

00:39:30,809 --> 00:39:29,079

calcium carbonate or magnesium carbonate

886

00:39:32,880 --> 00:39:30,819

they want to form other things

887

00:39:37,430 --> 00:39:32,890

oxygen is a tremendous atom for doing

888

00:39:39,390 --> 00:39:37,440

that it loves to oxidize so that said

889

00:39:42,349 --> 00:39:39,400

oxygen in an atmosphere would be

890

00:39:45,150 --> 00:39:42,359

depleted after just a few million years

891

00:39:47,789 --> 00:39:45,160

and if we have it in our atmosphere and

892

00:39:49,650 --> 00:39:47,799

a civilization is watching this planet

893

00:39:52,890 --> 00:39:49,660

and they notice that there's no real

894

00:39:56,130 --> 00:39:52,900

relative change in the oxygen level what

895

00:39:57,720 --> 00:39:56,140

does that tell you tells you that oxygen

896

00:40:00,490 --> 00:39:57,730

is being replenished

897

00:40:04,480 --> 00:40:00,500

uh-huh replenished

898

00:40:07,690 --> 00:40:04,490

by what cookie life that's replenishing

899

00:40:10,720 --> 00:40:07,700

it so they'll bet as a this planet very

900

00:40:12,460 --> 00:40:10,730

likely has some form of life and then

901
00:40:15,550 --> 00:40:12,470
tor gets a medal you know and they

902
00:40:17,680 --> 00:40:15,560
promote it yeah

903
00:40:19,240 --> 00:40:17,690
so yeah I've wondered about that and the

904
00:40:22,240 --> 00:40:19,250
James Webb that will be really

905
00:40:24,730 --> 00:40:22,250
interesting you know may may put SETI

906
00:40:26,800 --> 00:40:24,740
out of business you never know I don't

907
00:40:28,450 --> 00:40:26,810
know but you know I get it I also add

908
00:40:30,580 --> 00:40:28,460
one little thing too and that is you

909
00:40:32,920 --> 00:40:30,590
know a lot of people say that you know

910
00:40:34,060 --> 00:40:32,930
well we have a really odd situation here

911
00:40:37,480 --> 00:40:34,070
because we have a moon

912
00:40:39,190 --> 00:40:37,490
okay our moon you see this is them

913
00:40:41,140 --> 00:40:39,200

talking about there aren't our moon has

914

00:40:43,240 --> 00:40:41,150

made it possible for life to exist here

915

00:40:45,580 --> 00:40:43,250

without the moon life couldn't exist I

916

00:40:49,060 --> 00:40:45,590

don't know this is the moon okay

917

00:40:50,440 --> 00:40:49,070

this is a 3d printed this moon and this

918

00:40:52,990 --> 00:40:50,450

this moon okay

919

00:40:58,350 --> 00:40:53,000

it is sort of oblong because the real

920

00:41:03,130 --> 00:40:58,360

moon is oblong and its presence here I

921

00:41:06,820 --> 00:41:03,140

argue doesn't help us I think that

922

00:41:08,860 --> 00:41:06,830

traditionally it's hurt us and because

923

00:41:10,180 --> 00:41:08,870

the reason is that well people say well

924

00:41:13,990 --> 00:41:10,190

without the moon we don't have tides

925

00:41:16,270 --> 00:41:14,000

right wrong we do have tides they're

926

00:41:19,210 --> 00:41:16,280

just half the size now why isn't the Sun

927

00:41:21,340 --> 00:41:19,220

that's right yeah Martin Willis gets a

928

00:41:23,650 --> 00:41:21,350

gold star and he knows he knows you know

929

00:41:25,750 --> 00:41:23,660

what's going on here so yeah that's

930

00:41:29,110 --> 00:41:25,760

right so that's saying he's the guy he's

931

00:41:31,720 --> 00:41:29,120

a guy so that said okay when we look at

932

00:41:34,630 --> 00:41:31,730

the the tides from the Sun we would

933

00:41:37,390 --> 00:41:34,640

still get tidal pools we would still get

934

00:41:40,480 --> 00:41:37,400

fish left out into the atmosphere for a

935

00:41:43,200 --> 00:41:40,490

period of time and then they have to you

936

00:41:46,420 --> 00:41:43,210

know wait for that water to come back in

937

00:41:48,760 --> 00:41:46,430

and they would still adapt to being air

938

00:41:50,830 --> 00:41:48,770

breathers as well because that tidal

939

00:41:55,060 --> 00:41:50,840

pool mechanism is what's thought to have

940

00:41:57,510 --> 00:41:55,070

assisted in that process so that said I

941

00:42:01,240 --> 00:41:57,520

think that you know without the moon

942

00:42:04,030 --> 00:42:01,250

several things would have changed first

943

00:42:07,480 --> 00:42:04,040

of all our orbit tilted the way it is

944

00:42:09,370 --> 00:42:07,490

might not have been that if the initial

945

00:42:12,880 --> 00:42:09,380

collision that took the moon out of the

946

00:42:14,109 --> 00:42:12,890

Earth's primordial earth as the theory

947

00:42:17,559 --> 00:42:14,119

goes right we had the earth

948

00:42:20,200 --> 00:42:17,569

we had the moon blasted out okay by an

949

00:42:22,120 --> 00:42:20,210

impact with another object okay so this

950

00:42:24,339 --> 00:42:22,130

object hits the earth and boom this this

951
00:42:26,230 --> 00:42:24,349
this molten blob comes out and if she

952
00:42:28,390 --> 00:42:26,240
comes the moon eventually but if you

953
00:42:29,980 --> 00:42:28,400
noticed on our moon and you can't really

954
00:42:32,529 --> 00:42:29,990
see that there but there are more

955
00:42:33,999 --> 00:42:32,539
craters the craters have craters okay on

956
00:42:36,450 --> 00:42:34,009
this moon all right

957
00:42:38,529 --> 00:42:36,460
the craters have craters and that

958
00:42:40,180 --> 00:42:38,539
indicates that there was lots of

959
00:42:41,799 --> 00:42:40,190
bombardment going on a lot of things

960
00:42:43,809 --> 00:42:41,809
flying around the early solar system

961
00:42:46,109 --> 00:42:43,819
they clobbered earth that clobbered

962
00:42:51,009 --> 00:42:46,119
Mercury it clobbered Venus it clobbered

963
00:42:54,099 --> 00:42:51,019

the moon it clobbered Mars all right and

964

00:42:56,950 --> 00:42:54,109

the asteroids well those could never be

965

00:42:58,509 --> 00:42:56,960

a planet because of Jupiter so really

966

00:43:00,430 --> 00:42:58,519

what we're talking about is all this

967

00:43:04,239 --> 00:43:00,440

debris flying around in the early solar

968

00:43:05,739 --> 00:43:04,249

system is part of what caused a lot of

969

00:43:07,089 --> 00:43:05,749

the craters on the moon but when the

970

00:43:09,249 --> 00:43:07,099

moon was formed a lot of debris was

971

00:43:10,630 --> 00:43:09,259

formed with it and that also was

972

00:43:13,539 --> 00:43:10,640

responsible for what you're seeing on

973

00:43:15,609 --> 00:43:13,549

the moon now the moon is also got

974

00:43:17,470 --> 00:43:15,619

gravity now this thing is one-sixth the

975

00:43:18,069 --> 00:43:17,480

size of our planet okay our plan is a

976
00:43:21,130 --> 00:43:18,079

lot bigger

977
00:43:23,739 --> 00:43:21,140

however it has gravity a significant

978
00:43:25,870 --> 00:43:23,749

gravity so that anything that's in our

979
00:43:28,749 --> 00:43:25,880

neighborhood if it's on the fence about

980
00:43:29,859 --> 00:43:28,759

coming toward the earth the earth by the

981
00:43:31,210 --> 00:43:29,869

weight there's a moon I'm gonna go

982
00:43:33,069 --> 00:43:31,220

because the moon is gonna help pull it

983
00:43:36,430 --> 00:43:33,079

in so the moon is gonna add that

984
00:43:39,759 --> 00:43:36,440

additional kick to an object that's in

985
00:43:41,859 --> 00:43:39,769

the earth-moon arena area okay and bring

986
00:43:44,559 --> 00:43:41,869

it closer to the earth and possibly hit

987
00:43:49,019 --> 00:43:44,569

the earth we've had five major

988
00:43:51,400 --> 00:43:49,029

extinction events on the planet right so

989

00:43:54,249 --> 00:43:51,410

several of them we had one we had

990

00:43:56,049 --> 00:43:54,259

several impacts but some of them were

991

00:43:59,710 --> 00:43:56,059

changes in biodiversity on the planet

992

00:44:02,680 --> 00:43:59,720

but some impacts had a tremendous effect

993

00:44:03,729 --> 00:44:02,690

on life and our planet is actually very

994

00:44:06,220 --> 00:44:03,739

dynamic okay

995

00:44:10,390 --> 00:44:06,230

could have been volcanoes that wiped out

996

00:44:11,890 --> 00:44:10,400

the the would be mammals 252 million

997

00:44:14,200 --> 00:44:11,900

years ago when they were dominant on the

998

00:44:16,239 --> 00:44:14,210

planet okay the things it would become

999

00:44:18,729 --> 00:44:16,249

us like well mammals okay

1000

00:44:20,229 --> 00:44:18,739

they were dominant and then there was

1001

00:44:22,450 --> 00:44:20,239

this large eruption in what's now

1002

00:44:26,559 --> 00:44:22,460

Siberia the Permian of traps during the

1003

00:44:27,480 --> 00:44:26,569

Permian era and that once there was once

1004

00:44:30,660 --> 00:44:27,490

that LA

1005

00:44:32,100 --> 00:44:30,670

cap was you know once that lava went

1006

00:44:33,810 --> 00:44:32,110

around the edge that magma went around

1007

00:44:36,359 --> 00:44:33,820

the edge of this cap that was formed

1008

00:44:38,790 --> 00:44:36,369

over this this volcanic area that stuff

1009

00:44:41,160 --> 00:44:38,800

exploded into the atmosphere with many

1010

00:44:44,370 --> 00:44:41,170

Giga tons that's billions of tons of co2

1011

00:44:49,370 --> 00:44:44,380

and almost overnight relatively speaking

1012

00:44:52,109 --> 00:44:49,380

the oceans were toxic and oxygen stopped

1013

00:44:54,090 --> 00:44:52,119

you know entering the oceans and stopped

1014

00:44:56,640 --> 00:44:54,100

dissolving into the seawater in fact it

1015

00:44:59,910 --> 00:44:56,650

came out and a lot of life died the

1016

00:45:01,560 --> 00:44:59,920

ocean temperatures rose 24 degrees while

1017

00:45:04,260 --> 00:45:01,570

the planetary temperature rose 24

1018

00:45:06,660 --> 00:45:04,270

degrees over time oceans followed so

1019

00:45:09,720 --> 00:45:06,670

that was that change caused massive

1020

00:45:12,660 --> 00:45:09,730

upheaval in the life and over several

1021

00:45:15,540 --> 00:45:12,670

million years that the full weight of

1022

00:45:17,820 --> 00:45:15,550

that extinction event hit and mammals

1023

00:45:20,970 --> 00:45:17,830

were all but wiped out and another

1024

00:45:23,130 --> 00:45:20,980

life-form came to the forefront as the

1025

00:45:25,950 --> 00:45:23,140

king at that point and it turned out

1026
00:45:28,020 --> 00:45:25,960
that they were reptiles and so way back

1027
00:45:30,660 --> 00:45:28,030
then because of that extinction event

1028
00:45:32,250 --> 00:45:30,670
that happened all right an earth born

1029
00:45:35,730 --> 00:45:32,260
extinction event from the from the

1030
00:45:38,250 --> 00:45:35,740
volcanic eruptions we ended up with the

1031
00:45:40,290 --> 00:45:38,260
age of the dinosaurs and so that's why

1032
00:45:42,359 --> 00:45:40,300
the dinosaurs came to this planet well

1033
00:45:44,430 --> 00:45:42,369
came in to the forefront on the planet

1034
00:45:47,370 --> 00:45:44,440
and then 65 million years ago you know

1035
00:45:48,920 --> 00:45:47,380
how the dinosaurs were rendered extinct

1036
00:45:51,510 --> 00:45:48,930
by the asteroid strike off the Yucatan

1037
00:45:53,190 --> 00:45:51,520
we call that the Chicxulub impact of the

1038
00:45:54,720 --> 00:45:53,200

Cretaceous Paleogene boundary event

1039

00:45:56,130 --> 00:45:54,730

whatever you want to call it we just

1040

00:45:58,830 --> 00:45:56,140

call it dinosaur was killed by the

1041

00:46:01,770 --> 00:45:58,840

asteroid and when that happened that

1042

00:46:04,410 --> 00:46:01,780

many millions of years ago that paved

1043

00:46:05,820 --> 00:46:04,420

the way for the mammals to have a

1044

00:46:08,700 --> 00:46:05,830

resurgence and to come back

1045

00:46:10,859 --> 00:46:08,710

hey the mammals can come back now and so

1046

00:46:13,530 --> 00:46:10,869

out of the shadows came what would be us

1047

00:46:15,960 --> 00:46:13,540

eventually and that led down that

1048

00:46:20,580 --> 00:46:15,970

circuitous path that we followed in

1049

00:46:22,830 --> 00:46:20,590

evolution to get to us so maybe this guy

1050

00:46:26,010 --> 00:46:22,840

wasn't so helpful to us maybe this guy

1051
00:46:27,510 --> 00:46:26,020
is the reason that the dinosaurs died

1052
00:46:29,670 --> 00:46:27,520
maybe this guy is the reason that all

1053
00:46:31,170 --> 00:46:29,680
the other impacts occurred you know so

1054
00:46:36,120 --> 00:46:31,180
maybe it wasn't such a help after all

1055
00:46:36,330 --> 00:46:36,130
however I will say that we are what we

1056
00:46:39,330 --> 00:46:36,340
are

1057
00:46:40,830 --> 00:46:39,340
now we through evolution through all

1058
00:46:41,370 --> 00:46:40,840
these extinction events look like this

1059
00:46:44,100 --> 00:46:41,380
where the

1060
00:46:46,890 --> 00:46:44,110
little tiny weak frail things you know

1061
00:46:50,550 --> 00:46:46,900
and that Star Trek episode ugly bags of

1062
00:46:53,760 --> 00:46:50,560
water remember that kind of what we are

1063
00:46:59,510 --> 00:46:53,770

in a sense and so as these ugly bags of

1064

00:47:06,470 --> 00:46:59,520

water we are superior by intellect only

1065

00:47:09,840 --> 00:47:06,480

not by structure not by not by force of

1066

00:47:11,340 --> 00:47:09,850

strength and so forth so but that's our

1067

00:47:13,200 --> 00:47:11,350

intellect which brings us to dominance

1068

00:47:14,730 --> 00:47:13,210

on the planet so if there's another

1069

00:47:17,040 --> 00:47:14,740

life-form somewhere else right that

1070

00:47:20,340 --> 00:47:17,050

could happen there that can happen there

1071

00:47:22,020 --> 00:47:20,350

too so maybe in a planet on a planet

1072

00:47:25,400 --> 00:47:22,030

that didn't have as many extinction

1073

00:47:28,920 --> 00:47:25,410

events maybe those life forms developed

1074

00:47:32,070 --> 00:47:28,930

faster and more intelligently what if

1075

00:47:34,380 --> 00:47:32,080

the Permian extinction didn't happen 252

1076

00:47:36,420 --> 00:47:34,390

million years ago we certainly wouldn't

1077

00:47:38,910 --> 00:47:36,430

be having this conversation had we had

1078

00:47:41,070 --> 00:47:38,920

we come to dominance again as an

1079

00:47:43,530 --> 00:47:41,080

intelligent species I mean we wouldn't

1080

00:47:47,250 --> 00:47:43,540

have this conversation on a little

1081

00:47:49,290 --> 00:47:47,260

measly computer this would all be a

1082

00:47:51,540 --> 00:47:49,300

mental thing done maybe with telepathy

1083

00:47:53,570 --> 00:47:51,550

or some type of other process because we

1084

00:47:57,210 --> 00:47:53,580

would have been millions of years along

1085

00:47:59,460 --> 00:47:57,220

in a species evolution if we didn't wipe

1086

00:48:03,450 --> 00:47:59,470

ourselves out from something else that's

1087

00:48:05,580 --> 00:48:03,460

unforeseen as of yet you know or maybe

1088

00:48:07,650 --> 00:48:05,590

you know if a pandemic didn't kill the

1089

00:48:11,760 --> 00:48:07,660

entire race which typically they don't

1090

00:48:15,540 --> 00:48:11,770

yeah clearly gonna get people worried

1091

00:48:18,570 --> 00:48:15,550

now hey so what about Jupiter if Jupiter

1092

00:48:21,300 --> 00:48:18,580

never it wasn't part of our solar system

1093

00:48:23,820 --> 00:48:21,310

would we get clobbered a lot more do you

1094

00:48:26,040 --> 00:48:23,830

think yes that's a very good possibility

1095

00:48:28,290 --> 00:48:26,050

because Jupiter is what I call the

1096

00:48:30,330 --> 00:48:28,300

shepherd of the outer solar system you

1097

00:48:33,180 --> 00:48:30,340

know you have Mercury Venus Earth and

1098

00:48:35,580 --> 00:48:33,190

then you have Mars and I'll be on Mars

1099

00:48:36,840 --> 00:48:35,590

we have this this ring of asteroids all

1100

00:48:39,600 --> 00:48:36,850

right and this ring of asteroids out

1101

00:48:41,040 --> 00:48:39,610

there if you made it all into a planet

1102

00:48:42,900 --> 00:48:41,050

it would be something that's only about

1103

00:48:44,580 --> 00:48:42,910

a quarter of the size of the moon so

1104

00:48:47,250 --> 00:48:44,590

it's not like it could be a giant planet

1105

00:48:48,720 --> 00:48:47,260

okay so that that's how much mass is

1106

00:48:51,650 --> 00:48:48,730

there so it doesn't sound like a lot

1107

00:48:55,109 --> 00:48:51,660

when you break it out like that but

1108

00:48:57,089 --> 00:48:55,119

there's many many hundreds of

1109

00:49:01,079 --> 00:48:57,099

millions of these out there and some of

1110

00:49:04,140 --> 00:49:01,089

them are half a mile long a mile long 2

1111

00:49:06,779 --> 00:49:04,150

miles 3 miles you know or kilometers you

1112

00:49:08,940 --> 00:49:06,789

know 10 20 kilometers you know and so

1113

00:49:10,650 --> 00:49:08,950

when you when you go down that path you

1114

00:49:13,200 --> 00:49:10,660

think about that if Jupiter wasn't there

1115

00:49:15,299 --> 00:49:13,210

then something else could have happened

1116

00:49:17,069 --> 00:49:15,309

Jupiter is responsible for actually

1117

00:49:18,660 --> 00:49:17,079

tugging on the asteroids it's going

1118

00:49:20,880 --> 00:49:18,670

around and its orbit okay

1119

00:49:22,650 --> 00:49:20,890

it actually tugs on the asteroids as it

1120

00:49:24,569 --> 00:49:22,660

goes around now the asteroids are closer

1121

00:49:26,849 --> 00:49:24,579

so they're moving a little faster but as

1122

00:49:29,339 --> 00:49:26,859

Jupiter goes around okay it's actually

1123

00:49:30,630 --> 00:49:29,349

tugging on these things and when it tugs

1124

00:49:33,180 --> 00:49:30,640

on them it pulls them a little bit

1125

00:49:35,460 --> 00:49:33,190

further you know out toward Jupiter and

1126

00:49:38,190 --> 00:49:35,470

then they relax now that's the reason

1127

00:49:39,239 --> 00:49:38,200

they never formed into a planetoid okay

1128

00:49:41,579 --> 00:49:39,249

or something the size of the moon

1129

00:49:47,220 --> 00:49:41,589

obviously fourth the size of the moon

1130

00:49:50,210 --> 00:49:47,230

but Jupiter as a shepherd it's been

1131

00:49:53,519 --> 00:49:50,220

holding a lot of those asteroids at bay

1132

00:49:56,640 --> 00:49:53,529

so it wouldn't be a good thing for us if

1133

00:49:58,799 --> 00:49:56,650

Jupiter went away or had never been we

1134

00:50:01,200 --> 00:49:58,809

might have never been because there

1135

00:50:05,009 --> 00:50:01,210

might have been other potential problems

1136

00:50:06,269 --> 00:50:05,019

that happened because of those asteroids

1137

00:50:09,569 --> 00:50:06,279

out there maybe they would have become a

1138

00:50:11,460 --> 00:50:09,579

moon around another planet but on the

1139

00:50:13,680 --> 00:50:11,470

other hand okay and this is why it's

1140

00:50:16,470 --> 00:50:13,690

such a tricky question really on the

1141

00:50:19,499 --> 00:50:16,480

other hand because Jupiter's there it

1142

00:50:21,839 --> 00:50:19,509

has been holding the asteroids sort of

1143

00:50:24,539 --> 00:50:21,849

in place and keeping them you know in

1144

00:50:26,609 --> 00:50:24,549

their own little channels but sometimes

1145

00:50:29,039 --> 00:50:26,619

there are problems and sometimes

1146

00:50:30,180 --> 00:50:29,049

asteroids do get away for instance the

1147

00:50:32,249 --> 00:50:30,190

Chicxulub impact the one I just

1148

00:50:34,380 --> 00:50:32,259

mentioned through contagious Paley gene

1149

00:50:36,950 --> 00:50:34,390

boundary the death of the dinosaurs okay

1150

00:50:41,249 --> 00:50:36,960

that was 65 million years ago right so

1151

00:50:45,809 --> 00:50:41,259

that asteroid that hit us that may not

1152

00:50:48,239 --> 00:50:45,819

have been a near-earth asteroid for its

1153

00:50:50,460 --> 00:50:48,249

entire time obviously it was it was a

1154

00:50:53,039 --> 00:50:50,470

near hit a straight was a major hit

1155

00:50:54,660 --> 00:50:53,049

asteroid at one point but before it was

1156

00:50:57,329 --> 00:50:54,670

that and before it was a near-earth

1157

00:50:59,400 --> 00:50:57,339

object it was out in our asteroid belt

1158

00:51:01,739 --> 00:50:59,410

and it got perturbed or disturbed

1159

00:51:04,380 --> 00:51:01,749

there's another word for that and moved

1160

00:51:07,109 --> 00:51:04,390

here and they think they identified the

1161

00:51:07,970 --> 00:51:07,119

asteroid family as something called a

1162

00:51:11,640 --> 00:51:07,980

Florian

1163

00:51:16,440 --> 00:51:11,650

and the fluorine family of asteroids is

1164

00:51:19,260 --> 00:51:16,450

one that could have spawned this this

1165

00:51:23,460 --> 00:51:19,270

killer rock that ended up striking the

1166

00:51:27,150 --> 00:51:23,470

planet but uh really interesting to read

1167

00:51:28,680 --> 00:51:27,160

on and you have to you have to spend a

1168

00:51:30,030 --> 00:51:28,690

lot more time trying to learn about it

1169

00:51:32,610 --> 00:51:30,040

but you know what you don't want to put

1170

00:51:37,280 --> 00:51:32,620

people to sleep now yeah well what about

1171

00:51:42,030 --> 00:51:37,290

this recent I what's it called 20/20 JJ

1172

00:51:45,180 --> 00:51:42,040

that we've been fairly close now and

1173

00:51:48,170 --> 00:51:45,190

2020 JJ was a near-earth object we call

1174

00:51:51,600 --> 00:51:48,180

any O's right and the nice thing about

1175

00:51:54,900 --> 00:51:51,610

the thing about 20/20 JJ is it was

1176
00:51:59,400 --> 00:51:54,910
really kind of small so at the size of

1177
00:52:03,150 --> 00:51:59,410
20/20 JJ the asteroid didn't really

1178
00:52:05,760 --> 00:52:03,160
stand a chance of hurting us okay it

1179
00:52:07,800 --> 00:52:05,770
kind of snuck past us alright it flew

1180
00:52:09,740 --> 00:52:07,810
about forty three or forty four hundred

1181
00:52:13,680 --> 00:52:09,750
miles over the Pacific Ocean

1182
00:52:16,320 --> 00:52:13,690
and it ended up passing really really

1183
00:52:19,080 --> 00:52:16,330
quickly by us now it only four thousand

1184
00:52:21,480 --> 00:52:19,090
miles away you say wow that's just like

1185
00:52:24,420 --> 00:52:21,490
that's like twice the distance from

1186
00:52:27,720 --> 00:52:24,430
Connecticut to like Arizona you know

1187
00:52:31,290 --> 00:52:27,730
yeah maybe just about that's that's

1188
00:52:33,300 --> 00:52:31,300

that's pretty close by but again it was

1189

00:52:35,700 --> 00:52:33,310

only like nine between nine and twenty

1190

00:52:37,050 --> 00:52:35,710

feet long and if you're like worried

1191

00:52:39,390 --> 00:52:37,060

that we don't know exactly how big it

1192

00:52:41,040 --> 00:52:39,400

was well you can also be worried about

1193

00:52:43,830 --> 00:52:41,050

the fact that we didn't see it until it

1194

00:52:46,370 --> 00:52:43,840

was already in here and and practically

1195

00:52:49,610 --> 00:52:46,380

passing over us that's when it was found

1196

00:52:51,690 --> 00:52:49,620

the thing is many of these asteroids

1197

00:52:54,450 --> 00:52:51,700

have been seen before

1198

00:52:56,280 --> 00:52:54,460

they've been cataloged before but

1199

00:52:59,910 --> 00:52:56,290

they're their orbits had not been

1200

00:53:02,100 --> 00:52:59,920

determined fully but between nine and

1201

00:53:03,630 --> 00:53:02,110

twenty feet for this asteroid not a

1202

00:53:05,820 --> 00:53:03,640

threat to us means something like that

1203

00:53:10,100 --> 00:53:05,830

would burn up in the atmosphere you know

1204

00:53:12,660 --> 00:53:10,110

so not a problem but and to our credit

1205

00:53:16,200 --> 00:53:12,670

we do find some of the bigger ones right

1206

00:53:18,930 --> 00:53:16,210

but there are ways and you know there

1207

00:53:21,200 --> 00:53:18,940

are ways for instance to to avoid an

1208

00:53:23,240 --> 00:53:21,210

asteroid strike let's say

1209

00:53:24,410 --> 00:53:23,250

let's say that we did find that there

1210

00:53:29,540 --> 00:53:24,420

was an asteroid that was going to strike

1211

00:53:32,450 --> 00:53:29,550

us and let's say that we wanted to make

1212

00:53:35,360 --> 00:53:32,460

sure it didn't happen well NASA

1213

00:53:37,910 --> 00:53:35,370

certainly does track these objects that

1214

00:53:39,710 --> 00:53:37,920

are dangerous all right and they keep a

1215

00:53:44,300 --> 00:53:39,720

list it's called the sentry list you

1216

00:53:46,520 --> 00:53:44,310

know ascentria cntry and the sentry list

1217

00:53:50,150 --> 00:53:46,530

has these dangerous potential dangerous

1218

00:53:53,000 --> 00:53:50,160

objects on them on it until the orbits

1219

00:53:54,950 --> 00:53:53,010

can be calculated and we can tell

1220

00:53:57,170 --> 00:53:54,960

whether it's ever gonna orbit orbit

1221

00:53:59,210 --> 00:53:57,180

orbit and then pow if it's never gonna

1222

00:54:02,570 --> 00:53:59,220

hit us and we see it it's not gonna hit

1223

00:54:05,480 --> 00:54:02,580

us it is taken off the list but if it's

1224

00:54:08,450 --> 00:54:05,490

gonna hit us that would be a problem so

1225

00:54:12,380 --> 00:54:08,460

far there's no no asteroids on the list

1226

00:54:14,330 --> 00:54:12,390

that are gonna hit us and so every

1227

00:54:17,270 --> 00:54:14,340

object that's found it's gonna go on

1228

00:54:18,740 --> 00:54:17,280

like a list and until it's orbital

1229

00:54:20,480 --> 00:54:18,750

elements are found and what are those

1230

00:54:22,550 --> 00:54:20,490

those are just the the parameters which

1231

00:54:24,650 --> 00:54:22,560

tell us what kind of an orbit it has

1232

00:54:26,960 --> 00:54:24,660

most likely it's gonna be an elliptical

1233

00:54:29,300 --> 00:54:26,970

orbit sometimes on these really really

1234

00:54:31,430 --> 00:54:29,310

highly elliptical orbits you know where

1235

00:54:33,830 --> 00:54:31,440

it goes faster at the ends like this and

1236

00:54:37,160 --> 00:54:33,840

then slow in the middle around the

1237

00:54:41,750 --> 00:54:37,170

gravitational part you know and those

1238

00:54:44,690 --> 00:54:41,760

types of objects when they are when

1239

00:54:46,910 --> 00:54:44,700

they're coming toward us sometimes we

1240

00:54:50,210 --> 00:54:46,920

only catch them a little at a time we

1241

00:54:52,490 --> 00:54:50,220

might see one or two shots of it

1242

00:54:55,720 --> 00:54:52,500

captured on a survey somewhere Mount

1243

00:54:59,780 --> 00:54:55,730

Lemmon does surveys the Atlas telescope

1244

00:55:02,540 --> 00:54:59,790

in Mauna Kea does surveys atlas stands

1245

00:55:05,560 --> 00:55:02,550

for asteroid terrestrial impact last

1246

00:55:08,780 --> 00:55:05,570

alert system and and that that

1247

00:55:10,850 --> 00:55:08,790

particular set of telescopes finds

1248

00:55:14,480 --> 00:55:10,860

things like comets in fact in skites or

1249

00:55:16,760 --> 00:55:14,490

a live stream the the companion stream

1250

00:55:18,770 --> 00:55:16,770

to the radio show on kgr a skites or

1251

00:55:21,050 --> 00:55:18,780

live stream in our Observatory we

1252

00:55:22,610 --> 00:55:21,060

actually show people live at night we

1253

00:55:24,740 --> 00:55:22,620

showed them the comment and we show them

1254

00:55:27,860 --> 00:55:24,750

things moving through the sky we watched

1255

00:55:31,850 --> 00:55:27,870

the an asteroid moving through the field

1256

00:55:33,170 --> 00:55:31,860

of view just a few nights ago and people

1257

00:55:34,520 --> 00:55:33,180

watched it and we talked about it and

1258

00:55:38,060 --> 00:55:34,530

you know I told people

1259

00:55:40,670 --> 00:55:38,070

and yes they had questions and so you

1260

00:55:44,870 --> 00:55:40,680

know these near-earth objects okay are

1261

00:55:48,050 --> 00:55:44,880

just a fascinating pile of rocks that

1262

00:55:50,240 --> 00:55:48,060

are potentially dangerous to us now

1263

00:55:51,410 --> 00:55:50,250

should they have something happen to

1264

00:55:54,650 --> 00:55:51,420

them say they collide

1265

00:55:57,050 --> 00:55:54,660

well that that think that that thing

1266

00:56:00,640 --> 00:55:57,060

could actually end up being having its

1267

00:56:03,790 --> 00:56:00,650

orbit changed into a dangerous spot so

1268

00:56:06,440 --> 00:56:03,800

we have to have a way of getting rid of

1269

00:56:08,810 --> 00:56:06,450

asteroids that are gonna be a threat to

1270

00:56:11,570 --> 00:56:08,820

us and now there's a few ways to do that

1271

00:56:15,110 --> 00:56:11,580

one of the ways is you've heard this I'm

1272

00:56:18,770 --> 00:56:15,120

sure launched a nuclear weapon and an

1273

00:56:24,230 --> 00:56:18,780

asteroid and you know hit it and then

1274

00:56:26,690 --> 00:56:24,240

blow it to pieces well not a totally

1275

00:56:28,520 --> 00:56:26,700

good idea but not a terrible idea either

1276

00:56:30,620 --> 00:56:28,530

if the alternative is for this giant

1277

00:56:31,880 --> 00:56:30,630

rock to hit the earth but we have to

1278

00:56:36,740 --> 00:56:31,890

understand something else about some

1279

00:56:39,080 --> 00:56:36,750

asteroids like Ben you okay be and then

1280

00:56:42,980 --> 00:56:39,090

you like asteroid Bennu asteroid Bennu

1281

00:56:46,100 --> 00:56:42,990

is more of a rubble pile held together

1282

00:56:48,230 --> 00:56:46,110

by its mutual gravity and if you were to

1283

00:56:50,740 --> 00:56:48,240

strike it it would just blow this rubble

1284

00:56:53,390 --> 00:56:50,750

out into all different directions and

1285

00:56:56,060 --> 00:56:53,400

that rubble going in all different

1286

00:56:58,940 --> 00:56:56,070

directions could end up striking the

1287

00:57:01,790 --> 00:56:58,950

earth with not just one asteroid object

1288

00:57:05,120 --> 00:57:01,800

but with a hundred thousand objects that

1289

00:57:06,400 --> 00:57:05,130

might actually be you know or more that

1290

00:57:10,040 --> 00:57:06,410

might actually heat up the atmosphere

1291

00:57:11,390 --> 00:57:10,050

cause fires all over the world and send

1292

00:57:14,420 --> 00:57:11,400

us right down the path of another

1293

00:57:17,570 --> 00:57:14,430

extinction so we have to be careful so a

1294

00:57:19,510 --> 00:57:17,580

nuclear weapon fired at an asteroid not

1295

00:57:24,410 --> 00:57:19,520

the best idea

1296

00:57:28,040 --> 00:57:24,420

another possibility is a nuclear weapon

1297

00:57:33,200 --> 00:57:28,050

fired near an asteroid and letting the

1298

00:57:38,630 --> 00:57:33,210

pressure of the radiation push the nuts

1299

00:57:41,270 --> 00:57:38,640

the asteroid not as good as the third

1300

00:57:42,890 --> 00:57:41,280

option which is to actually land on the

1301

00:57:46,910 --> 00:57:42,900

asteroid with a little tiny rocket

1302

00:57:48,039 --> 00:57:46,920

nozzle and use the asteroids regolith or

1303

00:57:50,890 --> 00:57:48,049

soil to make your

1304

00:57:52,779 --> 00:57:50,900

on FUEL you bring some with you and then

1305

00:57:55,870 --> 00:57:52,789

fire the rocket and keep firing it for

1306

00:57:57,939 --> 00:57:55,880

like 10 years and little by little what

1307

00:58:01,059 --> 00:57:57,949

that'll do is that'll nudge the asteroid

1308

00:58:02,859 --> 00:58:01,069

off its course just enough so that when

1309

00:58:06,419 --> 00:58:02,869

it comes in its gonna miss the earth and

1310

00:58:10,660 --> 00:58:06,429

I hit the earth so the the nudging

1311

00:58:14,979 --> 00:58:10,670

process is something that's probably you

1312

00:58:16,569 --> 00:58:14,989

use that if you had access to the data

1313

00:58:20,439 --> 00:58:16,579

that showed that this asteroid was out

1314

00:58:22,390 --> 00:58:20,449

there you know well that is really

1315

00:58:24,819 --> 00:58:22,400

really interesting you know I've heard

1316

00:58:27,579 --> 00:58:24,829

it a couple of different theories of you

1317

00:58:30,249 --> 00:58:27,589

know how you can kind of through

1318

00:58:32,380 --> 00:58:30,259

gravitational ways just move something

1319

00:58:33,969 --> 00:58:32,390

off its track just enough you know we

1320

00:58:35,620 --> 00:58:33,979

have a ton of questions for you they're

1321

00:58:39,069 --> 00:58:35,630

coming in from all different sources

1322

00:58:41,859 --> 00:58:39,079

from Amanda's helping out and that's

1323

00:58:44,769 --> 00:58:41,869

manda my co-host yes that's right

1324

00:58:46,809 --> 00:58:44,779

hello Amanda thank you so much but I I

1325

00:58:48,279 --> 00:58:46,819

told someone way back that I would hold

1326

00:58:50,529 --> 00:58:48,289

I'm going to hold their question because

1327

00:58:52,120 --> 00:58:50,539

it has to do with UFOs and for right now

1328

00:58:55,329 --> 00:58:52,130

I'm just going to ask a couple of these

1329

00:58:57,390 --> 00:58:55,339

and one of them is uh I think it's an

1330

00:59:01,749 --> 00:58:57,400

interesting question is it likely that

1331

00:59:04,449 --> 00:59:01,759

black holes are permanent and can they

1332

00:59:08,019 --> 00:59:04,459

create wormholes those are combining two

1333

00:59:11,349 --> 00:59:08,029

questions yeah no that's that's okay

1334

00:59:14,349 --> 00:59:11,359

black holes are not permanent they they

1335

00:59:18,069 --> 00:59:14,359

evaporate now the smaller mass they are

1336

00:59:20,079 --> 00:59:18,079

the sooner they will evaporate but very

1337

00:59:21,459 --> 00:59:20,089

large black holes like the one in the

1338

00:59:24,489 --> 00:59:21,469

center of our galaxy which is a

1339

00:59:29,529 --> 00:59:24,499

supermassive black hole a black hole

1340

00:59:31,660 --> 00:59:29,539

like that although it's although it's

1341

00:59:34,870 --> 00:59:31,670

evaporating as well it's also gaining

1342

00:59:37,269 --> 00:59:34,880

more mass to with interactions

1343

00:59:40,839 --> 00:59:37,279

potentially with gas and dust near the

1344

00:59:44,650 --> 00:59:40,849

center and possibly other stars as these

1345

00:59:46,259 --> 00:59:44,660

stars passed by and that central black

1346

00:59:47,469 --> 00:59:46,269

hole is called the Sagittarius a

1347

00:59:49,870 --> 00:59:47,479

supernova

1348

00:59:52,719 --> 00:59:49,880

I'm sorry a supermassive black hole and

1349

00:59:54,849 --> 00:59:52,729

and that particular like hole we've

1350

00:59:57,549 --> 00:59:54,859

actually done a ten-year study I say we

1351

00:59:59,650 --> 00:59:57,559

the astronomers that studied the

1352

01:00:01,690 --> 00:59:59,660

research they did a ten-year study and

1353

01:00:04,120 --> 01:00:01,700

you can actually see the orbits

1354

01:00:05,890 --> 01:00:04,130

of the stars you see them orbiting going

1355

01:00:08,049 --> 01:00:05,900

around this thing that's that's it's

1356

01:00:10,270 --> 01:00:08,059

like you don't even know what it is you

1357

01:00:12,910 --> 01:00:10,280

know because there's nothing there but

1358

01:00:16,089 --> 01:00:12,920

they're orbiting it and we're literally

1359

01:00:18,160 --> 01:00:16,099

seeing stars circling around and

1360

01:00:20,799 --> 01:00:18,170

orbiting the supermassive black holes

1361

01:00:21,609 --> 01:00:20,809

the center of our galaxy it's really

1362

01:00:24,940 --> 01:00:21,619

incredible

1363

01:00:27,280 --> 01:00:24,950

so so the black holes do evaporate but

1364

01:00:29,680 --> 01:00:27,290

if they are gaining mass by you know

1365

01:00:32,440 --> 01:00:29,690

leaching off of nearby objects and stars

1366

01:00:34,930 --> 01:00:32,450

well then that's gonna really obviously

1367

01:00:36,490 --> 01:00:34,940

short lengthen the time what else be

1368

01:00:39,430 --> 01:00:36,500

around they're gonna that evaporation is

1369

01:00:43,359 --> 01:00:39,440

gonna take a lot longer so black holes

1370

01:00:45,490 --> 01:00:43,369

aren't permanent very interesting let's

1371

01:00:48,370 --> 01:00:45,500

see Kevin wanted to know why won't our

1372

01:00:51,539 --> 01:00:48,380

space agencies release or even use

1373

01:00:55,450 --> 01:00:51,549

high-res images for civilians ula

1374

01:00:59,829 --> 01:00:55,460

launches gun camera videos that type of

1375

01:01:02,579 --> 01:00:59,839

stuff well actually Google Earth used to

1376

01:01:05,260 --> 01:01:02,589

have all high res when you looked at it

1377

01:01:07,569 --> 01:01:05,270

way in the beginning you could zoom in

1378

01:01:10,650 --> 01:01:07,579

on a Google Earth image and the image

1379

01:01:14,140 --> 01:01:10,660

was pristine I mean it we're talking

1380

01:01:17,289 --> 01:01:14,150

full resolution but then as Google Earth

1381

01:01:18,520 --> 01:01:17,299

grew they ran into another problem and

1382

01:01:20,470 --> 01:01:18,530

the problem had nothing to do with the

1383

01:01:22,660 --> 01:01:20,480

NSA nothing to do with NASA and nothing

1384

01:01:25,870 --> 01:01:22,670

to do with governments anywhere it had

1385

01:01:29,559 --> 01:01:25,880

to do with computer storage space they

1386

01:01:32,470 --> 01:01:29,569

had to worry about how much memory and

1387

01:01:35,620 --> 01:01:32,480

many delayed this way disk space on

1388

01:01:38,200 --> 01:01:35,630

these big servers were being taken up

1389

01:01:40,990 --> 01:01:38,210

and then they had to worry about access

1390

01:01:44,109 --> 01:01:41,000

times and speed of access of the data

1391

01:01:45,700 --> 01:01:44,119

when you had not just thousands of

1392

01:01:47,799 --> 01:01:45,710

people looking at the data at the same

1393

01:01:50,440 --> 01:01:47,809

time but then hundreds of millions

1394

01:01:54,789 --> 01:01:50,450

looking at the data companies utilizing

1395

01:01:57,730 --> 01:01:54,799

the data every day in in to the tune of

1396

01:02:01,539 --> 01:01:57,740

you know millions and millions billions

1397

01:02:04,990 --> 01:02:01,549

of terabytes of data potentially in a

1398

01:02:07,270 --> 01:02:05,000

short amount of time now the data

1399

01:02:11,049 --> 01:02:07,280

pipeline to get all that data out to you

1400

01:02:13,299 --> 01:02:11,059

the civilian is gonna take forever so in

1401

01:02:14,779 --> 01:02:13,309

order to streamline and keep it a viable

1402

01:02:20,150 --> 01:02:14,789

product they had to

1403

01:02:21,709 --> 01:02:20,160

reduce the resolution now one area where

1404

01:02:25,249 --> 01:02:21,719

you can go to see the full resolution

1405

01:02:29,419 --> 01:02:25,259

data is actually not of the earth but

1406

01:02:33,529 --> 01:02:29,429

it's actually of the moon okay and I can

1407

01:02:36,319 --> 01:02:33,539

teach you that that is the Lunar

1408

01:02:38,509 --> 01:02:36,329

Reconnaissance Orbiter dataset and you

1409

01:02:39,130 --> 01:02:38,519

find that by looking up in Google

1410

01:02:46,819 --> 01:02:39,140

tah-dah

1411

01:02:51,079 --> 01:02:46,829

Lu a look up LRO quick map Oh R oh okay

1412

01:02:54,919 --> 01:02:51,089

Lima Romeo Oscar LRO quick map

1413

01:02:57,259 --> 01:02:54,929

all right just quick map and when you

1414

01:02:59,809 --> 01:02:57,269

get there you go in and now you're free

1415

01:03:02,179 --> 01:02:59,819

to zoom in on the moon all the way down

1416

01:03:06,019 --> 01:03:02,189

to being able to see things about 15 to

1417

01:03:07,549 --> 01:03:06,029

25 feet across and that's really cool

1418

01:03:09,589 --> 01:03:07,559

now they'll be striped various they'll

1419

01:03:11,989 --> 01:03:09,599

be stripes of areas that are not in yet

1420

01:03:15,289 --> 01:03:11,999

but for most of the moon you can see it

1421

01:03:18,829 --> 01:03:15,299

which is why talking about the UFO

1422

01:03:21,289 --> 01:03:18,839

subject a little bit which is why I feel

1423

01:03:22,519 --> 01:03:21,299

strongly that if there's intelligent

1424

01:03:26,059 --> 01:03:22,529

life out there and that they have found

1425

01:03:29,509 --> 01:03:26,069

this which I believe they have that they

1426
01:03:32,029 --> 01:03:29,519
will be in our oceans and not hiding on

1427
01:03:34,219 --> 01:03:32,039
our moon trying to look at us from say

1428
01:03:36,499 --> 01:03:34,229
the far side we have the far side locked

1429
01:03:38,329 --> 01:03:36,509
up you know this this this 3d print of

1430
01:03:41,120 --> 01:03:38,339
the moon I have here has every single

1431
01:03:44,870 --> 01:03:41,130
crater on the far side in ultra detail

1432
01:03:47,089 --> 01:03:44,880
and the actual digital model shows many

1433
01:03:50,089 --> 01:03:47,099
more details at the 3d print can even

1434
01:03:52,909 --> 01:03:50,099
show and the LRO quick map will show you

1435
01:03:55,640 --> 01:03:52,919
all those details down to about 25 feet

1436
01:03:57,529 --> 01:03:55,650
across on the far side everywhere on the

1437
01:03:59,059 --> 01:03:57,539
moon so if you're an alien species

1438
01:04:01,099 --> 01:03:59,069

you're gonna look at the moon and say

1439

01:04:02,809 --> 01:04:01,109

yeah well they they they they got a lot

1440

01:04:03,469 --> 01:04:02,819

of ships orbiting this thing let's do

1441

01:04:06,949 --> 01:04:03,479

something else

1442

01:04:09,199 --> 01:04:06,959

I know let's go where they are not well

1443

01:04:10,819 --> 01:04:09,209

where aren't they and it stored again

1444

01:04:12,890 --> 01:04:10,829

that darn toward he shows up everywhere

1445

01:04:15,049 --> 01:04:12,900

Touareg says well we're done they're not

1446

01:04:16,640 --> 01:04:15,059

in the oceans I mean they go up and down

1447

01:04:18,169 --> 01:04:16,650

in the oceans and they have submarine

1448

01:04:19,729 --> 01:04:18,179

thingies which kind of they'll go a

1449

01:04:21,949 --> 01:04:19,739

little bit into the ocean but not far

1450

01:04:23,179 --> 01:04:21,959

okay the ocean is this deep you know

1451

01:04:25,759 --> 01:04:23,189

they're only about that deep you know

1452

01:04:27,679 --> 01:04:25,769

and so we can be down here somewhere and

1453

01:04:28,580 --> 01:04:27,689

we can hide in the oceans and that's

1454

01:04:30,860 --> 01:04:28,590

exactly what I

1455

01:04:33,470 --> 01:04:30,870

think they've done I think if they're

1456

01:04:34,990 --> 01:04:33,480

here they're gonna be in the oceans and

1457

01:04:37,730 --> 01:04:35,000

this kind of goes along with one of the

1458

01:04:40,640 --> 01:04:37,740

legend from the Kimberley region of

1459

01:04:43,820 --> 01:04:40,650

Australia from like 5,000 years ago or

1460

01:04:46,330 --> 01:04:43,830

so I think it's the wanjina the wanjina

1461

01:04:49,490 --> 01:04:46,340

were a people that came from the Stars

1462

01:04:53,300 --> 01:04:49,500

lived under the waves unto the ocean and

1463

01:04:55,970 --> 01:04:53,310

had mastery of the water and there's a

1464

01:04:57,920 --> 01:04:55,980

myth that is only myth because there's

1465

01:05:00,640 --> 01:04:57,930

no proof obviously there's a myth that

1466

01:05:06,410 --> 01:05:00,650

says that two boys were torturing an owl

1467

01:05:08,090 --> 01:05:06,420

and in retribution the wanjina flooded

1468

01:05:10,040 --> 01:05:08,100

the lands and sent a tsunami to their

1469

01:05:12,350 --> 01:05:10,050

lands now that could just be a tsunami

1470

01:05:16,150 --> 01:05:12,360

story that was you know embellished or

1471

01:05:19,730 --> 01:05:16,160

whatever or if you look at it carefully

1472

01:05:22,040 --> 01:05:19,740

tortured an owl well if you put a grey

1473

01:05:22,660 --> 01:05:22,050

alien next to you know certain types of

1474

01:05:25,610 --> 01:05:22,670

ABBA's

1475

01:05:27,290 --> 01:05:25,620

they kind of look similar so the owl

1476

01:05:31,610 --> 01:05:27,300

could be what was we call a screen

1477

01:05:33,650 --> 01:05:31,620

memory and the alien creature okay would

1478

01:05:35,630 --> 01:05:33,660

be masked by this screen memory

1479

01:05:38,060 --> 01:05:35,640

potentially I mean I'm not saying that

1480

01:05:40,690 --> 01:05:38,070

that's what happened but I'm saying it's

1481

01:05:45,890 --> 01:05:40,700

possible and it's kind of an interesting

1482

01:05:49,250 --> 01:05:45,900

myth actually so they would don't hide

1483

01:05:50,780 --> 01:05:49,260

in our oceans I believe yeah and you I

1484

01:05:53,090 --> 01:05:50,790

don't know if I'll have time tonight but

1485

01:05:55,790 --> 01:05:53,100

you can tell a little story about the

1486

01:05:58,790 --> 01:05:55,800

incident you had on the submarine if we

1487

01:06:00,290 --> 01:05:58,800

have time we'll hit that but I could ask

1488

01:06:01,670 --> 01:06:00,300

this question a long time ago in the

1489

01:06:04,820 --> 01:06:01,680

chat room and again we're going to be

1490

01:06:08,900 --> 01:06:04,830

taking calls in about 20-25 minutes or

1491

01:06:11,840 --> 01:06:08,910

so the lig oh the laser interferometer

1492

01:06:14,050 --> 01:06:11,850

gravitational-wave Observatory

1493

01:06:17,570 --> 01:06:14,060

I guess it's operated by Caltech and MIT

1494

01:06:20,240 --> 01:06:17,580

there's someone in the chat that said

1495

01:06:24,250 --> 01:06:20,250

that that should be able to detect UFOs

1496

01:06:26,990 --> 01:06:24,260

coming in and out of our our system our

1497

01:06:27,500 --> 01:06:27,000

our atmosphere do you know anything

1498

01:06:30,800 --> 01:06:27,510

about that

1499

01:06:33,110 --> 01:06:30,810

I you know what here's the thing with

1500

01:06:34,880 --> 01:06:33,120

like oh okay there's several LIGO

1501

01:06:38,360 --> 01:06:34,890

detectors there's one in Hanford

1502

01:06:41,090 --> 01:06:38,370

Washington there's one in Louisiana and

1503

01:06:43,530 --> 01:06:41,100

there's a complementary instrument

1504

01:06:46,640 --> 01:06:43,540

called Virgo and

1505

01:06:48,750 --> 01:06:46,650

these three instruments rely on light

1506

01:06:52,020 --> 01:06:48,760

that's coming to us the high-energy

1507

01:06:53,370 --> 01:06:52,030

light and timing the difference in time

1508

01:06:55,050 --> 01:06:53,380

that it takes the light to reach these

1509

01:06:57,990 --> 01:06:55,060

different facilities and within each

1510

01:07:01,850 --> 01:06:58,000

instrument we can calculate where this

1511

01:07:06,270 --> 01:07:01,860

energy pulse we see is coming from now

1512

01:07:10,200 --> 01:07:06,280

the LIGO detectors would have to be

1513

01:07:12,240 --> 01:07:10,210

working in concert to see a source you

1514

01:07:14,010 --> 01:07:12,250

know if one LIGO detector detects it

1515

01:07:16,650 --> 01:07:14,020

then that makes it problematic you

1516

01:07:19,140 --> 01:07:16,660

that's one observation you have to have

1517

01:07:20,970 --> 01:07:19,150

more than one to be able to figure out

1518

01:07:22,710 --> 01:07:20,980

where it's coming from because of the

1519

01:07:26,070 --> 01:07:22,720

time differential and also something

1520

01:07:28,680 --> 01:07:26,080

called dispersion too much to get into

1521

01:07:30,270 --> 01:07:28,690

here about that I think but suffice it

1522

01:07:32,460 --> 01:07:30,280

to say that I don't think LIGO would be

1523

01:07:36,480 --> 01:07:32,470

sufficient I think you could get away

1524

01:07:39,360 --> 01:07:36,490

literally know why one of these this is

1525

01:07:42,930 --> 01:07:39,370

an iPhone you might have heard of these

1526

01:07:45,920 --> 01:07:42,940

and the iPhones actually can detect

1527

01:07:48,030 --> 01:07:45,930

gamma rays and you can actually view

1528

01:07:50,490 --> 01:07:48,040

cover up your camera you can actually

1529

01:07:52,680 --> 01:07:50,500

get a gamma ray detection application

1530

01:07:54,740 --> 01:07:52,690

and I don't know how accurate it is it

1531

01:07:59,220 --> 01:07:54,750

seems like it does work I did try this

1532

01:08:02,160 --> 01:07:59,230

and it if we can detect gamma rays then

1533

01:08:04,650 --> 01:08:02,170

then we're looking at a potential

1534

01:08:09,240 --> 01:08:04,660

incursion into our airspace it's a very

1535

01:08:10,950 --> 01:08:09,250

localized thing you know so we like I

1536

01:08:13,200 --> 01:08:10,960

work as you know with Douglas Trumbull

1537

01:08:14,520 --> 01:08:13,210

who is the guy that did the special

1538

01:08:17,370 --> 01:08:14,530

effects for Close Encounters of the

1539

01:08:20,510 --> 01:08:17,380

Third Kind Blade Runner 2001 a Space

1540

01:08:22,769 --> 01:08:20,520

Odyssey in fact so the man is a genius

1541

01:08:27,300 --> 01:08:22,779

Academy award-winning visual effects guy

1542

01:08:29,070 --> 01:08:27,310

but he's also a scientist in hiding he

1543

01:08:32,309 --> 01:08:29,080

wants to find the answer to the UFO

1544

01:08:33,960 --> 01:08:32,319

conundrum and so we came together on

1545

01:08:35,700 --> 01:08:33,970

that basis and then discovered that hey

1546

01:08:38,280 --> 01:08:35,710

you have a special effects business

1547

01:08:39,539 --> 01:08:38,290

yeah I do you knows well then you need

1548

01:08:40,140 --> 01:08:39,549

to work with us and we got all kinds of

1549

01:08:41,670 --> 01:08:40,150

things to do

1550

01:08:42,990 --> 01:08:41,680

and where we've been then we've been

1551

01:08:44,820 --> 01:08:43,000

talking several times today already

1552

01:08:47,789 --> 01:08:44,830

because we're working on a movie on

1553

01:08:49,320 --> 01:08:47,799

Nikola Tesla and we're gonna be creating

1554

01:08:53,789 --> 01:08:49,330

some really cool visual effects stuff

1555

01:08:55,120 --> 01:08:53,799

too tissue so but but that said gee Doug

1556

01:08:57,070 --> 01:08:55,130

and I have

1557

01:09:01,990 --> 01:08:57,080

I started a project that was originally

1558

01:09:04,840 --> 01:09:02,000

called you photography to find incursion

1559

01:09:07,329 --> 01:09:04,850

into our airspace by extraterrestrial

1560

01:09:11,579 --> 01:09:07,339

species and intelligent species if you

1561

01:09:14,669 --> 01:09:11,589

will and using instrumentation so beyond

1562

01:09:16,990 --> 01:09:14,679

it'll be beyond for instance the

1563

01:09:18,849 --> 01:09:17,000

subjective view of a person watching

1564

01:09:21,189 --> 01:09:18,859

with their eyes or saying wow look at

1565

01:09:22,629 --> 01:09:21,199

that with her cell phone camera and it

1566

01:09:26,820 --> 01:09:22,639

will actually take it to the scientific

1567

01:09:29,260 --> 01:09:26,830

level where it's just data and now you

1568

01:09:31,599 --> 01:09:29,270

you can interpret that data any way you

1569

01:09:32,950 --> 01:09:31,609

want but it's not gonna be just one

1570

01:09:34,899 --> 01:09:32,960

instrument it's gonna be like five

1571

01:09:40,559 --> 01:09:34,909

different instruments that are sensing

1572

01:09:42,669 --> 01:09:40,569

the sky spectrometers okay deciphering

1573

01:09:45,039 --> 01:09:42,679

signals coming from the sky to see if

1574

01:09:47,470 --> 01:09:45,049

these are transponders from aircraft or

1575

01:09:50,769 --> 01:09:47,480

something else listening for gamma rays

1576

01:09:53,439 --> 01:09:50,779

looking for other types of radiation in

1577

01:09:55,120 --> 01:09:53,449

all together for one observation of one

1578

01:09:58,090 --> 01:09:55,130

object seen in the sky if that one

1579

01:10:00,479 --> 01:09:58,100

object has you know some of these traits

1580

01:10:03,899 --> 01:10:00,489

that we say hey that's pretty cool and

1581

01:10:06,729 --> 01:10:03,909

does it mean it's an alien spaceship no

1582

01:10:08,290 --> 01:10:06,739

it could be something else but we're

1583

01:10:10,270 --> 01:10:08,300

gonna deploy these things in triads

1584

01:10:12,729 --> 01:10:10,280

triangles equilateral triangles so we'll

1585

01:10:14,740 --> 01:10:12,739

be able to have one talk to another and

1586

01:10:16,419 --> 01:10:14,750

then talk to another and say hey between

1587

01:10:19,570 --> 01:10:16,429

you three did you see this thing up in

1588

01:10:21,280 --> 01:10:19,580

the sky if they say yes then we know

1589

01:10:23,229 --> 01:10:21,290

that the thing was far up in the sky but

1590

01:10:25,419 --> 01:10:23,239

if they say no only one thought that we

1591

01:10:27,520 --> 01:10:25,429

know it was local down low and we can't

1592

01:10:30,010 --> 01:10:27,530

triangulate his distance or anything but

1593

01:10:32,439 --> 01:10:30,020

if only two of them see it then we'll be

1594

01:10:34,810 --> 01:10:32,449

able to triangulate how fast how high et

1595

01:10:36,729 --> 01:10:34,820

cetera which way it was going we can get

1596

01:10:39,220 --> 01:10:36,739

but we can't get a lot of data that we

1597

01:10:40,270 --> 01:10:39,230

would need but they're all gonna be

1598

01:10:41,709 --> 01:10:40,280

listening with these different

1599

01:10:47,530 --> 01:10:41,719

instruments on each of these we call

1600

01:10:50,370 --> 01:10:47,540

them platters and and you photographer

1601

01:10:55,030 --> 01:10:50,380

in the name no one wants to fund you man

1602

01:10:57,640 --> 01:10:55,040

so we're calling it the aerial anomaly

1603

01:11:01,500 --> 01:10:57,650

detection system I didn't know you even

1604

01:11:04,450 --> 01:11:01,510

changed that yes I remember I had

1605

01:11:06,910 --> 01:11:04,460

someone not did not want to show up on

1606

01:11:08,919 --> 01:11:06,920

my show because I had the word UFO in it

1607

01:11:12,100 --> 01:11:08,929

but you IP was okay

1608

01:11:14,439 --> 01:11:12,110

yeah you know and maybe we could say you

1609

01:11:15,700 --> 01:11:14,449

ap detector or something like that but

1610

01:11:18,700 --> 01:11:15,710

you know what

1611

01:11:21,729 --> 01:11:18,710

aerial anomaly is kind of a cool yeah

1612

01:11:23,620 --> 01:11:21,739

kind of cool but you know I I hate to

1613

01:11:25,689 --> 01:11:23,630

say it but you know what to get funding

1614

01:11:28,689 --> 01:11:25,699

for these things you have to be as much

1615

01:11:31,270 --> 01:11:28,699

a marketing guy as a scientist you know

1616

01:11:34,870 --> 01:11:31,280

you really have to know about marketing

1617

01:11:36,370 --> 01:11:34,880

yeah it's kind of hard to make that you

1618

01:11:39,520 --> 01:11:36,380

know to make that the to work together

1619

01:11:41,080 --> 01:11:39,530

you know so Duncan ah we're trying to do

1620

01:11:43,030 --> 01:11:41,090

the science and we need another guy to

1621

01:11:45,250 --> 01:11:43,040

do the marketing or another person

1622

01:11:47,260 --> 01:11:45,260

another human being of any kind well we

1623

01:11:48,850 --> 01:11:47,270

have a lot of non UFO questions in the

1624

01:11:51,729 --> 01:11:48,860

chat both chat and again I'll remind

1625

01:11:54,610 --> 01:11:51,739

everyone in just about 15 minutes or so

1626

01:11:57,939 --> 01:11:54,620

we're going to open up the lines but I

1627

01:12:02,850 --> 01:11:57,949

want us to say on the UFO topic for just

1628

01:12:05,620 --> 01:12:02,860

a couple minutes and what do you think

1629

01:12:07,720 --> 01:12:05,630

it would be a place to set something up

1630

01:12:10,510 --> 01:12:07,730

like that instruments I mean because

1631

01:12:14,620 --> 01:12:10,520

it's such a fleeting a you know this a

1632

01:12:17,290 --> 01:12:14,630

UFO you know you may see one in Arizona

1633

01:12:19,600 --> 01:12:17,300

one time and then you know someone sees

1634

01:12:22,270 --> 01:12:19,610

one in another state or whatever another

1635

01:12:23,500 --> 01:12:22,280

country it's just a fleeting thing it's

1636

01:12:25,120 --> 01:12:23,510

very hard to know where to set something

1637

01:12:27,340 --> 01:12:25,130

up how much of a range would something

1638

01:12:30,939 --> 01:12:27,350

like this happen well it would have the

1639

01:12:34,330 --> 01:12:30,949

range of the entire visible sky in all

1640

01:12:35,919 --> 01:12:34,340

directions you know so if that if it's

1641

01:12:39,939 --> 01:12:35,929

sitting on a mountaintop it has a

1642

01:12:42,820 --> 01:12:39,949

slightly higher you know distance that

1643

01:12:45,729 --> 01:12:42,830

it can look if it's in the valley it's

1644

01:12:48,130 --> 01:12:45,739

gonna have much less but they can go

1645

01:12:49,290 --> 01:12:48,140

anywhere we actually I designed one for

1646

01:12:52,570 --> 01:12:49,300

the ocean too and it would actually

1647

01:12:53,950 --> 01:12:52,580

float on a bobber and the action of

1648

01:12:56,470 --> 01:12:53,960

moving up and down would actually charge

1649

01:13:00,370 --> 01:12:56,480

its batteries it would let wave action

1650

01:13:03,880 --> 01:13:00,380

charge the batteries on board and that

1651
01:13:05,649 --> 01:13:03,890
one is that one's for the you know later

1652
01:13:08,320 --> 01:13:05,659
we want to get the land version done

1653
01:13:10,030 --> 01:13:08,330
first but I think you know the one in

1654
01:13:12,820 --> 01:13:10,040
the water is not gonna look up at all

1655
01:13:14,649 --> 01:13:12,830
it's gonna look down okay it's gonna

1656
01:13:17,520 --> 01:13:14,659
look down so we're gonna plant one I'd

1657
01:13:21,910 --> 01:13:17,530
like to see one planted over some of the

1658
01:13:24,280 --> 01:13:21,920
deeper water and see what we can find

1659
01:13:27,040 --> 01:13:24,290
you know if we see a strange signal

1660
01:13:30,400 --> 01:13:27,050
coming from deep under the water and we

1661
01:13:31,810 --> 01:13:30,410
know that it's not like a u.s. submarine

1662
01:13:35,070 --> 01:13:31,820
or something it may very well be

1663
01:13:39,790 --> 01:13:35,080

something else might be a interloper

1664

01:13:42,430 --> 01:13:39,800

into our atmosphere well while we're on

1665

01:13:45,220 --> 01:13:42,440

this topic just quickly for the person

1666

01:13:48,430 --> 01:13:45,230

that's never heard the story if you can

1667

01:13:52,660 --> 01:13:48,440

kind of do it in a condensed way your

1668

01:13:54,880 --> 01:13:52,670

submarine and come here and you know the

1669

01:13:56,350 --> 01:13:54,890

nice thing is you know most people who

1670

01:13:58,630 --> 01:13:56,360

know me know that I do a lot of work for

1671

01:13:59,890 --> 01:13:58,640

the Navy in fact I've got that little

1672

01:14:02,110 --> 01:13:59,900

thing right there you see right here

1673

01:14:04,200 --> 01:14:02,120

over here this is a submarine model that

1674

01:14:06,939 --> 01:14:04,210

I'm actually building for them right now

1675

01:14:10,390 --> 01:14:06,949

and I just sent out a 10-foot one a

1676

01:14:11,919 --> 01:14:10,400

little while ago you know so we're we do

1677

01:14:13,540 --> 01:14:11,929

a lot of work for the Navy so as such

1678

01:14:17,470 --> 01:14:13,550

sometimes you get opportunities I had an

1679

01:14:20,830 --> 01:14:17,480

opportunity to go on a sub and I went

1680

01:14:25,330 --> 01:14:20,840

for this ride down the sub if you want

1681

01:14:27,250 --> 01:14:25,340

to call that in it was really kind of

1682

01:14:29,080 --> 01:14:27,260

cool I it was the most fun I had getting

1683

01:14:33,640 --> 01:14:29,090

seasick to be honest because submarines

1684

01:14:36,580 --> 01:14:33,650

are actually you know cylinders okay

1685

01:14:38,770 --> 01:14:36,590

they're cylinders and they rock and roll

1686

01:14:41,140 --> 01:14:38,780

on the surface but underwater you don't

1687

01:14:43,030 --> 01:14:41,150

know they're moving however you feel

1688

01:14:44,770 --> 01:14:43,040

right now in your homes or in your place

1689

01:14:48,180 --> 01:14:44,780

of business and all he's not driving in

1690

01:14:51,700 --> 01:14:48,190

your car the way the way you feel now

1691

01:14:53,169 --> 01:14:51,710

you can barely detect any emotion that's

1692

01:14:56,470 --> 01:14:53,179

what it feels like underwater you don't

1693

01:14:58,300 --> 01:14:56,480

know but to get to where we were going

1694

01:15:00,010 --> 01:14:58,310

before you went underwater we actually

1695

01:15:03,220 --> 01:15:00,020

were rocking and rolling for quite a

1696

01:15:05,530 --> 01:15:03,230

while so I got sick I didn't get sick

1697

01:15:08,470 --> 01:15:05,540

sick but I got sick enough that I had to

1698

01:15:09,939 --> 01:15:08,480

go sit in a side area off the control

1699

01:15:12,160 --> 01:15:09,949

room which was called the sonar Shack

1700

01:15:14,729 --> 01:15:12,170

and I was sitting next to a kid in the

1701
01:15:19,570 --> 01:15:14,739
sonar and to make a long story short he

1702
01:15:21,340 --> 01:15:19,580
basically said that there was something

1703
01:15:23,530 --> 01:15:21,350
on the sonar and he called the executive

1704
01:15:26,919 --> 01:15:23,540
officer over the executive officer

1705
01:15:29,340 --> 01:15:26,929
looked at it and said you know a few

1706
01:15:31,090 --> 01:15:29,350
things like the bearing the range and

1707
01:15:33,400 --> 01:15:31,100
then he looked at it and said well how

1708
01:15:35,230 --> 01:15:33,410
fast was that moving and the kid was

1709
01:15:36,820 --> 01:15:35,240
incredulous because he had never

1710
01:15:40,960 --> 01:15:36,830
seen anything like this before his first

1711
01:15:42,550 --> 01:15:40,970
time he was a fast mover virgin if you

1712
01:15:43,870 --> 01:15:42,560
want to call that okay he'd never seen

1713
01:15:46,870 --> 01:15:43,880

these things I hadn't either

1714

01:15:47,980 --> 01:15:46,880

and I thought that it was a torpedo I

1715

01:15:52,470 --> 01:15:47,990

thought I was gonna die because I

1716

01:15:56,140 --> 01:15:52,480

accepted a ride in a submarine and the

1717

01:15:59,470 --> 01:15:56,150

kid turned to him and said several

1718

01:16:04,480 --> 01:15:59,480

hundred knots so in English

1719

01:16:05,700 --> 01:16:04,490

several hundred knots that means several

1720

01:16:10,570 --> 01:16:05,710

hundred miles an hour

1721

01:16:14,440 --> 01:16:10,580

underwater okay that perked my time that

1722

01:16:15,820 --> 01:16:14,450

perk me up so the kid did know what to

1723

01:16:16,480 --> 01:16:15,830

do with it because the sonar operator is

1724

01:16:19,150 --> 01:16:16,490

supposed to be able to classify

1725

01:16:21,820 --> 01:16:19,160

everything they see but my dad wait

1726

01:16:24,370 --> 01:16:21,830

there's no way so what did he do he he

1727

01:16:25,960 --> 01:16:24,380

kind of goes like this like like you I

1728

01:16:28,240 --> 01:16:25,970

couldn't see his face he's turned away

1729

01:16:32,500 --> 01:16:28,250

from me and the XO was on whose face I

1730

01:16:36,310 --> 01:16:32,510

could see and the XO just told them okay

1731

01:16:36,880 --> 01:16:36,320

log it and dog it and he kid said sir

1732

01:16:39,640 --> 01:16:36,890

yes sir

1733

01:16:42,130 --> 01:16:39,650

and I was like but and I got up and went

1734

01:16:44,140 --> 01:16:42,140

over to the XO and I said XO why I'm

1735

01:16:46,300 --> 01:16:44,150

kind of familiar with these fast movers

1736

01:16:48,970 --> 01:16:46,310

is is there anything I can help you with

1737

01:16:51,070 --> 01:16:48,980

in this he looks at me he goes mr.

1738

01:16:52,990 --> 01:16:51,080

Dantonio yeah I go yeah he says you

1739

01:16:56,800 --> 01:16:53,000

having a good trip so far yes sir I am

1740

01:16:59,380 --> 01:16:56,810

he goes let's keep it that way and that

1741

01:17:02,290 --> 01:16:59,390

was that not to be mentioned ever again

1742

01:17:04,750 --> 01:17:02,300

but several years later I had to do a

1743

01:17:06,370 --> 01:17:04,760

job for the Joint Chiefs all right and

1744

01:17:07,510 --> 01:17:06,380

people know the Joint Chiefs you know

1745

01:17:09,100 --> 01:17:07,520

they have reports the president the

1746

01:17:12,070 --> 01:17:09,110

United States well I had to do a job for

1747

01:17:16,690 --> 01:17:12,080

the Joint Chiefs and I brought this job

1748

01:17:19,570 --> 01:17:16,700

down to one of the Chiefs and the chief

1749

01:17:22,000 --> 01:17:19,580

and I were sitting alone and I said to

1750

01:17:23,020 --> 01:17:22,010

him probably shouldn't have I had the

1751

01:17:24,190 --> 01:17:23,030

words going through my head and I was

1752

01:17:26,050 --> 01:17:24,200

saying don't say it don't say it don't

1753

01:17:28,030 --> 01:17:26,060

say and well I'm think saying that the

1754

01:17:31,090 --> 01:17:28,040

words come out can you tell me anything

1755

01:17:32,590 --> 01:17:31,100

about the fast mover program and I'm

1756

01:17:34,210 --> 01:17:32,600

thinking oh I can't believe I just asked

1757

01:17:41,530 --> 01:17:34,220

that because they called it a fast mover

1758

01:17:45,190 --> 01:17:41,540

on the boat and the the the kid no sir

1759

01:17:46,780 --> 01:17:45,200

the the the guy said to me what he could

1760

01:17:49,150 --> 01:17:46,790

have said was I don't know what that is

1761

01:17:51,460 --> 01:17:49,160

what's that you know

1762

01:17:52,930 --> 01:17:51,470

in retrospect maybe he should have he

1763

01:17:55,330 --> 01:17:52,940

could have said never heard of it

1764

01:17:56,890 --> 01:17:55,340

maybe he should have instead he said oh

1765

01:18:01,450 --> 01:17:56,900

I can't talk about that program I'm

1766

01:18:06,340 --> 01:18:01,460

sorry I drove back from Washington like

1767

01:18:08,380 --> 01:18:06,350

this bridge you know Wow Oh car I mean

1768

01:18:11,830 --> 01:18:08,390

that was like hardly paying attention I

1769

01:18:13,960 --> 01:18:11,840

was so pumped up by that cuz that told

1770

01:18:15,010 --> 01:18:13,970

me that the US Navy is seeing things

1771

01:18:18,160 --> 01:18:15,020

they don't understand

1772

01:18:22,330 --> 01:18:18,170

and then just a few weeks ago I happen

1773

01:18:24,490 --> 01:18:22,340

to cross an article from the US Patent

1774

01:18:28,420 --> 01:18:24,500

Office that talked about granting the US

1775

01:18:34,530 --> 01:18:28,430

Navy patents on hypersonic underwater

1776

01:18:38,080 --> 01:18:34,540

and aerial vehicles yeah hmm related is

1777

01:18:40,420 --> 01:18:38,090

it possible that it was around when I

1778

01:18:42,640 --> 01:18:40,430

went on board the sub what year was that

1779

01:18:45,490 --> 01:18:42,650

I can't talk about the year but I can

1780

01:18:47,680 --> 01:18:45,500

tell you was decades ago now well really

1781

01:18:51,000 --> 01:18:47,690

you have to keep everything like that in

1782

01:18:54,970 --> 01:18:51,010

this particular case and and well before

1783

01:18:58,620 --> 01:18:54,980

this technology should have existed hmm

1784

01:19:01,150 --> 01:18:58,630

see so you tell me what it means

1785

01:19:05,500 --> 01:19:01,160

did they reverse engineer something oh

1786

01:19:08,260 --> 01:19:05,510

I'd love to know wouldn't you that would

1787

01:19:13,720 --> 01:19:08,270

be really something you would I know you

1788

01:19:15,640 --> 01:19:13,730

I can see it web cam sorry there are

1789

01:19:18,430 --> 01:19:15,650

there's so many questions here

1790

01:19:20,800 --> 01:19:18,440

how would you detect a vehicle that

1791

01:19:23,620 --> 01:19:20,810

manipulates gret manipulates gravity to

1792

01:19:25,930 --> 01:19:23,630

operate outside the local space-time

1793

01:19:28,600 --> 01:19:25,940

that's an interesting question I think

1794

01:19:30,610 --> 01:19:28,610

that for a vehicle to do that to

1795

01:19:34,180 --> 01:19:30,620

manipulate gravity requires huge amounts

1796

01:19:35,920 --> 01:19:34,190

of energy and you cannot mask the usage

1797

01:19:37,690 --> 01:19:35,930

of energy all right you're just gonna

1798

01:19:41,410 --> 01:19:37,700

see this this hole where the energy

1799

01:19:43,420 --> 01:19:41,420

should be all right effectively so to

1800

01:19:45,640 --> 01:19:43,430

see that that that process is very

1801

01:19:48,970 --> 01:19:45,650

likely going to release other types of

1802

01:19:50,980 --> 01:19:48,980

radiation in the process all right among

1803

01:19:53,220 --> 01:19:50,990

them might be Hawking radiation which is

1804

01:19:56,650 --> 01:19:53,230

notoriously difficult to detect and

1805

01:19:58,150 --> 01:19:56,660

costly however an analogue to it is the

1806

01:20:00,220 --> 01:19:58,160

gamma rays we talked about earlier if we

1807

01:20:02,320 --> 01:20:00,230

can see gamma rays it means that there's

1808

01:20:02,920 --> 01:20:02,330

probably one of those technologies in

1809

01:20:05,350 --> 01:20:02,930

play

1810

01:20:07,360 --> 01:20:05,360

so if we have a localized event say you

1811

01:20:08,830 --> 01:20:07,370

see a light moving through the sky all

1812

01:20:11,050 --> 01:20:08,840

right and all of a sudden it winks out

1813

01:20:14,530 --> 01:20:11,060

and you get a burst of gamma rays on

1814

01:20:18,220 --> 01:20:14,540

your detector when that happens that is

1815

01:20:20,770 --> 01:20:18,230

the smoking gun and that's exactly what

1816

01:20:22,750 --> 01:20:20,780

we're after with the aerial anomaly

1817

01:20:25,990 --> 01:20:22,760

system and it's what other people are

1818

01:20:27,430 --> 01:20:26,000

trying to do as well I encourage it you

1819

01:20:29,170 --> 01:20:27,440

know this isn't something where we're

1820

01:20:30,790 --> 01:20:29,180

gonna circle our wagons around our data

1821

01:20:32,740 --> 01:20:30,800

and say it's mine you have to pay to

1822

01:20:33,970 --> 01:20:32,750

have it you know Doug and I want the

1823

01:20:37,120 --> 01:20:33,980

world to have it this belongs to

1824

01:20:39,550 --> 01:20:37,130

humanity it belongs to everybody and if

1825

01:20:42,130 --> 01:20:39,560

we're fortunate enough to be able to you

1826
01:20:43,630 --> 01:20:42,140
know capture this data then we want to

1827
01:20:45,910 --> 01:20:43,640
make sure that the world is fortunate

1828
01:20:48,220 --> 01:20:45,920
fortunate enough to actually see the

1829
01:20:51,130 --> 01:20:48,230
data and we would make that data freely

1830
01:20:53,470 --> 01:20:51,140
available so we're not we're not looking

1831
01:20:56,410 --> 01:20:53,480
to make a business out of it we're not

1832
01:20:59,140 --> 01:20:56,420
looking to parlay it into a you know a

1833
01:21:01,330 --> 01:20:59,150
TV series we think that we're looking to

1834
01:21:03,700 --> 01:21:01,340
get the data because you want to know

1835
01:21:05,590 --> 01:21:03,710
the answers and if we get the answers

1836
01:21:09,040 --> 01:21:05,600
humanity should get the answers don't

1837
01:21:10,750 --> 01:21:09,050
you agree I agree I think I think I

1838
01:21:14,710 --> 01:21:10,760

think we're visited I think we're being

1839

01:21:16,800 --> 01:21:14,720

visited it it it seems to point that way

1840

01:21:18,640 --> 01:21:16,810

you know and there's just so many

1841

01:21:21,850 --> 01:21:18,650

there's just so many things there

1842

01:21:24,250 --> 01:21:21,860

totally unexplainable in any even any

1843

01:21:26,860 --> 01:21:24,260

technology especially when you look at

1844

01:21:29,470 --> 01:21:26,870

the history of UFOs going you know

1845

01:21:31,960 --> 01:21:29,480

things doing what people are saying oh

1846

01:21:33,760 --> 01:21:31,970

it's got to be you know government

1847

01:21:36,250 --> 01:21:33,770

secret aircraft or something like that

1848

01:21:38,770 --> 01:21:36,260

experimental but there talked about the

1849

01:21:41,020 --> 01:21:38,780

same things happening 45 years ago yeah

1850

01:21:43,810 --> 01:21:41,030

that would have been impossible I mean

1851

01:21:46,720 --> 01:21:43,820

what what was seen on that submarine at

1852

01:21:51,490 --> 01:21:46,730

that time could very well have been a

1853

01:21:53,680 --> 01:21:51,500

black project but kind of hard to

1854

01:21:57,400 --> 01:21:53,690

believe that because the technology back

1855

01:22:01,210 --> 01:21:57,410

then the science wasn't there that we

1856

01:22:03,220 --> 01:22:01,220

know I agree well wouldn't wouldn't say

1857

01:22:07,000 --> 01:22:03,230

not test something like that without

1858

01:22:10,540 --> 01:22:07,010

alerting a submarine in fact I made that

1859

01:22:12,340 --> 01:22:10,550

point a couple days ago it's directly I

1860

01:22:14,260 --> 01:22:12,350

said yeah they would they would unleash

1861

01:22:16,570 --> 01:22:14,270

this on their cruise when he talked

1862

01:22:18,340 --> 01:22:16,580

about the nimitz incident okay if

1863

01:22:20,830 --> 01:22:18,350

that was a black project if that was a

1864

01:22:23,740 --> 01:22:20,840

hypersonic vehicle being tested from the

1865

01:22:26,560 --> 01:22:23,750

patents okay let's say that was it they

1866

01:22:27,940 --> 01:22:26,570

wouldn't tell the Nimitz that they're

1867

01:22:29,410 --> 01:22:27,950

gonna be doing testing of this vehicle

1868

01:22:32,230 --> 01:22:29,420

they're just gonna send it out there and

1869

01:22:34,180 --> 01:22:32,240

see how the air crews react see if the

1870

01:22:35,560 --> 01:22:34,190

air crews can capture it you see the air

1871

01:22:37,570 --> 01:22:35,570

crews can lock onto it see if they can

1872

01:22:39,460 --> 01:22:37,580

shoot it down they're gonna try all

1873

01:22:42,310 --> 01:22:39,470

those things they're gonna see how

1874

01:22:44,080 --> 01:22:42,320

viable the technology is to use against

1875

01:22:46,990 --> 01:22:44,090

an adversary and to do that they can't

1876

01:22:48,820 --> 01:22:47,000

let on what they're doing to anybody Wow

1877

01:22:50,410 --> 01:22:48,830

they test it with the greatest air crews

1878

01:22:52,120 --> 01:22:50,420

in the world and that's the American air

1879

01:22:55,390 --> 01:22:52,130

force in the air wings of the air

1880

01:22:57,240 --> 01:22:55,400

carriers see so I think that those guys

1881

01:22:59,860 --> 01:22:57,250

are probably the ones that are gonna

1882

01:23:02,290 --> 01:22:59,870

experience these black projects but not

1883

01:23:03,700 --> 01:23:02,300

know that's what they were you know and

1884

01:23:05,800 --> 01:23:03,710

I'm not saying that the Nimitz and it

1885

01:23:07,540 --> 01:23:05,810

was that at all I I think that there's

1886

01:23:09,910 --> 01:23:07,550

there's plenty reason to believe that

1887

01:23:11,350 --> 01:23:09,920

that's not true there was a case where

1888

01:23:13,240 --> 01:23:11,360

this tick-tack object you know fray

1889

01:23:15,460 --> 01:23:13,250

versed in the Nimitz incident as you

1890

01:23:17,110 --> 01:23:15,470

made some of you may recall there's this

1891

01:23:18,880 --> 01:23:17,120

thick tech object to send it down toward

1892

01:23:21,040 --> 01:23:18,890

the ocean surface and when it descended

1893

01:23:25,330 --> 01:23:21,050

toward the ocean's surface a frothing on

1894

01:23:27,190 --> 01:23:25,340

the ocean began to arise and then when

1895

01:23:30,310 --> 01:23:27,200

the tick-tack took off that frothing

1896

01:23:32,020 --> 01:23:30,320

effect went away now that could be one

1897

01:23:33,790 --> 01:23:32,030

of two things the technology this thing

1898

01:23:37,960 --> 01:23:33,800

was used in the fly caused the frothing

1899

01:23:39,730 --> 01:23:37,970

near the surface of the water or the

1900

01:23:42,430 --> 01:23:39,740

frothing was caused by another object

1901

01:23:43,030 --> 01:23:42,440

underneath coming up and they were doing

1902

01:23:45,940 --> 01:23:43,040

some

1903

01:23:47,770 --> 01:23:45,950

communicative thing they're talking to

1904

01:23:51,490 --> 01:23:47,780

each other doing something they'd have

1905

01:23:54,190 --> 01:23:51,500

technology that to to to do that I'm

1906

01:23:56,830 --> 01:23:54,200

sure but water has a way with

1907

01:23:58,840 --> 01:23:56,840

electromagnetic signals you have to come

1908

01:24:00,820 --> 01:23:58,850

up into a shallow area that you can't

1909

01:24:04,210 --> 01:24:00,830

send a radio transmission from deep

1910

01:24:06,520 --> 01:24:04,220

underwater you can't you know it doesn't

1911

01:24:10,480 --> 01:24:06,530

work in fact they refer they rely on

1912

01:24:14,050 --> 01:24:10,490

sonar and they use sonar microphones and

1913

01:24:15,670 --> 01:24:14,060

tell us the sound microphones okay to

1914

01:24:17,230 --> 01:24:15,680

actually communicate deep in the ocean

1915

01:24:19,510 --> 01:24:17,240

they actually use sound they actually

1916

01:24:21,490 --> 01:24:19,520

talk into a headset and the headset

1917

01:24:23,800 --> 01:24:21,500

communicates a sound wave down through

1918

01:24:26,800 --> 01:24:23,810

the ocean which penetrates far more than

1919

01:24:29,020 --> 01:24:26,810

radar for instance or any other kind of

1920

01:24:30,250 --> 01:24:29,030

radiation that because sound wave isn't

1921

01:24:33,960 --> 01:24:30,260

radiation

1922

01:24:36,880 --> 01:24:33,970

you know so that that kind of thing is

1923

01:24:39,850 --> 01:24:36,890

still I think a problem for us but it's

1924

01:24:41,680 --> 01:24:39,860

also likely gonna be a problem in

1925

01:24:43,540 --> 01:24:41,690

general for for other being so maybe

1926

01:24:45,190 --> 01:24:43,550

they had to come up to a shallow depth

1927

01:24:47,290 --> 01:24:45,200

to be able to communicate or discuss

1928

01:24:48,760 --> 01:24:47,300

something and then they took off and

1929

01:24:51,670 --> 01:24:48,770

wouldn't that thing on the under the

1930

01:24:56,020 --> 01:24:51,680

water very likely be the same type of

1931

01:24:57,010 --> 01:24:56,030

thing that we saw on the sub something

1932

01:24:58,780 --> 01:24:57,020

they can move several hundred knots

1933

01:25:02,350 --> 01:24:58,790

underwater unimpeded like it's not even

1934

01:25:04,300 --> 01:25:02,360

there yeah that's incredible I mean it's

1935

01:25:08,680 --> 01:25:04,310

a stunner it's a lifetime stunner and

1936

01:25:12,250 --> 01:25:08,690

has been yeah I'm sure I'm sure Michael

1937

01:25:15,580 --> 01:25:12,260

asks about the laser induced plasma

1938

01:25:17,200 --> 01:25:15,590

effects being used by aircraft ships to

1939

01:25:20,350 --> 01:25:17,210

create decoys I read about that the

1940

01:25:22,690 --> 01:25:20,360

other day looked like a UFO or some

1941

01:25:26,500 --> 01:25:22,700

people could report it as UFO look like

1942

01:25:30,820 --> 01:25:26,510

something like that yeah well what was

1943

01:25:32,340 --> 01:25:30,830

he asking about it let's see I guess he

1944

01:25:35,590 --> 01:25:32,350

wanted to know if you've heard about it

1945

01:25:38,080 --> 01:25:35,600

only in passing I actually have not you

1946

01:25:40,570 --> 01:25:38,090

know done that any research on it I

1947

01:25:42,940 --> 01:25:40,580

don't know a whole lot about that and

1948

01:25:47,070 --> 01:25:42,950

are you going back on the discovery show

1949

01:25:49,000 --> 01:25:47,080

contact oh I don't know I mean I they

1950

01:25:51,910 --> 01:25:49,010

they haven't talked to me about coming

1951

01:25:54,820 --> 01:25:51,920

back I I know I did the final episode of

1952

01:25:56,740 --> 01:25:54,830

season one with them

1953

01:25:58,800 --> 01:25:56,750

it was kind of fun to meet Mike and Mike

1954

01:26:03,090 --> 01:25:58,810

you know they're great guys you know

1955

01:26:05,170 --> 01:26:03,100

one's a history no one's a former

1956

01:26:07,600 --> 01:26:05,180

Special Forces guy and the other one's a

1957

01:26:12,640 --> 01:26:07,610

history professor or medieval history of

1958

01:26:15,820 --> 01:26:12,650

medieval warfare professor Wow yeah

1959

01:26:17,110 --> 01:26:15,830

really really nice guys yeah I'm opening

1960

01:26:19,810 --> 01:26:17,120

up the line since we've had so many

1961

01:26:21,940 --> 01:26:19,820

people ask questions so you'll see that

1962

01:26:27,130 --> 01:26:21,950

number in YouTube you'll see that number

1963

01:26:28,930 --> 01:26:27,140

up on your screen it's 855 472 v 483 and

1964

01:26:32,320 --> 01:26:28,940

Bill will be standing by to take your

1965

01:26:35,130 --> 01:26:32,330

call 85 kg are alive there you go I

1966

01:26:39,010 --> 01:26:35,140

think you've said that a few times yeah

1967

01:26:42,160 --> 01:26:39,020

so there's another one when you're

1968

01:26:43,250 --> 01:26:42,170

saying the word they are you talking

1969

01:26:46,430 --> 01:26:43,260

about us

1970

01:26:48,230 --> 01:26:46,440

I don't know if I don't know what this

1971

01:26:50,000 --> 01:26:48,240

discussion was but they wanted to know

1972

01:26:52,660 --> 01:26:50,010

if you're talking about the air force of

1973

01:26:55,850 --> 01:26:52,670

the US Navy or another entity yes

1974

01:26:58,310 --> 01:26:55,860

okay that's clear now no no actually um

1975

01:27:01,180 --> 01:26:58,320

when they talk about they typically when

1976

01:27:04,250 --> 01:27:01,190

I talk about they I I mean to say

1977

01:27:06,620 --> 01:27:04,260

potential extraterrestrial life that's

1978

01:27:08,180 --> 01:27:06,630

here if I'm talking about Navy I'll talk

1979

01:27:09,530 --> 01:27:08,190

I'll say Navy if I talk about air force

1980

01:27:13,730 --> 01:27:09,540

don't say air force I don't typically

1981

01:27:15,200 --> 01:27:13,740

use the collective a with armed services

1982

01:27:17,180 --> 01:27:15,210

because it is important to differentiate

1983

01:27:20,330 --> 01:27:17,190

between the two between the different

1984

01:27:22,610 --> 01:27:20,340

types of services and my focus has

1985

01:27:24,920 --> 01:27:22,620

always been really with the Navy I don't

1986

01:27:27,830 --> 01:27:24,930

and have never done a lot of work at all

1987

01:27:29,240 --> 01:27:27,840

for the air force never done any work

1988

01:27:34,040 --> 01:27:29,250

for the army although it came close a

1989

01:27:36,950 --> 01:27:34,050

few times I've worked with I've work

1990

01:27:38,360 --> 01:27:36,960

with other agencies but not not the

1991

01:27:41,510 --> 01:27:38,370

three-letter agencies like everybody

1992

01:27:43,520 --> 01:27:41,520

thinks I did and at one point I was

1993

01:27:47,530 --> 01:27:43,530

doing little projects for some of those

1994

01:27:51,410 --> 01:27:47,540

you know ancillary agencies tied to them

1995

01:27:53,330 --> 01:27:51,420

but I I did actually I did deliver a

1996

01:27:57,050 --> 01:27:53,340

briefing once to the director of the CIA

1997

01:27:58,490 --> 01:27:57,060

I got to say that and that was sounds

1998

01:28:01,160 --> 01:27:58,500

pretty impressive I know you know I'm

1999

01:28:04,640 --> 01:28:01,170

really something I'm plugged in except I

2000

01:28:09,470 --> 01:28:04,650

was an intern and I was in Washington

2001
01:28:11,000 --> 01:28:09,480
during high school and we drew straws to

2002
01:28:12,860 --> 01:28:11,010
see you had to drive out to Langley I

2003
01:28:14,300 --> 01:28:12,870
didn't wanna do it no one want to do it

2004
01:28:17,150 --> 01:28:14,310
I got the short straw I had the trifling

2005
01:28:19,730 --> 01:28:17,160
in deliberate and I ended up meeting

2006
01:28:23,240 --> 01:28:19,740
with the associate associate deputy

2007
01:28:25,130 --> 01:28:23,250
stand in possible senior director as the

2008
01:28:26,990 --> 01:28:25,140
guy that's like down the chain but still

2009
01:28:29,780 --> 01:28:27,000
has a really impressive title so I

2010
01:28:32,210 --> 01:28:29,790
didn't actually meet the director okay

2011
01:28:34,520 --> 01:28:32,220
there's people in the UFO arena who say

2012
01:28:36,800 --> 01:28:34,530
they have the record of the CIA on speed

2013
01:28:40,640 --> 01:28:36,810

dial and all that and it's like yeah

2014

01:28:42,920 --> 01:28:40,650

okay I know what you're talking about

2015

01:28:45,560 --> 01:28:42,930

yeah I don't know that that's entirely

2016

01:28:48,130 --> 01:28:45,570

possible but it could be you know I

2017

01:28:51,830 --> 01:28:48,140

can't take away that might be true but

2018

01:28:55,130 --> 01:28:51,840

the likelihood is not there yeah we have

2019

01:28:58,600 --> 01:28:55,140

Andy calling from Connecticut Andy

2020

01:29:05,960 --> 01:29:04,460

handi can you hear me bill I think it's

2021

01:29:11,170 --> 01:29:05,970

possible we have a problem with our

2022

01:29:14,390 --> 01:29:11,180

phone system you clicked on there yep

2023

01:29:17,030 --> 01:29:14,400

it's on here now he's on here now so

2024

01:29:20,410 --> 01:29:17,040

bill just keep in mind something's

2025

01:29:23,690 --> 01:29:20,420

happening to our it's not coming through

2026

01:29:25,490 --> 01:29:23,700

so uh so we'll just keep on moving on

2027

01:29:27,590 --> 01:29:25,500

hopefully bill can figure that out

2028

01:29:29,630 --> 01:29:27,600

Martin just use your telepathy for

2029

01:29:32,300 --> 01:29:29,640

crying out loud yeah I know it's yeah

2030

01:29:35,360 --> 01:29:32,310

it's a little rusty tonight I would try

2031

01:29:39,920 --> 01:29:35,370

it but we have plenty of questions we're

2032

01:29:41,860 --> 01:29:39,930

coming in like left and right and just

2033

01:29:45,440 --> 01:29:41,870

see if I can pick up one of those but

2034

01:29:47,930 --> 01:29:45,450

well if not let's uh let's go into a

2035

01:29:50,450 --> 01:29:47,940

topic that I wanted to talk about and

2036

01:29:52,820 --> 01:29:50,460

that is so mmm just another mystery

2037

01:29:55,190 --> 01:29:52,830

that's not UFO related but dark matter

2038

01:29:56,960 --> 01:29:55,200

and dark energy because yeah I think

2039

01:30:00,320 --> 01:29:56,970

it's pretty interesting when you think

2040

01:30:02,090 --> 01:30:00,330

about the what we know

2041

01:30:04,970 --> 01:30:02,100

rocks planet stars all that stuff

2042

01:30:05,810 --> 01:30:04,980

there's only like 5% of what's going on

2043

01:30:08,720 --> 01:30:05,820

out there

2044

01:30:11,300 --> 01:30:08,730

then there's dark matter and then

2045

01:30:14,600 --> 01:30:11,310

there's dark energy like makes up the

2046

01:30:17,300 --> 01:30:14,610

majority of it and the puzzle of it all

2047

01:30:19,430 --> 01:30:17,310

is what has always intrigued me and and

2048

01:30:22,250 --> 01:30:19,440

the thoughts and I was just reading

2049

01:30:25,700 --> 01:30:22,260

something about was it axioms as a

2050

01:30:29,420 --> 01:30:25,710

possibility of dark dark matter

2051

01:30:31,130 --> 01:30:29,430

you know the sub particles yeah yes

2052

01:30:33,200 --> 01:30:31,140

there's there's there was some

2053

01:30:36,400 --> 01:30:33,210

commentary in the literature that states

2054

01:30:40,630 --> 01:30:36,410

that dark energy might not actually

2055

01:30:44,540 --> 01:30:40,640

really be needed to explain anything but

2056

01:30:45,770 --> 01:30:44,550

it depends how you embrace the research

2057

01:30:49,160 --> 01:30:45,780

that said it was there in the first

2058

01:30:51,110 --> 01:30:49,170

place and it has to do with the

2059

01:30:53,810 --> 01:30:51,120

expansion rate of the universe okay and

2060

01:30:57,680 --> 01:30:53,820

so when we look at dark energy for

2061

01:31:02,180 --> 01:30:57,690

instance words that come from well in

2062

01:31:03,920 --> 01:31:02,190

the 20s Edwin Hubble famous American

2063

01:31:06,230 --> 01:31:03,930

astronomer he was actually studying the

2064

01:31:08,390 --> 01:31:06,240

galaxies far away and he noticed that

2065

01:31:10,000 --> 01:31:08,400

these galaxies are receding from us at a

2066

01:31:13,899 --> 01:31:10,010

faster rate the farther away

2067

01:31:16,120 --> 01:31:13,909

and he was able to deduce an expansion

2068

01:31:18,609 --> 01:31:16,130

rate of the universe and that expansion

2069

01:31:19,569 --> 01:31:18,619

rate became known as the Hubble name for

2070

01:31:22,479 --> 01:31:19,579

him constant

2071

01:31:26,049 --> 01:31:22,489

well the Hubble constant turns out it

2072

01:31:30,759 --> 01:31:26,059

it's not constant the Planck telescope

2073

01:31:36,100 --> 01:31:30,769

and other studies showed that the rate

2074

01:31:38,620 --> 01:31:36,110

of expansion has been accelerating and

2075

01:31:40,779 --> 01:31:38,630

if they're accelerating that means that

2076

01:31:42,160 --> 01:31:40,789

that means that the expansion is getting

2077

01:31:45,910 --> 01:31:42,170

faster and faster and faster every

2078

01:31:49,779 --> 01:31:45,920

second basically now what could possibly

2079

01:31:53,370 --> 01:31:49,789

explain that 13.8 billion years after

2080

01:31:58,649 --> 01:31:53,380

the Big Bang that started at all well it

2081

01:32:02,379 --> 01:31:58,659

turns out that dark energies actually

2082

01:32:04,600 --> 01:32:02,389

postulated because of the fact that the

2083

01:32:05,529 --> 01:32:04,610

explanation of this expansion has to

2084

01:32:08,140 --> 01:32:05,539

come from somewhere

2085

01:32:09,160 --> 01:32:08,150

so it wasn't toward the guy I've been

2086

01:32:11,500 --> 01:32:09,170

telling you about because he didn't

2087

01:32:14,290 --> 01:32:11,510

alien he's somewhere else but it was

2088

01:32:17,229 --> 01:32:14,300

probably some of these people that were

2089

01:32:19,629 --> 01:32:17,239

trying to think of ways to explain the

2090

01:32:22,629 --> 01:32:19,639

accelerating expansion and so they

2091

01:32:24,009 --> 01:32:22,639

thought of the concept and saw if it

2092

01:32:26,350 --> 01:32:24,019

worked out and it did

2093

01:32:28,209 --> 01:32:26,360

oddly enough I mean serendipity you know

2094

01:32:31,359 --> 01:32:28,219

you think of something they worked out

2095

01:32:33,459 --> 01:32:31,369

well it turns out that the expansion

2096

01:32:38,109 --> 01:32:33,469

rate of the universe if you think about

2097

01:32:41,319 --> 01:32:38,119

an energy that causes not objects to

2098

01:32:45,459 --> 01:32:41,329

expand but the very space that they're

2099

01:32:50,049 --> 01:32:45,469

in to expand it actually is expanding

2100

01:32:53,969 --> 01:32:50,059

space all around yet the dark energy is

2101
01:32:58,779 --> 01:32:53,979
and so that means that the acceleration

2102
01:33:01,989 --> 01:32:58,789
due to this energy that's expanding the

2103
01:33:04,149 --> 01:33:01,999
very space will cause this accelerated

2104
01:33:05,770 --> 01:33:04,159
expansion we see and that's where the

2105
01:33:08,589 --> 01:33:05,780
concept of dark energy came from isn't

2106
01:33:13,299 --> 01:33:08,599
that nice and Elementary no it's not

2107
01:33:14,199 --> 01:33:13,309
it's not very intuitive okay but you

2108
01:33:18,489 --> 01:33:14,209
know the concept of the universe

2109
01:33:20,560 --> 01:33:18,499
expanding however is has always been has

2110
01:33:23,500 --> 01:33:20,570
been plaguing people with problems and

2111
01:33:25,490 --> 01:33:23,510
one of them is if you look at for

2112
01:33:28,040 --> 01:33:25,500
instance

2113
01:33:29,180 --> 01:33:28,050

say you have objects in space and you

2114

01:33:31,729 --> 01:33:29,190

look at and you look at another object

2115

01:33:33,379 --> 01:33:31,739

in space every single object is moving

2116

01:33:36,379 --> 01:33:33,389

away from every other object in the

2117

01:33:38,899 --> 01:33:36,389

universe wait a minute what how can that

2118

01:33:41,330 --> 01:33:38,909

be what if they're closer to us well how

2119

01:33:44,120 --> 01:33:41,340

can that work well you might think that

2120

01:33:46,189 --> 01:33:44,130

you know that that can't happen well it

2121

01:33:48,680 --> 01:33:46,199

does and if you want to see it happen

2122

01:33:50,510 --> 01:33:48,690

you all you need is a balloon and a

2123

01:33:51,740 --> 01:33:50,520

Sharpie you get a balloon in a Sharpie

2124

01:33:53,120 --> 01:33:51,750

you take your balloon and put little

2125

01:33:54,979 --> 01:33:53,130

dots on it okay

2126
01:33:58,100 --> 01:33:54,989
and Amanda Curran who's been helping you

2127
01:34:00,680 --> 01:33:58,110
tonight did this and a video on her site

2128
01:34:02,990 --> 01:34:00,690
on her youtube channel to show this

2129
01:34:04,850 --> 01:34:03,000
concept I was trying to put across mmm

2130
01:34:06,800 --> 01:34:04,860
and by the expansion of the universe and

2131
01:34:09,020 --> 01:34:06,810
you put dots on this balloon it's not

2132
01:34:11,450 --> 01:34:09,030
blown up and then you blow it up and you

2133
01:34:12,859 --> 01:34:11,460
watch the dots you'll see that every dot

2134
01:34:15,020 --> 01:34:12,869
you put on that balloon is moving away

2135
01:34:17,450 --> 01:34:15,030
from every other dot as the universe

2136
01:34:20,030 --> 01:34:17,460
expands as the balloon expands and that

2137
01:34:22,129 --> 01:34:20,040
is the basic concept of universe

2138
01:34:24,800 --> 01:34:22,139

expansion and so I think that's

2139

01:34:26,359 --> 01:34:24,810

something that's really crucial to

2140

01:34:28,609 --> 01:34:26,369

understand first before you can start

2141

01:34:29,780 --> 01:34:28,619

thinking about accelerated expansion so

2142

01:34:33,379 --> 01:34:29,790

once you know the universe is expanding

2143

01:34:36,020 --> 01:34:33,389

then you look at the fact that it's

2144

01:34:39,770 --> 01:34:36,030

actually going faster and faster and the

2145

01:34:43,819 --> 01:34:39,780

causes are this energy inside it's like

2146

01:34:45,550 --> 01:34:43,829

someone is blowing harder and harder and

2147

01:34:48,200 --> 01:34:45,560

harder every second into the balloon and

2148

01:34:51,080 --> 01:34:48,210

causing this expansion to increase and

2149

01:34:53,600 --> 01:34:51,090

that's that someone is actually

2150

01:34:57,050 --> 01:34:53,610

something and it's the dark energy which

2151
01:34:59,479 --> 01:34:57,060
is causing the space itself to expand in

2152
01:35:02,660 --> 01:34:59,489
every direction so that's the arc energy

2153
01:35:05,089 --> 01:35:02,670
and I'm telling you if you're still here

2154
01:35:07,520 --> 01:35:05,099
and not like if your brain hasn't popped

2155
01:35:11,359 --> 01:35:07,530
well then you know we can go to the next

2156
01:35:12,500 --> 01:35:11,369
one yeah well I we have a handy back on

2157
01:35:17,000 --> 01:35:12,510
the line we figured out what the problem

2158
01:35:17,569 --> 01:35:17,010
was so who'd you have muted yes that's

2159
01:35:22,669 --> 01:35:17,579
exactly it

2160
01:35:28,370 --> 01:35:22,679
and anyway no I had I had kgr a muted

2161
01:35:30,910 --> 01:35:28,380
but anyway yeah yeah there's just so

2162
01:35:33,379 --> 01:35:30,920
many mysteries and makes you wonder if

2163
01:35:34,760 --> 01:35:33,389

we haven't figured there's something we

2164

01:35:37,220 --> 01:35:34,770

have figured wrong about gravity or

2165

01:35:38,030 --> 01:35:37,230

gravity reacts differently but I don't

2166

01:35:42,280 --> 01:35:38,040

want you

2167

01:35:44,270 --> 01:35:42,290

we'll take on Andy first and continuing

2168

01:35:46,700 --> 01:35:44,280

and you're on the air

2169

01:35:50,060 --> 01:35:46,710

welcome to the show excellent hi guys

2170

01:35:52,040 --> 01:35:50,070

there ain't well my question for mark is

2171

01:35:54,560 --> 01:35:52,050

uh I think he touched on this earlier

2172

01:35:57,230 --> 01:35:54,570

when he when he referenced uh his his

2173

01:36:00,680 --> 01:35:57,240

thinking that went into his book but

2174

01:36:03,290 --> 01:36:00,690

given that we seem to find life in the

2175

01:36:07,120 --> 01:36:03,300

most unlikely places we look here on

2176

01:36:10,430 --> 01:36:07,130

earth no just bang off a couple

2177

01:36:13,040 --> 01:36:10,440

radioactive waste hot springs in

2178

01:36:16,610 --> 01:36:13,050

undersea volcanic vents incredible

2179

01:36:18,800 --> 01:36:16,620

pressure in temperature the movile cave

2180

01:36:21,590 --> 01:36:18,810

in Romania

2181

01:36:23,120 --> 01:36:21,600

back in 86 it was five million years cut

2182

01:36:26,110 --> 01:36:23,130

off from sunlight and still with

2183

01:36:31,730 --> 01:36:26,120

poisonous gases life is thriving there

2184

01:36:34,910 --> 01:36:31,740

the surface of the ISS and on and on so

2185

01:36:38,630 --> 01:36:34,920

given given those facts is it not likely

2186

01:36:41,960 --> 01:36:38,640

then that life is actually ubiquitous in

2187

01:36:43,700 --> 01:36:41,970

the universe and and not rare we just

2188

01:36:47,720 --> 01:36:43,710

don't have the ability to get into the

2189

01:36:51,440 --> 01:36:47,730

details on what's happening on these new

2190

01:36:52,790 --> 01:36:51,450

planets they're discovering water mark

2191

01:36:55,460 --> 01:36:52,800

Mark's thoughts on I think he probably

2192

01:36:56,900 --> 01:36:55,470

would agree Andy I totally agree with

2193

01:36:59,870 --> 01:36:56,910

you hundred percent in fact as a matter

2194

01:37:01,970 --> 01:36:59,880

of fact the the subtext the subtitle of

2195

01:37:04,520 --> 01:37:01,980

the populated universe that book I wrote

2196

01:37:05,870 --> 01:37:04,530

is life in the universe may very well be

2197

01:37:07,850 --> 01:37:05,880

the rule not the exception

2198

01:37:09,890 --> 01:37:07,860

and it's based on those that very same

2199

01:37:11,750 --> 01:37:09,900

predicate that you mentioned that I base

2200

01:37:13,880 --> 01:37:11,760

it on ever were we looking to see the

2201

01:37:15,440 --> 01:37:13,890

building blocks of life and one one

2202

01:37:17,930 --> 01:37:15,450

place you didn't mention another place

2203

01:37:20,780 --> 01:37:17,940

that was cut off for for a long long

2204

01:37:23,690 --> 01:37:20,790

time is in Antarctica its lake vostok

2205

01:37:25,970 --> 01:37:23,700

lake vostok is a mile or more between

2206

01:37:28,580 --> 01:37:25,980

you know underneath the Antarctic Isis

2207

01:37:30,920 --> 01:37:28,590

has never seen the light of day in many

2208

01:37:34,910 --> 01:37:30,930

many years been cut off for I actually

2209

01:37:37,520 --> 01:37:34,920

forget the amount but for quite a few I

2210

01:37:38,690 --> 01:37:37,530

won't say I don't know how many millions

2211

01:37:40,940 --> 01:37:38,700

years it was cut off if it wasn't

2212

01:37:45,170 --> 01:37:40,950

hundreds of thousands but the bottom

2213

01:37:49,670 --> 01:37:45,180

line is that lake has more than 3500

2214

01:37:51,590 --> 01:37:49,680

different species of life within it all

2215

01:37:54,430 --> 01:37:51,600

working within the small

2216

01:37:57,620 --> 01:37:54,440

frail ecosystem that is lake vostok

2217

01:38:00,590 --> 01:37:57,630

beneath the Arctic ice now the pressure

2218

01:38:02,180 --> 01:38:00,600

is immense under all that ice and then

2219

01:38:03,320 --> 01:38:02,190

you have the weight of the water on top

2220

01:38:05,840 --> 01:38:03,330

of it okay

2221

01:38:07,670 --> 01:38:05,850

yet if your life you evolve into that

2222

01:38:09,560 --> 01:38:07,680

you don't know any different right we

2223

01:38:11,750 --> 01:38:09,570

evolved into fourteen point seven pounds

2224

01:38:13,120 --> 01:38:11,760

per square inch on our bodies every

2225

01:38:15,800 --> 01:38:13,130

square inch pressing every which way

2226

01:38:17,120 --> 01:38:15,810

because we evolved here this is how we

2227

01:38:18,980 --> 01:38:17,130

evolved we don't even think about it

2228

01:38:21,590 --> 01:38:18,990

but we're actually feeling the weight of

2229

01:38:23,900 --> 01:38:21,600

the air over our heads up to space the

2230

01:38:26,360 --> 01:38:23,910

weight of that air all the way column of

2231

01:38:27,860 --> 01:38:26,370

air over your head every square inch is

2232

01:38:29,810 --> 01:38:27,870

gonna be fourteen point seven pounds of

2233

01:38:32,720 --> 01:38:29,820

air over your head okay

2234

01:38:35,120 --> 01:38:32,730

overall now that's that's quite a lot

2235

01:38:37,070 --> 01:38:35,130

you know and other planets have less

2236

01:38:39,680 --> 01:38:37,080

atmosphere like Mars and other planets

2237

01:38:42,530 --> 01:38:39,690

have a lot more like Venus okay Venus is

2238

01:38:44,660 --> 01:38:42,540

ninety times as dense as ours Titan okay

2239

01:38:46,640 --> 01:38:44,670

has a lot more atmosphere than the earth

2240

01:38:48,140 --> 01:38:46,650

and Titan is of only about three

2241

01:38:50,030 --> 01:38:48,150

thousand miles across compared to the

2242

01:38:51,380 --> 01:38:50,040

earth being eight thousand so I agree

2243

01:38:53,360 --> 01:38:51,390

with you we see the building blocks of

2244

01:38:55,940 --> 01:38:53,370

life everywhere we look the deep ocean

2245

01:38:58,040 --> 01:38:55,950

vents had we not found life you know and

2246

01:39:00,020 --> 01:38:58,050

you probably know this too Andy had we

2247

01:39:03,140 --> 01:39:00,030

not found life at these sulfide chimneys

2248

01:39:05,240 --> 01:39:03,150

on the ocean floor we probably wouldn't

2249

01:39:09,220 --> 01:39:05,250

have thought that we could have life at

2250

01:39:15,320 --> 01:39:09,230

Europa Jupiter's moon or Enceladus

2251
01:39:18,500 --> 01:39:15,330
yeah Cassini saw these fantastic fissure

2252
01:39:23,660 --> 01:39:18,510
looking hotspots at the South Pole of

2253
01:39:26,630 --> 01:39:23,670
Enceladus this is telling us that we're

2254
01:39:29,120 --> 01:39:26,640
seeing hydrothermal vents we're seeing

2255
01:39:30,200 --> 01:39:29,130
hydrocarbons we're seeing carbon we're

2256
01:39:32,630 --> 01:39:30,210
seeing carbon dioxide were seeing

2257
01:39:35,600 --> 01:39:32,640
hydrogen we're seeing water spewing out

2258
01:39:38,960 --> 01:39:35,610
of these from subterranean oceans oceans

2259
01:39:41,960 --> 01:39:38,970
beneath the ice caps how phenomenal is

2260
01:39:44,720 --> 01:39:41,970
that and that's a Jupiter and Saturn

2261
01:39:46,700 --> 01:39:44,730
okay and you know people think well you

2262
01:39:49,180 --> 01:39:46,710
know you know that's far out I mean how

2263
01:39:51,920 --> 01:39:49,190

could how could it be warm enough well

2264

01:39:53,900 --> 01:39:51,930

Europa has a possibly sixty to ninety

2265

01:39:55,850 --> 01:39:53,910

mile deep ocean underneath that ice and

2266

01:39:58,250 --> 01:39:55,860

it's warm because of the fact that as

2267

01:40:00,140 --> 01:39:58,260

Europa goes around it's in a it's an

2268

01:40:02,810 --> 01:40:00,150

orbital resonance that's called with IO

2269

01:40:04,790 --> 01:40:02,820

and Ganymede and as it goes around those

2270

01:40:05,510 --> 01:40:04,800

those moons are tugging on it and so is

2271

01:40:07,040 --> 01:40:05,520

Jupiter and it

2272

01:40:09,230 --> 01:40:07,050

causes it to do this kind of thing as

2273

01:40:12,050 --> 01:40:09,240

it's moving all right and as it does

2274

01:40:13,610 --> 01:40:12,060

that it actually heats up from the

2275

01:40:15,530 --> 01:40:13,620

friction and you can do this with a

2276

01:40:16,820 --> 01:40:15,540

piece of clay that's hard right out of

2277

01:40:18,380 --> 01:40:16,830

the refrigerator take a piece of clay

2278

01:40:20,210 --> 01:40:18,390

and you start squeezed in squeezing it

2279

01:40:22,430 --> 01:40:20,220

and within about 20 minutes that clay is

2280

01:40:23,990 --> 01:40:22,440

soft and pliable now why you're

2281

01:40:25,490 --> 01:40:24,000

squeezing it you're doing what gravity

2282

01:40:27,590 --> 01:40:25,500

does you're squeezing tugging and

2283

01:40:30,530 --> 01:40:27,600

pulling and by that time then the clay

2284

01:40:32,180 --> 01:40:30,540

warms up it's pliable and beautiful and

2285

01:40:34,640 --> 01:40:32,190

that's what's happening underneath

2286

01:40:36,740 --> 01:40:34,650

Europa's surface the ice is cracking the

2287

01:40:40,160 --> 01:40:36,750

ice is fusing back together we're seeing

2288

01:40:42,200 --> 01:40:40,170

geysers actually on Europa if all the

2289

01:40:46,670 --> 01:40:42,210

data's right we're seeing hydrogen and

2290

01:40:49,850 --> 01:40:46,680

we're seeing oxygen and other compounds

2291

01:40:53,330 --> 01:40:49,860

coming out of Europa's geysers this as

2292

01:40:55,430 --> 01:40:53,340

you point out Andy probably is pointing

2293

01:40:59,150 --> 01:40:55,440

out the fact that life is indeed

2294

01:41:01,430 --> 01:40:59,160

ubiquitous throughout the universe in I

2295

01:41:03,980 --> 01:41:01,440

think I know I run the risk of being

2296

01:41:07,160 --> 01:41:03,990

what's labeled a carbon bigot yeah

2297

01:41:09,380 --> 01:41:07,170

that's right but as a carbon bigot I can

2298

01:41:11,030 --> 01:41:09,390

tell you that I think that the universe

2299

01:41:15,440 --> 01:41:11,040

provides a template for carbon-based

2300

01:41:16,520 --> 01:41:15,450

life here and everywhere and as I say it

2301

01:41:18,740 --> 01:41:16,530

happened here and it could happen

2302

01:41:20,960 --> 01:41:18,750

everywhere comets deliver carbon-based

2303

01:41:23,870 --> 01:41:20,970

compounds meteors deliver carbon-based

2304

01:41:26,090 --> 01:41:23,880

compounds and asteroids deliver

2305

01:41:30,590 --> 01:41:26,100

carbon-based compounds and these

2306

01:41:35,390 --> 01:41:30,600

compounds will then be part of a process

2307

01:41:37,430 --> 01:41:35,400

to create the oxygen from life and from

2308

01:41:40,790 --> 01:41:37,440

geological processes once once we see

2309

01:41:43,820 --> 01:41:40,800

the little tiny bacteria that form our

2310

01:41:46,100 --> 01:41:43,830

planet like they did then at that point

2311

01:41:50,950 --> 01:41:46,110

the oxygen atmosphere builds up and when

2312

01:41:54,850 --> 01:41:50,960

that happens now the opportunity for a

2313

01:41:57,800 --> 01:41:54,860

radiative outward explosion of life is

2314

01:42:01,490 --> 01:41:57,810

available and I think that this is

2315

01:42:03,740 --> 01:42:01,500

something that happens everywhere maybe

2316

01:42:07,460 --> 01:42:03,750

it happened under Europa's surface don't

2317

01:42:09,230 --> 01:42:07,470

you think yeah it's highly likely I

2318

01:42:12,230 --> 01:42:09,240

can't wait till we can get there and

2319

01:42:15,380 --> 01:42:12,240

look an opal clipper and I'll take your

2320

01:42:17,750 --> 01:42:15,390

head off air mark but uh you would know

2321

01:42:19,340 --> 01:42:17,760

better than I what was the robot that we

2322

01:42:21,490 --> 01:42:19,350

landed on the passage

2323

01:42:24,830 --> 01:42:21,500

japanese and landed on that passing

2324

01:42:27,170 --> 01:42:24,840

asteroid and then are there plans to do

2325

01:42:31,880 --> 01:42:27,180

anything else in the near future that

2326

01:42:33,140 --> 01:42:31,890

you know of I know that um thank you yes

2327

01:42:34,160 --> 01:42:33,150

sir no thank you very much for the call

2328

01:42:37,520 --> 01:42:34,170

excellent questions

2329

01:42:40,130 --> 01:42:37,530

um I think thank you the robots that

2330

01:42:44,000 --> 01:42:40,140

landed on the asteroid Ryuga

2331

01:42:46,190 --> 01:42:44,010

okay I can't I don't remember their

2332

01:42:48,410 --> 01:42:46,200

names there are more acronyms than the

2333

01:42:50,390 --> 01:42:48,420

names I think but I could be wrong about

2334

01:42:52,790 --> 01:42:50,400

that but they landed several of these

2335

01:42:56,930 --> 01:42:52,800

and the the gravity on this asteroid was

2336

01:43:00,140 --> 01:42:56,940

so small so slight as a matter of fact I

2337

01:43:01,970 --> 01:43:00,150

don't have a I had a digital print of

2338

01:43:04,250 --> 01:43:01,980

that asteroid to show you and I don't

2339

01:43:08,210 --> 01:43:04,260

know where I put it now but I'll use the

2340

01:43:10,640 --> 01:43:08,220

moon so the the the the the gravity was

2341

01:43:12,500 --> 01:43:10,650

so slight on this asteroid that the the

2342

01:43:14,990 --> 01:43:12,510

way the thing moved around was it just

2343

01:43:16,910 --> 01:43:15,000

had a little bar and just went thunk and

2344

01:43:19,040 --> 01:43:16,920

when it like that it moved this thing

2345

01:43:20,840 --> 01:43:19,050

off the asteroid it was just like a

2346

01:43:23,630 --> 01:43:20,850

little bar that just swatted the

2347

01:43:25,250 --> 01:43:23,640

asteroid and when it did that the thing

2348

01:43:27,290 --> 01:43:25,260

flew off the asteroid and then came back

2349

01:43:30,110 --> 01:43:27,300

at a different place not very efficient

2350

01:43:32,720 --> 01:43:30,120

not very uh well not very steerable

2351

01:43:35,810 --> 01:43:32,730

actually however it did the job and it

2352

01:43:41,680 --> 01:43:35,820

brought it to various places and that

2353

01:43:44,960 --> 01:43:41,690

that that was that mission alright was

2354

01:43:46,730 --> 01:43:44,970

essential because it was telling us the

2355

01:43:49,670 --> 01:43:46,740

complete the complexities of the

2356

01:43:50,870 --> 01:43:49,680

asteroids makeup in chemistry and then

2357

01:43:54,200 --> 01:43:50,880

we of course we have the sample return

2358

01:43:57,070 --> 01:43:54,210

that's going to be coming from there and

2359

01:43:59,180 --> 01:43:57,080

we have osiris-rex out at menu and

2360

01:44:00,590 --> 01:43:59,190

osiris-rex is near and dear to me

2361

01:44:04,460 --> 01:44:00,600

because one of the people that worked on

2362

01:44:07,280 --> 01:44:04,470

it was a catholic nun who i didn't know

2363

01:44:10,010 --> 01:44:07,290

was a Catholic nun when she was here my

2364

01:44:12,500 --> 01:44:10,020

house and because she doesn't dress up

2365

01:44:15,190 --> 01:44:12,510

like one you know she saw unfortunately

2366

01:44:18,620 --> 01:44:15,200

passed away a couple of years ago but

2367

01:44:20,270 --> 01:44:18,630

she was someone that said I have an

2368

01:44:22,100 --> 01:44:20,280

interest in the Hubble Space Telescope I

2369

01:44:24,170 --> 01:44:22,110

said oh I can show you some pictures oh

2370

01:44:25,400 --> 01:44:24,180

I'd love that so I went down and made

2371

01:44:27,140 --> 01:44:25,410

some pictures I actually printed her

2372

01:44:28,580 --> 01:44:27,150

some beautiful digital copies brought

2373

01:44:30,920 --> 01:44:28,590

him up and presented her with these

2374

01:44:32,359 --> 01:44:30,930

things and I telling her about these

2375

01:44:33,770 --> 01:44:32,369

things right

2376

01:44:36,379 --> 01:44:33,780

I'll tell you why this relates the

2377

01:44:39,139 --> 01:44:36,389

osiris-rex in a minute so she actually

2378

01:44:40,369 --> 01:44:39,149

said to me well those are beautiful you

2379

01:44:42,529 --> 01:44:40,379

know and I said these are yours you may

2380

01:44:45,379 --> 01:44:42,539

have them oh thank you and then her

2381

01:44:48,859 --> 01:44:45,389

companion another Catholic nun who was a

2382

01:44:51,109 --> 01:44:48,869

relative actually started to laugh and

2383

01:44:53,719 --> 01:44:51,119

they go what are you laughing for and

2384

01:45:00,229 --> 01:44:53,729

she looks at me she goes she's an

2385

01:45:02,419 --> 01:45:00,239

astrophysicist and I went what what oh

2386

01:45:04,759 --> 01:45:02,429

yeah sister Mary Ellen was an

2387

01:45:07,189 --> 01:45:04,769

astrophysicist worked at Goddard okay

2388

01:45:08,599 --> 01:45:07,199

and I didn't know that because she never

2389

01:45:11,299 --> 01:45:08,609

talked about it she never crowed about

2390

01:45:14,719 --> 01:45:11,309

it but she was the only human in history

2391

01:45:18,139 --> 01:45:14,729

to ever land an actual probe on an

2392

01:45:21,369 --> 01:45:18,149

asteroid she was she was working on the

2393

01:45:24,229 --> 01:45:21,379

near-earth asteroid rendezvous near and

2394

01:45:27,379 --> 01:45:24,239

she was the one who helped land this

2395

01:45:28,579 --> 01:45:27,389

asteroid I land on this asteroid and I

2396

01:45:33,020 --> 01:45:28,589

know Cyrus wrecks

2397

01:45:35,059 --> 01:45:33,030

I am mortalized her because when when

2398

01:45:38,299 --> 01:45:35,069

the osiris-rex team was talking about

2399

01:45:41,179 --> 01:45:38,309

including a little microdot with the

2400

01:45:43,399 --> 01:45:41,189

names of all the people I in a little

2401
01:45:44,869 --> 01:45:43,409
memory and photos of sister Mary Ellen

2402
01:45:47,299 --> 01:45:44,879
and they put it on for us so it was

2403
01:45:50,569 --> 01:45:47,309
really nice so it's sitting out there

2404
01:45:53,779 --> 01:45:50,579
and asteroid Bennu who else iris Rex's

2405
01:45:56,469 --> 01:45:53,789
and Mary Ellen is there I think it's

2406
01:45:59,149 --> 01:45:56,479
pretty cool that is I can't imagine the

2407
01:46:02,000 --> 01:45:59,159
calculating that would have to be done

2408
01:46:04,549 --> 01:46:02,010
to land on an asteroid I mean it's just

2409
01:46:06,439 --> 01:46:04,559
mind-blowing it is and we don't

2410
01:46:08,449 --> 01:46:06,449
necessarily get it right look at the

2411
01:46:11,139 --> 01:46:08,459
landing on the comet of the Rosetta

2412
01:46:13,250 --> 01:46:11,149
mission right the Rosetta mission was

2413
01:46:15,319 --> 01:46:13,260

fantastic it showed us views and

2414

01:46:18,199 --> 01:46:15,329

chemistry or a comment we'd never knew

2415

01:46:20,359 --> 01:46:18,209

okay and then there was a little lander

2416

01:46:24,319 --> 01:46:20,369

that was being deployed called fillet

2417

01:46:25,939 --> 01:46:24,329

you know ph IL AE right fillet and it

2418

01:46:27,799 --> 01:46:25,949

went down and went to land in the

2419

01:46:29,389 --> 01:46:27,809

asteroid and what it's supposed to do is

2420

01:46:31,909 --> 01:46:29,399

a supposed to at land it was supposed to

2421

01:46:33,559 --> 01:46:31,919

engage these hooks that would then hold

2422

01:46:35,419 --> 01:46:33,569

it down to the asteroid because yeah I'm

2423

01:46:38,750 --> 01:46:35,429

sorry their comment because the comment

2424

01:46:41,599 --> 01:46:38,760

was so low mass and so low gravity but

2425

01:46:43,009 --> 01:46:41,609

instead they either didn't fire that was

2426

01:46:45,349 --> 01:46:43,019

ineffective and when it hit it just

2427

01:46:46,330 --> 01:46:45,359

bounced off and it's continued to bounce

2428

01:46:49,220 --> 01:46:46,340

for

2429

01:46:52,430 --> 01:46:49,230

until it ended up lodged in a crevasse

2430

01:46:54,670 --> 01:46:52,440

on that Rosetta comment which was

2431

01:46:58,790 --> 01:46:54,680

actually a comet churyumov-gerasimenko

2432

01:46:59,740 --> 01:46:58,800

which is comet 67p P meaning periodic so

2433

01:47:03,530 --> 01:46:59,750

it'll be back

2434

01:47:06,320 --> 01:47:03,540

well amazing it's just so amazing hey

2435

01:47:10,220 --> 01:47:06,330

someone wanted to know are there any

2436

01:47:12,020 --> 01:47:10,230

plans to ever do any more deep field you

2437

01:47:15,440 --> 01:47:12,030

know pictures like the Hubble did oh

2438

01:47:16,970 --> 01:47:15,450

yeah I don't know I I'm not I've not

2439

01:47:20,330 --> 01:47:16,980

seen any of the docketts I haven't seen

2440

01:47:21,770 --> 01:47:20,340

any of the program's to know whether and

2441

01:47:22,750 --> 01:47:21,780

I know I haven't read any of that

2442

01:47:25,520 --> 01:47:22,760

information

2443

01:47:27,560 --> 01:47:25,530

you know I I've been focusing on our

2444

01:47:29,540 --> 01:47:27,570

Observatory to try and just get

2445

01:47:32,690 --> 01:47:29,550

astronomy to the masses you know get

2446

01:47:34,340 --> 01:47:32,700

people out there and you know it I think

2447

01:47:38,120 --> 01:47:34,350

it helps to have an astronomer who was

2448

01:47:40,250 --> 01:47:38,130

also a a full full-on believer in

2449

01:47:41,810 --> 01:47:40,260

extraterrestrial life and thinks they

2450

01:47:43,400 --> 01:47:41,820

could be here I mean I don't see any

2451
01:47:46,600 --> 01:47:43,410
reason why not the sheer numbers of

2452
01:47:49,160 --> 01:47:46,610
planets out there seems to negate

2453
01:47:53,570 --> 01:47:49,170
negativism about this objects and this

2454
01:47:56,150 --> 01:47:53,580
is this possibility when when we sure I

2455
01:47:57,410 --> 01:47:56,160
think I'll well we'll say we we can take

2456
01:47:59,450 --> 01:47:57,420
one more call if someone would like to

2457
01:48:01,520 --> 01:47:59,460
call in that numbers up on the screen

2458
01:48:03,980 --> 01:48:01,530
eight five five four seven two five four

2459
01:48:07,790 --> 01:48:03,990
eight three so we'll take another call

2460
01:48:10,460 --> 01:48:07,800
if you'd like but what you know what

2461
01:48:13,130 --> 01:48:10,470
sparked your interest in actually taking

2462
01:48:15,200 --> 01:48:13,140
a look at UFOs and what they could be in

2463
01:48:20,030 --> 01:48:15,210

the beginning how old were you and all

2464

01:48:21,410 --> 01:48:20,040

that I was probably around 12 yeah yeah

2465

01:48:27,220 --> 01:48:21,420

and I'll tell you why

2466

01:48:31,280 --> 01:48:27,230

no I was 11 I'm sorry I had seen a

2467

01:48:35,480 --> 01:48:31,290

rocket launch and the rocket launch was

2468

01:48:39,260 --> 01:48:35,490

a rocket launch to disseminate some dye

2469

01:48:42,320 --> 01:48:39,270

in the upper atmosphere and I saw the

2470

01:48:47,060 --> 01:48:42,330

results of this in the sky and I went

2471

01:48:50,290 --> 01:48:47,070

absolutely crazy I couldn't believe it I

2472

01:48:54,650 --> 01:48:50,300

was looking at so I ended up I ended up

2473

01:48:57,320 --> 01:48:54,660

looking at this this potential thing in

2474

01:49:00,080 --> 01:48:57,330

the sky is it possible is it this is UFO

2475

01:49:02,270 --> 01:49:00,090

what am I looking at and that got me

2476

01:49:06,080 --> 01:49:02,280

so interested so excited about something

2477

01:49:09,939 --> 01:49:06,090

I didn't understand okay that I ended up

2478

01:49:12,760 --> 01:49:09,949

pursuing this and I found out it was a

2479

01:49:15,050 --> 01:49:12,770

sounding rocket releasing a particular

2480

01:49:16,879 --> 01:49:15,060

material into the upper atmosphere to

2481

01:49:18,800 --> 01:49:16,889

create false Aurora's to do studies blah

2482

01:49:20,930 --> 01:49:18,810

blah blah okay that's fine

2483

01:49:24,589 --> 01:49:20,940

not bad for age eleven but I ended up

2484

01:49:26,330 --> 01:49:24,599

being someone that ended up deciding I

2485

01:49:29,089 --> 01:49:26,340

wanted to investigate these types of

2486

01:49:30,350 --> 01:49:29,099

these types of anomalies and then I went

2487

01:49:34,879 --> 01:49:30,360

to the library because that's what you

2488

01:49:35,899 --> 01:49:34,889

did when I was 11 and I got on my little

2489

01:49:40,879 --> 01:49:35,909

bike and pushed down

2490

01:49:42,649 --> 01:49:40,889

pedal down to the library and I saw that

2491

01:49:46,100 --> 01:49:42,659

there were some advertisements for this

2492

01:49:48,229 --> 01:49:46,110

group called the Midwest UFO network Wow

2493

01:49:50,750 --> 01:49:48,239

the word UFO that's up straight out of

2494

01:49:52,850 --> 01:49:50,760

me I want to learn about that so I I

2495

01:49:56,870 --> 01:49:52,860

started reading about it and then I

2496

01:50:00,410 --> 01:49:56,880

basically asked my mommy to subscribe me

2497

01:50:04,580 --> 01:50:00,420

to this Midwest UFO network and I

2498

01:50:08,839 --> 01:50:04,590

remember the very first met letter I got

2499

01:50:11,169 --> 01:50:08,849

from what would then become MUFON it was

2500

01:50:15,320 --> 01:50:11,179

move on then but just different meaning

2501
01:50:18,649 --> 01:50:15,330
was this this this card signed by Walter

2502
01:50:21,109 --> 01:50:18,659
Andrus the guy that founded the Midwest

2503
01:50:22,970 --> 01:50:21,119
UFO network running out of his garage

2504
01:50:26,959 --> 01:50:22,980
with file cabinets and lots of paper

2505
01:50:30,560 --> 01:50:26,969
alright and that card had his name on it

2506
01:50:32,419 --> 01:50:30,570
sign name actual sign in blue pen and

2507
01:50:36,350 --> 01:50:32,429
that gray card stayed in my wallet still

2508
01:50:38,270 --> 01:50:36,360
just a few years ago okay and I had to

2509
01:50:39,620 --> 01:50:38,280
change wallets because it dropped in the

2510
01:50:41,510 --> 01:50:39,630
water and I thought I don't know I gotta

2511
01:50:44,600 --> 01:50:41,520
change walls now so I changed the wall

2512
01:50:47,270 --> 01:50:44,610
that I get to the my my ID card from

2513
01:50:50,689 --> 01:50:47,280

MUFON and they go to pull it out and the

2514

01:50:53,060 --> 01:50:50,699

images there on the plastic sheet but

2515

01:50:53,990 --> 01:50:53,070

there was no card it had long since

2516

01:50:57,709 --> 01:50:54,000

disintegrated

2517

01:51:00,410 --> 01:50:57,719

I didn't you know so I was in MUFON

2518

01:51:04,070 --> 01:51:00,420

since 1971 which is about two years

2519

01:51:06,680 --> 01:51:04,080

after it started that is so amazing and

2520

01:51:08,540 --> 01:51:06,690

do you still do a lot of the photo

2521

01:51:11,720 --> 01:51:08,550

analysis and video analysis do you have

2522

01:51:13,920 --> 01:51:11,730

time to do that I do and I get calls and

2523

01:51:17,040 --> 01:51:13,930

I have to do it every day

2524

01:51:18,510 --> 01:51:17,050

and that's certainly what I do I've got

2525

01:51:21,210 --> 01:51:18,520

some active cases now that people have

2526
01:51:24,300 --> 01:51:21,220
asked me to do and I have no problem

2527
01:51:26,910 --> 01:51:24,310
doing it um you know it's it's my first

2528
01:51:29,400 --> 01:51:26,920
love really you know I've never strayed

2529
01:51:30,780 --> 01:51:29,410
from the MUFON organization I know it

2530
01:51:32,130 --> 01:51:30,790
has its ups and downs I know others

2531
01:51:33,600 --> 01:51:32,140
pitfalls there's problems there's always

2532
01:51:36,690 --> 01:51:33,610
politics there's things there's this or

2533
01:51:38,760 --> 01:51:36,700
that you're gonna get that anywhere yeah

2534
01:51:41,550 --> 01:51:38,770
unless you're a lone wolf going at it

2535
01:51:42,870 --> 01:51:41,560
all by yourself you just accepting it

2536
01:51:45,210 --> 01:51:42,880
the good with the bad you take what you

2537
01:51:46,760 --> 01:51:45,220
need and you leave the rest that's what

2538
01:51:52,680 --> 01:51:46,770

I do

2539

01:51:55,560 --> 01:51:52,690

and have you like I remember we had this

2540

01:51:57,570 --> 01:51:55,570

conversation and I do have to tell I do

2541

01:52:00,260 --> 01:51:57,580

have to tell the listeners this if if I

2542

01:52:03,780 --> 01:52:00,270

hadn't said it before but I remember a

2543

01:52:05,850 --> 01:52:03,790

driving out to Arizona and when we've

2544

01:52:08,280 --> 01:52:05,860

met a whole bunch of times but when we

2545

01:52:11,540 --> 01:52:08,290

were out in Arizona I drove out from

2546

01:52:14,190 --> 01:52:11,550

Maine which is I'll never do again and

2547

01:52:17,280 --> 01:52:14,200

there was a picture taken out the window

2548

01:52:19,920 --> 01:52:17,290

and I said my god there's a disc in in

2549

01:52:22,320 --> 01:52:19,930

this picture and I showed it to you and

2550

01:52:24,000 --> 01:52:22,330

you looked at it for five seconds and

2551

01:52:26,370 --> 01:52:24,010

you said I think there's something on

2552

01:52:27,750 --> 01:52:26,380

the window so I went outside to my car

2553

01:52:30,990 --> 01:52:27,760

and I looked and sure enough there was a

2554

01:52:32,700 --> 01:52:31,000

little little pine needle like a little

2555

01:52:36,210 --> 01:52:32,710

piece of a pine needle on the window at

2556

01:52:38,160 --> 01:52:36,220

an angle a perfect UFO yeah but a lot of

2557

01:52:40,350 --> 01:52:38,170

stuff like that happens right yeah yeah

2558

01:52:44,250 --> 01:52:40,360

and those are the common things and and

2559

01:52:46,140 --> 01:52:44,260

and I wasn't trying to you know disable

2560

01:52:48,210 --> 01:52:46,150

your intent to go searching for the

2561

01:52:49,800 --> 01:52:48,220

truth or anything I was just trying to

2562

01:52:56,580 --> 01:52:49,810

point out quickly and efficiently

2563

01:52:58,680 --> 01:52:56,590

I was broken no I was trying to point

2564

01:53:00,840 --> 01:52:58,690

out fast you know so we can move on I

2565

01:53:02,970 --> 01:53:00,850

know that you know the questions out

2566

01:53:05,700 --> 01:53:02,980

there the questions gonna be answered if

2567

01:53:08,130 --> 01:53:05,710

not by Doug and I doing the aerial

2568

01:53:09,690 --> 01:53:08,140

anomaly system by other people working

2569

01:53:13,170 --> 01:53:09,700

on similar systems

2570

01:53:15,150 --> 01:53:13,180

I do think as we move forward we have to

2571

01:53:16,980 --> 01:53:15,160

understand that when we leave the planet

2572

01:53:19,380 --> 01:53:16,990

someday and we have to because the Sun

2573

01:53:21,300 --> 01:53:19,390

is gonna run out of hydrogen someday and

2574

01:53:24,210 --> 01:53:21,310

when it does that some days not next

2575

01:53:25,890 --> 01:53:24,220

year or ten years it's like five billion

2576

01:53:29,460 --> 01:53:25,900

years from now

2577

01:53:31,950 --> 01:53:29,470

mm-hmm so don't start packing yet but

2578

01:53:34,230 --> 01:53:31,960

when it does the sun's gonna swell into

2579

01:53:36,450 --> 01:53:34,240

a red giant and when it does that earth

2580

01:53:38,970 --> 01:53:36,460

is gonna likely get swallowed up to

2581

01:53:41,100 --> 01:53:38,980

Mercury Venus are gonna go that way

2582

01:53:43,440 --> 01:53:41,110

earth is gonna go that way we have it's

2583

01:53:46,320 --> 01:53:43,450

gonna hit our orbit even but this is

2584

01:53:48,660 --> 01:53:46,330

wonderful to end in such a happy note I

2585

01:53:51,930 --> 01:53:48,670

said five billion years buddy don't you

2586

01:53:55,110 --> 01:53:51,940

mean yeah thanks so much mark and we

2587

01:53:56,820 --> 01:53:55,120

have to run so goat talk about where

2588

01:53:58,830 --> 01:53:56,830

someone can find your book in the title

2589

01:54:00,840 --> 01:53:58,840

real quick and your website you know

2590

01:54:03,930 --> 01:54:00,850

that the book is actually called a

2591

01:54:06,690 --> 01:54:03,940

populated universe as a very attractive

2592

01:54:10,050 --> 01:54:06,700

read cover that's not a very attractive

2593

01:54:12,420 --> 01:54:10,060

picture but that looks like someone in

2594

01:54:18,510 --> 01:54:12,430

fear that's also when I was ten pounds

2595

01:54:20,820 --> 01:54:18,520

heavier too but um it's on Amazon you

2596

01:54:24,120 --> 01:54:20,830

can find that on Amazon the populated

2597

01:54:27,210 --> 01:54:24,130

universe and I've gotten a lot of people

2598

01:54:29,850 --> 01:54:27,220

who have read the book and I would like

2599

01:54:32,610 --> 01:54:29,860

to very much thank my editor Tara who

2600

01:54:36,480 --> 01:54:32,620

lives in Arizona who actually edited a

2601
01:54:39,510 --> 01:54:36,490
lot of the era's out for me I also want

2602
01:54:43,200 --> 01:54:39,520
to thank Mary Ann who is in Arizona as

2603
01:54:45,870 --> 01:54:43,210
well right yes is orchestrating the

2604
01:54:47,670 --> 01:54:45,880
build of my Observatory out there for

2605
01:54:49,530 --> 01:54:47,680
Sky Tree livestream the way I hate to

2606
01:54:52,200 --> 01:54:49,540
say it but we're out of time or I'm

2607
01:54:54,210 --> 01:54:52,210
sorry yeah thanks so much all right all

2608
01:54:56,160 --> 01:54:54,220
right everyone so that's it for the show

2609
01:54:58,410 --> 01:54:56,170
tonight thank you so much for listening

2610
01:54:59,640 --> 01:54:58,420
we'll be back next week with Randall

2611
01:55:02,010 --> 01:54:59,650
Nickerson we're going to be talking

2612
01:55:04,230 --> 01:55:02,020
about the aerial phenomenon I want to

2613
01:55:06,090 --> 01:55:04,240

thank everyone so much glad this

2614

01:55:08,070 --> 01:55:06,100

software I mean the streaming service

2615

01:55:12,450 --> 01:55:08,080

worked well and we'll see you next week

2616

01:55:15,060 --> 01:55:12,460

remember everyone to keep your eyes to

2617

01:55:16,590 --> 01:55:15,070

the sky and it hits me oh my gosh this

2618

01:55:18,149 --> 01:55:16,600

is that triangle you know there's

2619

01:55:19,830 --> 01:55:18,159

explanation for everything that occur

2620

01:55:22,679 --> 01:55:19,840

the Rendlesham forest incident it

2621

01:55:26,189 --> 01:55:22,689

involved aliens at all it was completely

2622

01:55:29,429 --> 01:55:26,199

silent it comes right over our head it's

2623

01:55:31,020 --> 01:55:29,439

so classic flying-saucer really standing

2624

01:55:32,429 --> 01:55:31,030

in the clearing he turned over to my