

Episode **559**

THE  
**SKEPTIC  
ZONE**  
PODCAST

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7 July 2019

The Skeptic Zone Podcast



*Richard Saunders and Leonard Trameil*

Episode **559** - 7 July 2019

Homeopathy putting  
people at risk -  
Interview with Michael Marshall

A tour of the  
Chabot Space & Science Center



1  
00:00:12,670 --> 00:00:09,930  
welcome to the skeptic zone the podcast

2  
00:00:14,750 --> 00:00:12,680  
from Australia for science and reason

3  
00:00:17,650 --> 00:00:14,760  
[Music]

4  
00:00:23,600 --> 00:00:17,660  
[Applause]

5  
00:00:26,370 --> 00:00:23,610  
[Music]

6  
00:00:30,180 --> 00:00:26,380  
yes it's the skeptic zone podcast

7  
00:00:32,370 --> 00:00:30,190  
episode number 559 for the 7th of july

8  
00:00:35,100 --> 00:00:32,380  
2019 richardsaunders

9  
00:00:37,530 --> 00:00:35,110  
coming to you once more from the San

10  
00:00:39,960 --> 00:00:37,540  
Francisco Bay Area although I'll be

11  
00:00:42,180 --> 00:00:39,970  
heading home very soon coming up on this

12  
00:00:45,570 --> 00:00:42,190  
week's show a bit later on a special

13  
00:00:48,660 --> 00:00:45,580

extended report live on the scene as it

14

00:00:51,720 --> 00:00:48,670

were I have a private tour of the Shabo

15

00:00:54,299 --> 00:00:51,730

space and Science Center which is in the

16

00:00:58,410 --> 00:00:54,309

Oakland Hills my friend Leonard Trammell

17

00:01:00,360 --> 00:00:58,420

is a volunteer tour guide at the center

18

00:01:01,979 --> 00:01:00,370

and I was lucky enough to get some of

19

00:01:04,910 --> 00:01:01,989

his time as he took me around and showed

20

00:01:08,700 --> 00:01:04,920

me the exhibits including the

21

00:01:12,480 --> 00:01:08,710

spectacular exhibit called luminous moon

22

00:01:15,780 --> 00:01:12,490

which is on until the 8th of September

23

00:01:18,750 --> 00:01:15,790

and this has photographs of the moon

24

00:01:21,240 --> 00:01:18,760

from the moon of the Moon at the moon

25

00:01:21,570 --> 00:01:21,250

around the moon that you have to see to

26

00:01:24,420 --> 00:01:21,580

believe

27

00:01:27,830 --> 00:01:24,430

and just glancing at the official blurb

28

00:01:31,080 --> 00:01:27,840

on the website here at Chabot space Torg

29

00:01:33,450 --> 00:01:31,090

this is our Moon as you've never seen it

30

00:01:35,310 --> 00:01:33,460

the only thing more extraordinary than

31

00:01:39,060 --> 00:01:35,320

the science we are learning about the

32

00:01:41,670 --> 00:01:39,070

moon is its incredible beauty Shabo

33

00:01:44,190 --> 00:01:41,680

stunning new photographic essay explores

34

00:01:46,590 --> 00:01:44,200

the moon's sweeping craters and once

35

00:01:48,900 --> 00:01:46,600

active volcanoes with photos by NASA

36

00:01:52,260 --> 00:01:48,910

astronauts who witnessed its beautiful

37

00:01:54,240 --> 00:01:52,270

desolation firsthand and images taken by

38

00:01:58,170 --> 00:01:54,250

a satellite that allow us to explore

39

00:02:01,000 --> 00:01:58,180

places we have not even yet visited

40

00:02:03,220 --> 00:02:01,010

yes it lives up to the hype folks and

41

00:02:06,370 --> 00:02:03,230

you'll hear more about that in the

42

00:02:08,680 --> 00:02:06,380

second half of today's skeptic zone rib

43

00:02:10,389 --> 00:02:08,690

coming up at the top of the show we have

44

00:02:14,010 --> 00:02:10,399

an interview with michael marshall from

45

00:02:17,020 --> 00:02:14,020

the good thinking society our regular

46

00:02:18,970 --> 00:02:17,030

correspondent in the UK and Marsh is

47

00:02:21,460 --> 00:02:18,980

going to tell us about a campaign by a

48

00:02:22,960 --> 00:02:21,470

good thinking about protecting people

49

00:02:27,010 --> 00:02:22,970

helping to protect people with autism

50

00:02:28,480 --> 00:02:27,020

from harmful homeopathic cures yes there

51  
00:02:30,550 --> 00:02:28,490  
are many people in the alternative

52  
00:02:33,160 --> 00:02:30,560  
medical community that think that autism

53  
00:02:35,949 --> 00:02:33,170  
is a disease that can be treated and

54  
00:02:38,170 --> 00:02:35,959  
cured Marsh will tell us more about this

55  
00:02:39,340 --> 00:02:38,180  
and the action they are taking and he's

56  
00:02:44,920 --> 00:02:39,350  
going to talk about something called

57  
00:02:48,130 --> 00:02:44,930  
cease therapy ceas ii and just quickly

58  
00:02:50,440 --> 00:02:48,140  
cease therapists claim they can cure

59  
00:02:54,580 --> 00:02:50,450  
autism based on the false belief that

60  
00:02:57,030 --> 00:02:54,590  
autism is caused by vaccines and the

61  
00:03:00,400 --> 00:02:57,040  
symptoms of autism can be cured with

62  
00:03:04,650 --> 00:03:00,410  
homeopathic treatments dangerously high

63  
00:03:07,540 --> 00:03:04,660

dose vitamin C and dietary restriction

64

00:03:09,490 --> 00:03:07,550

many c s-- therapists are aligned with

65

00:03:12,160 --> 00:03:09,500

the extremely dangerous anti-vaccination

66

00:03:14,670 --> 00:03:12,170

movement which is gaining traction in

67

00:03:18,449 --> 00:03:14,680

the UK the National Autistic Society

68

00:03:22,150 --> 00:03:18,459

have described cease therapy as

69

00:03:25,030 --> 00:03:22,160

absolutely appalling always good to talk

70

00:03:27,789 --> 00:03:25,040

to Marsh and find out what action the

71

00:03:29,199 --> 00:03:27,799

good thinking society are taking well

72

00:03:32,020 --> 00:03:29,209

that's enough for me at the moment it's

73

00:03:34,960 --> 00:03:32,030

time for me to run upstairs and today is

74

00:03:37,690 --> 00:03:34,970

definitely a blue cheese and cracker day

75

00:03:50,750 --> 00:03:37,700

well I enjoy my blue cheese and crackers

76

00:03:50,760 --> 00:04:00,270

[Music]

77

00:04:04,840 --> 00:04:02,440

joining me now all the way from

78

00:04:06,850 --> 00:04:04,850

Liverpool it's the project director at

79

00:04:09,220 --> 00:04:06,860

the good thinking society Michael

80

00:04:10,690 --> 00:04:09,230

Marshall hello Marsh hi Richard hi nice

81

00:04:12,790 --> 00:04:10,700

to be back on there on the sceptic zone

82

00:04:15,220 --> 00:04:12,800

I think it's it's been a little while

83

00:04:17,710 --> 00:04:15,230

but I'm semi-regular at this point

84

00:04:20,440 --> 00:04:17,720

absolutely over the years you certainly

85

00:04:23,800 --> 00:04:20,450

are you're always a welcome visitor to

86

00:04:26,080 --> 00:04:23,810

the skeptic zone now I've contacted you

87

00:04:28,000 --> 00:04:26,090

because some action that the good

88

00:04:30,880 --> 00:04:28,010

thinking society came to my attention

89

00:04:34,360 --> 00:04:30,890

and it's quite formal in a ways and it's

90

00:04:37,210 --> 00:04:34,370

a judicial review it involves homeopathy

91

00:04:40,180 --> 00:04:37,220

it involves autism can you wrap it up

92

00:04:42,940 --> 00:04:40,190

for us yeah so I'm sure your listeners

93

00:04:44,530 --> 00:04:42,950

will be aware of the anti-tax movement

94

00:04:46,330 --> 00:04:44,540

obviously in Australia

95

00:04:47,830 --> 00:04:46,340

skeptics all over Australia been doing

96

00:04:50,680 --> 00:04:47,840

fantastic work in countering the

97

00:04:52,570 --> 00:04:50,690

anti-vaccine what one aspect of the anti

98

00:04:54,550 --> 00:04:52,580

vex movement in the UK and also kind of

99

00:04:57,160 --> 00:04:54,560

in other parts of the world as well are

100

00:05:00,340 --> 00:04:57,170

the claims that not only does do

101  
00:05:02,470 --> 00:05:00,350  
vaccines cause autism but that the

102  
00:05:03,940 --> 00:05:02,480  
autism can be treated through a range of

103  
00:05:08,500 --> 00:05:03,950  
different treatments so things like

104  
00:05:11,440 --> 00:05:08,510  
homeopathy vitamin C intravenous vitamin

105  
00:05:13,210 --> 00:05:11,450  
C high dosage intravenous zinc things

106  
00:05:14,890 --> 00:05:13,220  
like that and so there are a group of

107  
00:05:17,350 --> 00:05:14,900  
homeopaths you practice something called

108  
00:05:21,070 --> 00:05:17,360  
ceased therapy cease therapy now that's

109  
00:05:24,280 --> 00:05:21,080  
I've I saw something about that that's C

110  
00:05:26,500 --> 00:05:24,290  
e a is e and that would stand for

111  
00:05:29,440 --> 00:05:26,510  
something I imagine it does it stands

112  
00:05:32,050 --> 00:05:29,450  
for a complete elimination of autism

113  
00:05:33,940 --> 00:05:32,060

spectrum exhibition good it is very much

114

00:05:36,040 --> 00:05:33,950

meant to be a and autism cure and it

115

00:05:38,560 --> 00:05:36,050

involves homeopathy and hide hide or C

116

00:05:40,840 --> 00:05:38,570

supplementation and some dietary

117

00:05:43,840 --> 00:05:40,850

restriction as well no evidence that it

118

00:05:45,970 --> 00:05:43,850

has any positive effect on any of the

119

00:05:47,680 --> 00:05:45,980

symptoms associated with autism it

120

00:05:50,830 --> 00:05:47,690

certainly isn't an autism cure and the

121

00:05:53,290 --> 00:05:50,840

idea that a developmental issue that

122

00:05:54,520 --> 00:05:53,300

that comes to that comes to be part of

123

00:05:56,469 --> 00:05:54,530

how people see themselves you know

124

00:05:58,260 --> 00:05:56,479

something like autism is it's not an

125

00:06:00,450 --> 00:05:58,270

injury it's a neuro

126

00:06:01,920 --> 00:06:00,460

neurodiversity the idea that newer

127

00:06:03,660 --> 00:06:01,930

diversity in that way can be cured is

128

00:06:05,730 --> 00:06:03,670

something that's obviously a very

129

00:06:07,140 --> 00:06:05,740

dangerous and misleading claim yeah I'm

130

00:06:09,240 --> 00:06:07,150

for playing yeah absolutely

131

00:06:13,470 --> 00:06:09,250

and so there are maybe something in the

132

00:06:15,330 --> 00:06:13,480

region of 60 homeopaths in the UK who

133

00:06:17,880 --> 00:06:15,340

are actually members of the Society of

134

00:06:19,950 --> 00:06:17,890

homeopaths which is the UK's a kind of

135

00:06:22,110 --> 00:06:19,960

official accredited body of homeopaths

136

00:06:22,740 --> 00:06:22,120

it's the that the body the regulator of

137

00:06:24,930 --> 00:06:22,750

homeopaths

138

00:06:26,460 --> 00:06:24,940

and certainly the organization that to

139

00:06:28,380 --> 00:06:26,470

be part of it homeopathy will sort of

140

00:06:31,380 --> 00:06:28,390

point to the fact that they are members

141

00:06:33,480 --> 00:06:31,390

of an accredited organization accredited

142

00:06:35,550 --> 00:06:33,490

regulator they'll point to that as one

143

00:06:36,990 --> 00:06:35,560

of the reasons that the public can trust

144

00:06:38,070 --> 00:06:37,000

them you know we can't we have to be

145

00:06:40,260 --> 00:06:38,080

doing things the right way because we've

146

00:06:42,240 --> 00:06:40,270

got a formal official regulator that

147

00:06:44,910 --> 00:06:42,250

makes sure we're safe and trustworthy

148

00:06:46,590 --> 00:06:44,920

and all these kinds of things and that

149

00:06:49,950 --> 00:06:46,600

society of homeopaths that regulators

150

00:06:51,630 --> 00:06:49,960

actually regulated itself under under a

151  
00:06:54,840 --> 00:06:51,640  
body in the UK called professional

152  
00:06:56,760 --> 00:06:54,850  
standards authority and the PSA is the

153  
00:06:59,490 --> 00:06:56,770  
health care the health care regulator of

154  
00:07:01,380 --> 00:06:59,500  
regulators so they will regulate doctors

155  
00:07:03,210 --> 00:07:01,390  
you know the GMC the General Medical

156  
00:07:05,340 --> 00:07:03,220  
Council the regulator of doctors roles

157  
00:07:06,990 --> 00:07:05,350  
under the year the remit of the PSA the

158  
00:07:09,090 --> 00:07:07,000  
general den of Dental Council falls

159  
00:07:12,690 --> 00:07:09,100  
under the remit of the PSA so it's the

160  
00:07:14,070 --> 00:07:12,700  
regulator of regulators and in 2014 the

161  
00:07:16,950 --> 00:07:14,080  
Society Homa class were allowed to join

162  
00:07:19,050 --> 00:07:16,960  
that scheme and become voluntary members

163  
00:07:20,760 --> 00:07:19,060

of this regulator and that means that

164

00:07:22,620 --> 00:07:20,770

members of the Society of homeopaths

165

00:07:24,600 --> 00:07:22,630

are allowed to put on their website a

166

00:07:26,220 --> 00:07:24,610

big tick like a government tick saying

167

00:07:29,160 --> 00:07:26,230

we are regulated by the government we

168

00:07:30,450 --> 00:07:29,170

are therefore safe and trustworthy and

169

00:07:32,820 --> 00:07:30,460

all those kinds of things

170

00:07:34,290 --> 00:07:32,830

yeah and yet there was a story in The

171

00:07:36,870 --> 00:07:34,300

Guardian last year and there's a follow

172

00:07:38,700 --> 00:07:36,880

up earlier in June about these

173

00:07:40,500 --> 00:07:38,710

homeopaths were practically practicing

174

00:07:42,780 --> 00:07:40,510

ceased therapy and as a result of that

175

00:07:45,660 --> 00:07:42,790

one of the things the PSA did was urge

176

00:07:48,000 --> 00:07:45,670

parents not to go to any old homeopathy

177

00:07:49,230 --> 00:07:48,010

but only or any old practitioner but to

178

00:07:51,270 --> 00:07:49,240

always look for a health care

179

00:07:53,730 --> 00:07:51,280

practitioner that is on their list of

180

00:07:55,410 --> 00:07:53,740

accredited regulators accredited members

181

00:07:56,910 --> 00:07:55,420

Jeong know that they've been sort of

182

00:07:59,460 --> 00:07:56,920

vetted and that they're regulated and

183

00:08:01,920 --> 00:07:59,470

that they are trustworthy but that list

184

00:08:03,240 --> 00:08:01,930

that the PSA have of accredited

185

00:08:05,760 --> 00:08:03,250

regulators that they were pointing

186

00:08:06,330 --> 00:08:05,770

parents to on that list of the society

187

00:08:11,549 --> 00:08:06,340

homeopaths

188

00:08:13,379 --> 00:08:11,559

those articles in the first pass for

189

00:08:16,529 --> 00:08:13,389

so we have this very strange situation

190

00:08:19,079 --> 00:08:16,539

so with all of this going on to be an

191

00:08:21,179 --> 00:08:19,089

accredited regulator every year you get

192

00:08:22,499 --> 00:08:21,189

reviewed by the PSA who do like an order

193

00:08:24,109 --> 00:08:22,509

to like an annual review to make sure

194

00:08:26,429 --> 00:08:24,119

that you're keeping up standards and

195

00:08:28,709 --> 00:08:26,439

maintaining protection of the public and

196

00:08:30,899 --> 00:08:28,719

all that kind of stuff so all of this

197

00:08:32,699 --> 00:08:30,909

went on in first of all 2017 at the end

198

00:08:35,219 --> 00:08:32,709

of their review in 2017 of the Society

199

00:08:37,170 --> 00:08:35,229

homeopaths the PSA highlighted their

200

00:08:39,929 --> 00:08:37,180

members who do cease therapy as a

201  
00:08:43,259 --> 00:08:39,939  
particular issue and a concern and they

202  
00:08:45,989 --> 00:08:43,269  
even said for example that the their

203  
00:08:48,150 --> 00:08:45,999  
members aren't allowed to tell to say on

204  
00:08:50,429 --> 00:08:48,160  
their website or to tell patients and

205  
00:08:51,600 --> 00:08:50,439  
parents that they do complete

206  
00:08:53,970 --> 00:08:51,610  
elimination of autism spectrum

207  
00:08:56,189 --> 00:08:53,980  
exhibition they can only say a cease

208  
00:08:58,230 --> 00:08:56,199  
they can't explain what cease means

209  
00:08:59,790 --> 00:08:58,240  
because if you explain the acronym you

210  
00:09:02,610 --> 00:08:59,800  
are making a claim about curing autism

211  
00:09:04,230 --> 00:09:02,620  
that the PSA we're happy to accept you

212  
00:09:05,670 --> 00:09:04,240  
weren't necessarily making if you just

213  
00:09:08,519 --> 00:09:05,680

use the acronym oh yeah that sounds like

214

00:09:11,249 --> 00:09:08,529

something from Monty Python yeah it's

215

00:09:12,749 --> 00:09:11,259

it's we can you allow to say you offer a

216

00:09:14,850 --> 00:09:12,759

treatment as long as you don't tell them

217

00:09:16,650 --> 00:09:14,860

what that treatment means is a very

218

00:09:18,960 --> 00:09:16,660

curious position to be in and I think

219

00:09:21,269 --> 00:09:18,970

even even the PSA rocks at the time that

220

00:09:22,889 --> 00:09:21,279

they didn't they weren't fully confident

221

00:09:24,869 --> 00:09:22,899

they weren't fully convinced that this

222

00:09:26,670 --> 00:09:24,879

would actually protect the public but

223

00:09:29,400 --> 00:09:26,680

they accredited them in 2017 nonetheless

224

00:09:31,170 --> 00:09:29,410

and then it came around to reviewing

225

00:09:34,049 --> 00:09:31,180

them in 2018 ahead of their 2019

226

00:09:36,809 --> 00:09:34,059

accreditation and the PSA even again

227

00:09:38,249 --> 00:09:36,819

highlighted that that Society of

228

00:09:40,650 --> 00:09:38,259

homeopathy members were offering C's

229

00:09:42,869 --> 00:09:40,660

therapy that they were making claims to

230

00:09:45,689 --> 00:09:42,879

cure autism that they were making claims

231

00:09:49,199 --> 00:09:45,699

about vaccines that directly violated or

232

00:09:50,639 --> 00:09:49,209

directly contradicted NHS guidance about

233

00:09:52,199 --> 00:09:50,649

vaccines you know the best practice

234

00:09:54,509 --> 00:09:52,209

advice which is that vaccines are safe

235

00:09:55,949 --> 00:09:54,519

yet homeopaths he was saying vaccines

236

00:09:57,600 --> 00:09:55,959

aren't safe from vaccines are toxic and

237

00:09:59,910 --> 00:09:57,610

all this kind of stuff and even though

238

00:10:03,720 --> 00:09:59,920

the PSA highlighted these concerns and

239

00:10:06,210 --> 00:10:03,730

highlighted that that these C's therapy

240

00:10:07,530 --> 00:10:06,220

practitioners are harming the presenting

241

00:10:09,869 --> 00:10:07,540

a risk of harm to the public and

242

00:10:12,030 --> 00:10:09,879

specifically a risk of harm to autistic

243

00:10:13,319 --> 00:10:12,040

children within the public they decided

244

00:10:14,970 --> 00:10:13,329

to give them that rubber stamp all the

245

00:10:16,379 --> 00:10:14,980

same and they went ahead and they give

246

00:10:17,730 --> 00:10:16,389

them really credit ation which means the

247

00:10:19,799 --> 00:10:17,740

society home the offer members can carry

248

00:10:21,329 --> 00:10:19,809

on using that government stamp of

249

00:10:24,030 --> 00:10:21,339

authority and stamp of approval on their

250

00:10:24,780 --> 00:10:24,040

website it's it's quite staggering to me

251  
00:10:26,250 --> 00:10:24,790  
and and

252  
00:10:28,200 --> 00:10:26,260  
something we've I think we've discussed

253  
00:10:31,200 --> 00:10:28,210  
before that a lot of the people involved

254  
00:10:33,360 --> 00:10:31,210  
in the homeopathic industry are sincere

255  
00:10:35,460 --> 00:10:33,370  
and firm believers in not only

256  
00:10:37,890 --> 00:10:35,470  
homeopathy but they would certainly be

257  
00:10:40,860 --> 00:10:37,900  
sincere and firm believers that autism

258  
00:10:43,980 --> 00:10:40,870  
is caused by vaccinations yeah I I

259  
00:10:45,630 --> 00:10:43,990  
absolutely agree with you that I don't

260  
00:10:47,850 --> 00:10:45,640  
think and I've spoken to many many

261  
00:10:49,050 --> 00:10:47,860  
homeopaths I don't think I've spoken to

262  
00:10:50,310 --> 00:10:49,060  
homeopathy who I didn't think was

263  
00:10:52,340 --> 00:10:50,320

completely sincere in what they're doing

264

00:10:54,990 --> 00:10:52,350

and the problem is what they're doing is

265

00:10:56,910 --> 00:10:55,000

incorrect and that's presenting it is

266

00:10:58,860 --> 00:10:56,920

presenting a risk because they genuinely

267

00:11:00,450 --> 00:10:58,870

believe in the in the stuff that happens

268

00:11:02,670 --> 00:11:00,460

to be incorrect and aren't following the

269

00:11:04,320 --> 00:11:02,680

evidence unfortunately so because this

270

00:11:06,990 --> 00:11:04,330

government body gives them that rubber

271

00:11:09,180 --> 00:11:07,000

stamp of authority again we decided will

272

00:11:10,590 --> 00:11:09,190

we looked at that that decision and we

273

00:11:12,450 --> 00:11:10,600

thought in our opinion that decision

274

00:11:14,910 --> 00:11:12,460

looks to be unlawful because if you're

275

00:11:17,370 --> 00:11:14,920

going to be a government body whose main

276

00:11:19,200 --> 00:11:17,380

remit is protecting the public making

277

00:11:20,400 --> 00:11:19,210

sure that practitioners of various

278

00:11:22,440 --> 00:11:20,410

health care including conventional

279

00:11:24,810 --> 00:11:22,450

health care and making sure that what

280

00:11:26,430 --> 00:11:24,820

they're doing is is trustworthy that

281

00:11:28,290 --> 00:11:26,440

it's safe that it's on the that it's

282

00:11:30,360 --> 00:11:28,300

looking out for people's best interests

283

00:11:31,890 --> 00:11:30,370

in terms of health if that's your remit

284

00:11:34,800 --> 00:11:31,900

which it is the remit of the PSE it

285

00:11:37,050 --> 00:11:34,810

seems contradictory to that remit to

286

00:11:39,090 --> 00:11:37,060

then a creditor body that you recognize

287

00:11:40,830 --> 00:11:39,100

is posing a potential risk and

288

00:11:43,650 --> 00:11:40,840

specifically a pet potential risk to

289

00:11:45,030 --> 00:11:43,660

disabled people and autistic people yeah

290

00:11:47,040 --> 00:11:45,040

it makes about as much sense as

291

00:11:50,160 --> 00:11:47,050

homeopathy in general I think yeah

292

00:11:53,280 --> 00:11:50,170

exactly so because this was a decision

293

00:11:56,460 --> 00:11:53,290

made by a government body it is subject

294

00:11:58,860 --> 00:11:56,470

to being challenged yeah if if you if

295

00:12:00,150 --> 00:11:58,870

you are able to get together a legal

296

00:12:01,950 --> 00:12:00,160

case to do that you can challenge this

297

00:12:03,690 --> 00:12:01,960

decision so we actually filed our legal

298

00:12:05,550 --> 00:12:03,700

cases judicial review is the name of the

299

00:12:07,620 --> 00:12:05,560

type of legal challenge that you would

300

00:12:09,420 --> 00:12:07,630

make to a decision UK made by a

301

00:12:12,420 --> 00:12:09,430

government body and so we filed that

302

00:12:14,520 --> 00:12:12,430

judicial review on Friday the 28th so a

303

00:12:16,680 --> 00:12:14,530

couple of days ago as of recording this

304

00:12:19,170 --> 00:12:16,690

and what we're trying to do is point out

305

00:12:21,000 --> 00:12:19,180

that this decision by the PSA in our

306

00:12:22,440 --> 00:12:21,010

opinion is unlawful and we've made laid

307

00:12:25,440 --> 00:12:22,450

out our case as to why we believe that's

308

00:12:28,020 --> 00:12:25,450

unlawful and if the court grants

309

00:12:31,020 --> 00:12:28,030

permission for this to go ahead we can

310

00:12:34,800 --> 00:12:31,030

have this have this essentially out in

311

00:12:36,480 --> 00:12:34,810

court and as a result the gtps a may

312

00:12:38,519 --> 00:12:36,490

have to go back and remake that decision

313

00:12:40,590 --> 00:12:38,529

with - while taking a

314

00:12:42,179 --> 00:12:40,600

a close look at protecting the public in

315

00:12:44,280 --> 00:12:42,189

the areas that we've highlighted are

316

00:12:48,210 --> 00:12:44,290

particularly concerned and so what we're

317

00:12:50,189 --> 00:12:48,220

hoping is the PSA either recognize that

318

00:12:52,110 --> 00:12:50,199

the decision they made is unlawful we

319

00:12:53,429 --> 00:12:52,120

think it's unlawful we think a

320

00:12:55,139 --> 00:12:53,439

reasonable argument for that we're

321

00:12:56,759 --> 00:12:55,149

hoping the PSA recognize that and

322

00:12:58,230 --> 00:12:56,769

reverse that decision can go back to the

323

00:12:59,819 --> 00:12:58,240

drawing board and say we're going to now

324

00:13:01,079 --> 00:12:59,829

take another look at that accreditation

325

00:13:03,929 --> 00:13:01,089

and see where the saying we should have

326

00:13:05,549 --> 00:13:03,939

done differently and if not then it'll

327

00:13:07,230 --> 00:13:05,559

end up in court and we're hoping that a

328

00:13:09,569 --> 00:13:07,240

court will make that decision so we're

329

00:13:11,340 --> 00:13:09,579

hoping at the end of this there we will

330

00:13:14,400 --> 00:13:11,350

be in a position where people who have

331

00:13:18,629 --> 00:13:14,410

autism are not being subjected to these

332

00:13:21,299 --> 00:13:18,639

these unproven harmful treatments with

333

00:13:24,569 --> 00:13:21,309

the tacit endorsement or a certain leave

334

00:13:26,850 --> 00:13:24,579

you're the the authority and kite mark

335

00:13:29,220 --> 00:13:26,860

of the government's official health care

336

00:13:30,509 --> 00:13:29,230

regulator in doing so that it's that if

337

00:13:32,429 --> 00:13:30,519

they're going to do this and we're going

338

00:13:34,079 --> 00:13:32,439

to try to try and demonstrate why they

339

00:13:35,759 --> 00:13:34,089

why these honkers should not be doing

340

00:13:37,319 --> 00:13:35,769

these therapies they absolutely should

341

00:13:39,269 --> 00:13:37,329

not be doing them with the government on

342

00:13:41,519 --> 00:13:39,279

they're effectively on their side in

343

00:13:43,740 --> 00:13:41,529

terms of how it looks yeah absolutely

344

00:13:46,650 --> 00:13:43,750

now the good thinking Society is known

345

00:13:48,329 --> 00:13:46,660

for this sort of being on the front foot

346

00:13:50,249 --> 00:13:48,339

so to speak taking action

347

00:13:52,740 --> 00:13:50,259

how can people how can our listeners

348

00:13:54,780 --> 00:13:52,750

help your cause well there's two things

349

00:13:56,340 --> 00:13:54,790

that listeners can really do the first

350

00:13:59,400 --> 00:13:56,350

thing is unfortunately a judicial review

351

00:14:01,710 --> 00:13:59,410

is quite an expensive procedure it's

352

00:14:03,749 --> 00:14:01,720

incredibly in it's incredibly in-depth

353

00:14:05,309 --> 00:14:03,759

we have to have expert lawyers who are

354

00:14:07,590 --> 00:14:05,319

experts in this area and we work with an

355

00:14:09,420 --> 00:14:07,600

excellent law firm who we've worked with

356

00:14:11,100 --> 00:14:09,430

for many many years who've done a huge

357

00:14:14,160 --> 00:14:11,110

amount of excellent skeptical work with

358

00:14:16,470 --> 00:14:14,170

us and and are very very on the on the

359

00:14:19,470 --> 00:14:16,480

side of good in that area but they also

360

00:14:20,939 --> 00:14:19,480

have to turn they say this into into

361

00:14:24,059 --> 00:14:20,949

paid work otherwise they can't be doing

362

00:14:25,019 --> 00:14:24,069

a skeptical work full time so because

363

00:14:27,299 --> 00:14:25,029

this is quite expensive we've actually

364

00:14:28,559 --> 00:14:27,309

launched a crowdfunding campaign where

365

00:14:29,850 --> 00:14:28,569

we're saying to people if you believe in

366

00:14:31,259 --> 00:14:29,860

this work if you think this is a real

367

00:14:34,290 --> 00:14:31,269

good thing for us to do if you think

368

00:14:35,970 --> 00:14:34,300

this will help protect autistic people

369

00:14:37,889 --> 00:14:35,980

from these types of pseudo therapies and

370

00:14:39,679 --> 00:14:37,899

certainly from having the these given

371

00:14:43,439 --> 00:14:39,689

these pseudo therapies the veneer of

372

00:14:45,629 --> 00:14:43,449

government or sment you can help fund

373

00:14:47,369 --> 00:14:45,639

our legal fees we want to try and raise

374

00:14:50,299 --> 00:14:47,379

up to 36 thousand pounds we think that's

375

00:14:52,260 --> 00:14:50,309

what the legal fees should cost at most

376

00:14:54,450 --> 00:14:52,270

we just anything

377

00:14:56,010 --> 00:14:54,460

people who do to help us meet at least

378

00:14:59,130 --> 00:14:56,020

some of that would be hugely hugely

379

00:15:01,260 --> 00:14:59,140

appreciated and we have a sight upon on

380

00:15:01,770 --> 00:15:01,270

crowd justice comm where people can do

381

00:15:03,540 --> 00:15:01,780

that

382

00:15:05,100 --> 00:15:03,550

and the other side of it is you can put

383

00:15:07,500 --> 00:15:05,110

the money in and help us if you could if

384

00:15:09,030 --> 00:15:07,510

you also want to if you can't do that or

385

00:15:10,410 --> 00:15:09,040

if you want to do as well you can spread

386

00:15:11,850 --> 00:15:10,420

this information as far as possible you

387

00:15:14,070 --> 00:15:11,860

can tell people about this you can post

388

00:15:16,170 --> 00:15:14,080

it to social media and you can highlight

389

00:15:17,910 --> 00:15:16,180

this issue because the more attention we

390

00:15:19,440 --> 00:15:17,920

can draw to this crowd funder the more

391

00:15:21,450 --> 00:15:19,450

attention we can draw to this legal

392

00:15:23,670 --> 00:15:21,460

challenge the more likely we are of

393

00:15:26,070 --> 00:15:23,680

being able to meet some of our legal

394

00:15:28,740 --> 00:15:26,080

costs and also the more likely we are

395

00:15:30,330 --> 00:15:28,750

being demonstrate to people that they

396

00:15:32,520 --> 00:15:30,340

ceased therapy starts being promoted by

397

00:15:34,650 --> 00:15:32,530

people in lots different areas is not

398

00:15:36,600 --> 00:15:34,660

effective so the the other side of this

399

00:15:38,400 --> 00:15:36,610

really is that we're hoping this case

400

00:15:40,620 --> 00:15:38,410

will shed light on the fact that ceased

401  
00:15:43,080 --> 00:15:40,630  
therapy is out there so that parents you

402  
00:15:45,090 --> 00:15:43,090  
do have autistic children who might come

403  
00:15:46,920 --> 00:15:45,100  
across this therapy they might also come

404  
00:15:48,990 --> 00:15:46,930  
across our story and recognize and

405  
00:15:50,940 --> 00:15:49,000  
actually there's some genuine harms and

406  
00:15:52,920 --> 00:15:50,950  
risks of harms going on here so if you

407  
00:15:55,140 --> 00:15:52,930  
can share this story far and wide and if

408  
00:15:56,640 --> 00:15:55,150  
you can and you think it's worth it's

409  
00:15:58,830 --> 00:15:56,650  
worth us doing this if you can got the

410  
00:16:00,930 --> 00:15:58,840  
crowd fund and put even a little bit of

411  
00:16:02,820 --> 00:16:00,940  
money in there the more people who do

412  
00:16:05,850 --> 00:16:02,830  
that the better we'll all be and we can

413  
00:16:07,950 --> 00:16:05,860

really make this a success we hope yes

414

00:16:10,380 --> 00:16:07,960

folks there will be a link directly to

415

00:16:12,960 --> 00:16:10,390

the page in question where you can help

416

00:16:14,580 --> 00:16:12,970

help out chip in with the the

417

00:16:16,860 --> 00:16:14,590

crowdfunding there and it's the case

418

00:16:18,780 --> 00:16:16,870

Michael Marshall of cease therapy should

419

00:16:21,150 --> 00:16:18,790

cease I think you could say it

420

00:16:23,460 --> 00:16:21,160

absolutely is absolutely air correct

421

00:16:25,050 --> 00:16:23,470

Richard absolutely oh it took me a long

422

00:16:28,350 --> 00:16:25,060

time to come up with that one now before

423

00:16:31,860 --> 00:16:28,360

we before we go I've just today as it

424

00:16:33,780 --> 00:16:31,870

happens I was being very healthy also on

425

00:16:36,030 --> 00:16:33,790

the treadmill listening to one of my

426  
00:16:38,220 --> 00:16:36,040  
favorite podcasts be reasonable in the

427  
00:16:39,930 --> 00:16:38,230  
latest episode is it about homeopathy

428  
00:16:42,720 --> 00:16:39,940  
you interviewer homeopathy which is

429  
00:16:45,060 --> 00:16:42,730  
deeply fascinating folks it was a good

430  
00:16:47,100 --> 00:16:45,070  
timing in a way Marsh that that stories

431  
00:16:48,450 --> 00:16:47,110  
come out now yeah it was a surprise

432  
00:16:50,940 --> 00:16:48,460  
actually because I actually recorded

433  
00:16:52,770 --> 00:16:50,950  
this interview a couple of months ago

434  
00:16:54,480 --> 00:16:52,780  
and for listeners who aren't aware of

435  
00:16:56,520 --> 00:16:54,490  
what be reasonable is I interview

436  
00:16:58,530 --> 00:16:56,530  
someone that I disagree with but instead

437  
00:17:00,210 --> 00:16:58,540  
of being antagonistic instead of being

438  
00:17:02,160 --> 00:17:00,220

aggressive instead of trying to win the

439

00:17:04,590 --> 00:17:02,170

conversation and win the debate I try to

440

00:17:05,700 --> 00:17:04,600

have a civil discussion and try to

441

00:17:07,020 --> 00:17:05,710

genuinely understand

442

00:17:09,180 --> 00:17:07,030

the other side's point of view I think

443

00:17:10,860 --> 00:17:09,190

that's a valuable thing to do because it

444

00:17:12,420 --> 00:17:10,870

means we've heard the arguments that are

445

00:17:13,830 --> 00:17:12,430

being used to persuade the people we

446

00:17:15,180 --> 00:17:13,840

disagree with and once you've heard

447

00:17:17,100 --> 00:17:15,190

those arguments we could be much much

448

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

better at counteracting them so it's the

449

00:17:21,000 --> 00:17:19,120

kind of show that you listen to and I'm

450

00:17:22,350 --> 00:17:21,010

not gonna tell anyone that they're

451  
00:17:23,520 --> 00:17:22,360  
completely wrong about things I'm not

452  
00:17:25,680 --> 00:17:23,530  
going to go for the jugular I'm just

453  
00:17:27,300 --> 00:17:25,690  
going to try and introduce sense checks

454  
00:17:29,640 --> 00:17:27,310  
and try and get as much information as

455  
00:17:31,650 --> 00:17:29,650  
possible and the the show that's out

456  
00:17:33,990 --> 00:17:31,660  
that was out at the end of June was with

457  
00:17:36,390 --> 00:17:34,000  
Kate Burch who is a HomePath who

458  
00:17:37,770 --> 00:17:36,400  
actually practices ceased therapy and so

459  
00:17:40,260 --> 00:17:37,780  
the story that was published in The

460  
00:17:42,360 --> 00:17:40,270  
Guardian that started June one of the

461  
00:17:44,100 --> 00:17:42,370  
the homeopaths they talked about as

462  
00:17:46,050 --> 00:17:44,110  
practicing ceased therapy was kay perch

463  
00:17:47,760 --> 00:17:46,060

so it was really surprising to me to see

464

00:17:48,900 --> 00:17:47,770

that this interview that I did in sort

465

00:17:50,940 --> 00:17:48,910

of February or March kind of time

466

00:17:52,020 --> 00:17:50,950

certainly had a relevance to not just

467

00:17:54,060 --> 00:17:52,030

what was in the media at the time but

468

00:17:55,500 --> 00:17:54,070

then the the legal case that we will

469

00:17:57,570 --> 00:17:55,510

we've been working on in the subsequent

470

00:17:58,560 --> 00:17:57,580

months so it all sort of came back

471

00:18:01,260 --> 00:17:58,570

together so if you want to hear

472

00:18:02,970 --> 00:18:01,270

firsthand what what a homeopath you who

473

00:18:04,380 --> 00:18:02,980

promotes cease therapy who also believes

474

00:18:06,000 --> 00:18:04,390

that homeopathy can be used to treat

475

00:18:08,250 --> 00:18:06,010

AIDS and many many other things as well

476

00:18:10,740 --> 00:18:08,260

if you want to hear firsthand what they

477

00:18:12,420 --> 00:18:10,750

say and how they explain their position

478

00:18:14,130 --> 00:18:12,430

how they justify to themselves in to

479

00:18:15,540 --> 00:18:14,140

their patients that position you can

480

00:18:17,220 --> 00:18:15,550

check out the latest episode of be

481

00:18:19,350 --> 00:18:17,230

reasonable and you can hear it straight

482

00:18:21,600 --> 00:18:19,360

from the homie cat's mouth straight from

483

00:18:23,670 --> 00:18:21,610

the homeopaths mouth again a link will

484

00:18:25,950 --> 00:18:23,680

be in this week's show notes and I'll

485

00:18:29,520 --> 00:18:25,960

probably press you mosh to send me a new

486

00:18:30,660 --> 00:18:29,530

little audio promo for be reasonable

487

00:18:34,170 --> 00:18:30,670

it's certainly one of the most

488

00:18:36,510 --> 00:18:34,180

fascinating skeptical podcasts out there

489

00:18:39,000 --> 00:18:36,520

well Michael Marshall thanks again for

490

00:18:40,230 --> 00:18:39,010

your time and thanks for taking this

491

00:18:42,540 --> 00:18:40,240

sort of action I think it's very

492

00:18:44,280 --> 00:18:42,550

important and people can follow the

493

00:18:46,290 --> 00:18:44,290

links and help you out but for now

494

00:18:47,850 --> 00:18:46,300

Michael Marshall from Liverpool thank

495

00:18:49,410 --> 00:18:47,860

you very much thanks you meet Richard

496

00:18:50,580 --> 00:18:49,420

and also thanks to all the skeptics or

497

00:18:52,230 --> 00:18:50,590

listeners who've been listening to your

498

00:18:52,740 --> 00:18:52,240

show for so long it's a really great

499

00:18:54,150 --> 00:18:52,750

show

500

00:18:55,380 --> 00:18:54,160

a really great for an important thing

501  
00:18:56,880 --> 00:18:55,390  
that's happening in the in the skeptical

502  
00:18:58,900 --> 00:18:56,890  
movement so yeah thanks to all the

503  
00:19:10,650 --> 00:18:58,910  
listeners as well

504  
00:19:15,400 --> 00:19:13,150  
be reasonable is the interview show from

505  
00:19:16,660 --> 00:19:15,410  
the Merseyside skeptic society where

506  
00:19:18,880 --> 00:19:16,670  
each month I speak to someone about

507  
00:19:21,280 --> 00:19:18,890  
their fringe beliefs of the Earth's have

508  
00:19:23,290 --> 00:19:21,290  
spoken to psychics UFO believers moon

509  
00:19:25,180 --> 00:19:23,300  
landing and ayahs flat earthers Hollow

510  
00:19:27,010 --> 00:19:25,190  
Earth as an all manner of unusual

511  
00:19:28,810 --> 00:19:27,020  
conspiracy theorists but I've also

512  
00:19:31,180 --> 00:19:28,820  
talked to aids denialists white

513  
00:19:32,680 --> 00:19:31,190

supremacists gay conversion therapies

514

00:19:34,570 --> 00:19:32,690

I even interviewed Jim Humble the

515

00:19:36,160 --> 00:19:34,580

inventor of miracle mineral supplement a

516

00:19:37,840 --> 00:19:36,170

form of industrial police that he and

517

00:19:40,630 --> 00:19:37,850

his followers used to treat cancer and

518

00:19:42,760 --> 00:19:40,640

HIV this isn't a debate show my aim

519

00:19:45,070 --> 00:19:42,770

isn't to win an argument but when we

520

00:19:47,230 --> 00:19:45,080

listen to how people promote and justify

521

00:19:49,240 --> 00:19:47,240

the ideas that we disagree with even the

522

00:19:50,950 --> 00:19:49,250

dangerous ones I think you become much

523

00:19:52,780 --> 00:19:50,960

more effective at countering those ideas

524

00:19:54,820 --> 00:19:52,790

if that sounds like something you'd be

525

00:19:56,830 --> 00:19:54,830

interested in look for be reasonable on

526  
00:19:57,710 --> 00:19:56,840  
Apple podcasts and everywhere else the

527  
00:20:16,310 --> 00:19:57,720  
podcast

528  
00:20:19,610 --> 00:20:16,320  
[Music]

529  
00:20:21,920 --> 00:20:19,620  
jabo space and Science Center is a

530  
00:20:25,010 --> 00:20:21,930  
non-profit institution and community

531  
00:20:27,710 --> 00:20:25,020  
resource located on thirteen trail laced

532  
00:20:28,370 --> 00:20:27,720  
acres in Redwood Regional Park in

533  
00:20:31,610 --> 00:20:28,380  
Oakland

534  
00:20:33,100 --> 00:20:31,620  
amid the largest stand of coastal

535  
00:20:36,770 --> 00:20:33,110  
redwoods in the East Bay

536  
00:20:39,830 --> 00:20:36,780  
Chabot features a 241 seat full dome

537  
00:20:43,160 --> 00:20:39,840  
planetarium interactive and hands-on

538  
00:20:45,950 --> 00:20:43,170

exhibits space artifacts a giant screen

539

00:20:48,260 --> 00:20:45,960

theater a Challenger Learning Center and

540

00:20:50,600 --> 00:20:48,270

the early research level telescopes

541

00:20:53,690 --> 00:20:50,610

regularly available to the public for

542

00:20:56,840 --> 00:20:53,700

weekly live viewing in the western

543

00:20:59,120 --> 00:20:56,850

United States shahboz mission is to

544

00:21:05,900 --> 00:20:59,130

inspire and educate learners of all ages

545

00:21:07,460 --> 00:21:05,910

about the universe and planet Earth it

546

00:21:10,580 --> 00:21:07,470

was my great pleasure to visit the

547

00:21:13,700 --> 00:21:10,590

center in June 2019 and have a personal

548

00:21:25,880 --> 00:21:13,710

tour by my friend Leonard Trammell who

549

00:21:28,940 --> 00:21:25,890

volunteers at the center surrounded by

550

00:21:31,050 --> 00:21:28,950

this beautiful forest countryside that

551

00:21:35,040 --> 00:21:31,060

sits in the middle of a

552

00:21:36,630 --> 00:21:35,050

I can tell that can tell and you look

553

00:21:39,360 --> 00:21:36,640

the part you're all decked out in your

554

00:21:41,370 --> 00:21:39,370

volunteer shirt with your space and

555

00:21:43,050 --> 00:21:41,380

science and a hat on looks alright it

556

00:21:45,120 --> 00:21:43,060

looks great I'm official

557

00:21:47,940 --> 00:21:45,130

you are official good to see you again

558

00:21:50,190 --> 00:21:47,950

yes and I can't wait to have a look at

559

00:21:52,280 --> 00:21:50,200

the exhibition and the rest of the

560

00:21:58,660 --> 00:21:52,290

center oh absolutely

561

00:22:02,570 --> 00:21:58,670

[Music]

562

00:22:05,690 --> 00:22:02,580

now we've walked inside here and we are

563

00:22:07,820 --> 00:22:05,700

presented with a giant I guess it's like

564

00:22:10,580 --> 00:22:07,830

an inflatable ball isn't it yeah of the

565

00:22:12,800 --> 00:22:10,590

moon and you're just telling me that

566

00:22:15,590 --> 00:22:12,810

it's as it's sitting here above this

567

00:22:18,980 --> 00:22:15,600

it's upside down to your eye right and

568

00:22:23,570 --> 00:22:18,990

it should be right side up to yours yeah

569

00:22:26,750 --> 00:22:23,580

I'm trying to yes yes I I'm trying to

570

00:22:29,810 --> 00:22:26,760

recognize it because it's a bit it's a

571

00:22:32,930 --> 00:22:29,820

bit disconcerting because it's the whole

572

00:22:34,640 --> 00:22:32,940

moon and I'm trying to find the the near

573

00:22:37,070 --> 00:22:34,650

side that this decided the places us

574

00:22:40,060 --> 00:22:37,080

yeah yeah this is the new science video

575

00:22:42,440 --> 00:22:40,070

because I think I recognized that

576  
00:22:43,820 --> 00:22:42,450  
particular crater over there although I

577  
00:22:46,640 --> 00:22:43,830  
could be kidding myself

578  
00:22:48,920 --> 00:22:46,650  
that's fascinating we can walk right

579  
00:22:54,080 --> 00:22:48,930  
around it so I'm walking around the moon

580  
00:22:56,510 --> 00:22:54,090  
now it's about oh it's about three

581  
00:23:00,440 --> 00:22:56,520  
meters off the ground it's about two

582  
00:23:02,780 --> 00:23:00,450  
meters in diameter well we come around

583  
00:23:05,990 --> 00:23:02,790  
to the far side of the Moon here which

584  
00:23:09,030 --> 00:23:06,000  
is sometimes called the dark side which

585  
00:23:10,890 --> 00:23:09,040  
isn't really the dark side

586  
00:23:14,280 --> 00:23:10,900  
and that's quite a different viewers

587  
00:23:17,760 --> 00:23:14,290  
nodes it's a lot less patchy in a way

588  
00:23:19,890 --> 00:23:17,770

yeah the most ironic thing about the

589

00:23:22,740 --> 00:23:19,900

Dark Side of the Moon is it's actually

590

00:23:24,480 --> 00:23:22,750

much lighter yeah it is and I don't

591

00:23:27,030 --> 00:23:24,490

think I've ever seen it seen something

592

00:23:30,080 --> 00:23:27,040

like this now let's look at the the pole

593

00:23:33,410 --> 00:23:30,090

here and this is the North Pole

594

00:23:36,600 --> 00:23:33,420

okay we're directly under the North Pole

595

00:23:39,090 --> 00:23:36,610

wow that's fascinating so that's been

596

00:23:42,030 --> 00:23:39,100

some fantastic images in the exhibit

597

00:23:43,470 --> 00:23:42,040

upstairs of the north and south poles of

598

00:23:45,900 --> 00:23:43,480

the Moon and this has been stitched

599

00:23:50,910 --> 00:23:45,910

together with thousands of photographs I

600

00:23:54,800 --> 00:23:50,920

imagine it looks I want one have you

601  
00:23:57,410 --> 00:23:54,810  
ever seen a moon pebble no

602  
00:23:59,930 --> 00:23:57,420  
I'm walking over to a little display

603  
00:24:04,310 --> 00:23:59,940  
here that's a part of the moon it's a

604  
00:24:07,010 --> 00:24:04,320  
lunar sample returned by Apollo 16 and

605  
00:24:08,090 --> 00:24:07,020  
look and it's not very big of course

606  
00:24:10,160 --> 00:24:08,100  
it's you know it's less than a

607  
00:24:12,350 --> 00:24:10,170  
centimeter that's all right a centimeter

608  
00:24:13,760 --> 00:24:12,360  
but it's a part of the moon and right

609  
00:24:19,280 --> 00:24:13,770  
there in front of us

610  
00:24:22,850 --> 00:24:19,290  
wow it's pretty that looks great well

611  
00:24:26,600 --> 00:24:22,860  
this is fun yeah around here it's

612  
00:24:30,220 --> 00:24:26,610  
getting very dark oh so this is a model

613  
00:24:34,850 --> 00:24:30,230

of a 50 by 50 by 50 Lightyear cube

614

00:24:37,040 --> 00:24:34,860

centered on the Sun and shows 200 or so

615

00:24:40,850 --> 00:24:37,050

of the closest stars

616

00:24:44,420 --> 00:24:40,860

this is absolutely gobsmacked invokes

617

00:24:47,450 --> 00:24:44,430

it's a giant cube with little points of

618

00:24:52,340 --> 00:24:47,460

light dotted through it to represent our

619

00:24:54,500 --> 00:24:52,350

galactic neighborhood right and I can

620

00:24:58,850 --> 00:24:54,510

just move from side to side up and down

621

00:25:01,760 --> 00:24:58,860

and I can see how the stars situated

622

00:25:05,120 --> 00:25:01,770

with respect to each other what a great

623

00:25:09,560 --> 00:25:05,130

idea that weren't dark you'd see that

624

00:25:10,820 --> 00:25:09,570

it's made of fiber-optic oh it's shining

625

00:25:12,530 --> 00:25:10,830

a little light we can see that although

626

00:25:14,150 --> 00:25:12,540

the fiber-optic so you take that away

627

00:25:17,870 --> 00:25:14,160

and you just see the little points of

628

00:25:19,520 --> 00:25:17,880

light that is what what a wonderful idea

629

00:25:22,370 --> 00:25:19,530

and I think that would work if it was

630

00:25:25,220 --> 00:25:22,380

four or five six times as big so the

631

00:25:28,400 --> 00:25:25,230

first one of these that I saw was at the

632

00:25:31,940 --> 00:25:28,410

McLaughlin planetarium in Toronto at the

633

00:25:33,440 --> 00:25:31,950

Royal Ontario Museum and that one is

634

00:25:35,840 --> 00:25:33,450

large enough that you can actually walk

635

00:25:38,790 --> 00:25:35,850

through it

636

00:25:40,890 --> 00:25:38,800

it I think this is a terrific idea

637

00:25:43,380 --> 00:25:40,900

because it really gives especially

638

00:25:45,960 --> 00:25:43,390

children yeah the concept in their head

639

00:25:48,180 --> 00:25:45,970

you have the three-dimensional nature's

640

00:25:51,540 --> 00:25:48,190

base so there's the sun in the middle

641

00:25:54,000 --> 00:25:51,550

there we are yep and this is our closest

642

00:25:57,360 --> 00:25:54,010

neighbor and it's a triple star system

643

00:25:59,130 --> 00:25:57,370

as you can see yeah and most people

644

00:26:03,000 --> 00:25:59,140

don't know this but the second closest

645

00:26:05,130 --> 00:26:03,010

star system to the earth is a red dwarf

646

00:26:08,810 --> 00:26:05,140

too faint to be seen with the naked eye

647

00:26:12,840 --> 00:26:08,820

really and that's that one oh yes yes

648

00:26:15,420 --> 00:26:12,850

yeah and it's actually brighter here

649

00:26:18,710 --> 00:26:15,430

than it would be in in actually so this

650

00:26:21,360 --> 00:26:18,720

is 50 by 50 by 50 light yet right Wow

651  
00:26:23,070 --> 00:26:21,370  
line snapping absolutely brilliant and

652  
00:26:25,740 --> 00:26:23,080  
in there is the brightest star in the

653  
00:26:27,420 --> 00:26:25,750  
night sky Sirius yeah it's it's gorgeous

654  
00:26:31,290 --> 00:26:27,430  
that's gorgeous that what a great idea

655  
00:26:33,840 --> 00:26:31,300  
folks I it's it's just hard to relay

656  
00:26:36,620 --> 00:26:33,850  
what what a fantastic thing that is to

657  
00:26:41,580 --> 00:26:36,630  
give people the concept of

658  
00:26:44,070 --> 00:26:41,590  
three-dimensional space ooh hello we've

659  
00:26:47,820 --> 00:26:44,080  
got a gravity well let me pick up a few

660  
00:26:49,500 --> 00:26:47,830  
planets here and it's like those things

661  
00:26:51,000 --> 00:26:49,510  
you see in some shopping centers where

662  
00:27:02,220 --> 00:26:51,010  
you put a coin in and they right roll

663  
00:27:06,880 --> 00:27:05,350

little spheres representing little

664

00:27:15,550 --> 00:27:06,890

Marvel type things representing planet

665

00:27:17,080 --> 00:27:15,560

Oh God

666

00:27:20,770 --> 00:27:17,090

fortunately that doesn't happen in

667

00:27:28,440 --> 00:27:20,780

actual solar systems the orbits go decay

668

00:27:33,700 --> 00:27:28,450

and fall into the Sun is this real yes

669

00:27:38,920 --> 00:27:33,710

ccccp it's a it says sawyers an actual

670

00:27:40,420 --> 00:27:38,930

Soyuz descent module good heavens it's

671

00:27:43,480 --> 00:27:40,430

smaller than you think

672

00:27:46,240 --> 00:27:43,490

in real life you just let me climb up

673

00:27:49,690 --> 00:27:46,250

this little viewing platform we can look

674

00:27:52,600 --> 00:27:49,700

through the window here if it's three oh

675

00:27:54,790 --> 00:27:52,610

it does too so you go in there with two

676  
00:27:58,870 --> 00:27:54,800  
of you are literally closest to here

677  
00:28:00,910 --> 00:27:58,880  
friends and from what I've read it's a

678  
00:28:03,310 --> 00:28:00,920  
bumpy landing when these things come up

679  
00:28:09,190 --> 00:28:03,320  
well they'll end on the ground ground

680  
00:28:13,480 --> 00:28:09,200  
yeah it's it's about the same impact as

681  
00:28:14,470 --> 00:28:13,490  
a moderate traffic accident so you get

682  
00:28:19,660 --> 00:28:14,480  
get smacked

683  
00:28:23,380 --> 00:28:19,670  
in here and see this poor little

684  
00:28:25,450 --> 00:28:23,390  
cosmonauts all bunched up boy and these

685  
00:28:28,090 --> 00:28:25,460  
are all their legs are wrapped around

686  
00:28:31,060 --> 00:28:28,100  
it's amazing wow that's that's a great

687  
00:28:34,900 --> 00:28:31,070  
thing to have here now we come across

688  
00:28:37,960 --> 00:28:34,910

another model here of the planet Mars is

689

00:28:40,480 --> 00:28:37,970

this to scale it's the scale except the

690

00:28:43,720 --> 00:28:40,490

vertical has been exaggerated by about a

691

00:28:46,540 --> 00:28:43,730

factor of 25 course this is at this

692

00:28:49,150 --> 00:28:46,550

scale correctly Marge would look like a

693

00:28:51,280 --> 00:28:49,160

billiard ball very very smooth of course

694

00:28:52,630 --> 00:28:51,290

it would so it's exaggerated to show us

695

00:28:56,440 --> 00:28:52,640

where the mountains are this is olympus

696

00:28:58,030 --> 00:28:56,450

mons for examples and when i saw i mean

697

00:29:01,480 --> 00:28:58,040

what we're looking at folks is a giant

698

00:29:03,940 --> 00:29:01,490

globe of mars with that Valles Marianas

699

00:29:05,980 --> 00:29:03,950

here we've got Olympus Mons and we can

700

00:29:07,930 --> 00:29:05,990

walk right round the whole planet which

701  
00:29:10,450 --> 00:29:07,940  
is about a meter and

702  
00:29:11,650 --> 00:29:10,460  
there's a North Pole but yes that the

703  
00:29:13,180 --> 00:29:11,660  
mountains have been exaggerated because

704  
00:29:15,220 --> 00:29:13,190  
when Isis or olympus mons i thought it

705  
00:29:17,050 --> 00:29:15,230  
can't be that we can't extend that far

706  
00:29:19,120 --> 00:29:17,060  
out from the planet but it's a great it

707  
00:29:21,720 --> 00:29:19,130  
gives people a great idea that the

708  
00:29:25,570 --> 00:29:21,730  
craters in the mountains of mars and

709  
00:29:28,210 --> 00:29:25,580  
it's nice and red yeah and you can touch

710  
00:29:31,240 --> 00:29:28,220  
it and you can feel the the craters and

711  
00:29:33,790 --> 00:29:31,250  
the bumps and everything I want one of

712  
00:29:35,590 --> 00:29:33,800  
these two now I absolutely want one of

713  
00:29:40,270 --> 00:29:35,600

these and just behind us here behind

714

00:29:41,980 --> 00:29:40,280

this glass panel is a big representation

715

00:29:46,090 --> 00:29:41,990

of the surface of Mars a little Rover

716

00:29:48,430 --> 00:29:46,100

little Rover in one of the stations over

717

00:29:50,200 --> 00:29:48,440

that you noticed earlier you can

718

00:29:51,640 --> 00:29:50,210

actually won't control this and drive it

719

00:29:54,190 --> 00:29:51,650

around I'd say you can drive around this

720

00:29:56,230 --> 00:29:54,200

track okay and there's a camera above

721

00:29:58,380 --> 00:29:56,240

that shows you and a camera in the front

722

00:30:01,720 --> 00:29:58,390

of it that shows you where it's pointing

723

00:30:04,090 --> 00:30:01,730

what fun what a fun place this is folks

724

00:30:07,420 --> 00:30:04,100

I can't tell you it's fantastic fun

725

00:30:10,110 --> 00:30:07,430

stuff Oh 3d let me put on my little 3d

726

00:30:13,990 --> 00:30:10,120

glasses here and recognize that it's the

727

00:30:17,080 --> 00:30:14,000

red-blue method of 3d pop these on and

728

00:30:22,060 --> 00:30:17,090

oh look at that big crater on the

729

00:30:23,800 --> 00:30:22,070

surface of Mars fantastic oh now we're

730

00:30:26,740 --> 00:30:23,810

walking across to another section down

731

00:30:28,150 --> 00:30:26,750

at my feet look up first artificial

732

00:30:30,010 --> 00:30:28,160

satellite the silver sphere is a

733

00:30:34,390 --> 00:30:30,020

full-scale model of the Soviet Union's

734

00:30:36,460 --> 00:30:34,400

of NIP one Sputnik one the first

735

00:30:38,440 --> 00:30:36,470

man-made object to up the earth 1957

736

00:30:41,410 --> 00:30:38,450

there it is directly above our heads

737

00:30:44,380 --> 00:30:41,420

there's a scale model of love beep beep

738

00:30:44,890 --> 00:30:44,390

beep yes but it's going to Dickens other

739

00:30:47,950 --> 00:30:44,900

people

740

00:30:51,730 --> 00:30:47,960

and here's a Saturn 5 and we're coming

741

00:30:53,710 --> 00:30:51,740

up a 1/10 scale model of a Saturn 5 and

742

00:30:56,890 --> 00:30:53,720

it's still huge once again take a look

743

00:30:59,950 --> 00:30:56,900

at the top you'll see the escape tower

744

00:31:03,020 --> 00:30:59,960

on an actual Saturn 5 the escape tower

745

00:31:07,820 --> 00:31:03,030

is the size of this model

746

00:31:09,230 --> 00:31:07,830

Wow and we're viewing this from about

747

00:31:11,510 --> 00:31:09,240

three-quarters of the way up up some

748

00:31:13,360 --> 00:31:11,520

stairs here it's a long way down to the

749

00:31:15,710 --> 00:31:13,370

bottom where the base of this rocket is

750

00:31:18,980 --> 00:31:15,720

I'm quite a long way up and it's only

751

00:31:21,230 --> 00:31:18,990

one-tenth scale model it's it's big so

752

00:31:23,630 --> 00:31:21,240

there are two remaining Saturn 5s in

753

00:31:27,350 --> 00:31:23,640

existence oh yeah one at the Kennedy

754

00:31:29,540 --> 00:31:27,360

Space Center in Florida the other at the

755

00:31:33,110 --> 00:31:29,550

Johnson Space Center in Texas and you

756

00:31:35,990 --> 00:31:33,120

can go and and see them pretty good as

757

00:31:38,540 --> 00:31:36,000

you can see it's large there's a scale

758

00:31:39,980 --> 00:31:38,550

model of it get her to a giraffe yeah

759

00:31:42,470 --> 00:31:39,990

and the Statue of Liberty doesn't even

760

00:31:45,130 --> 00:31:42,480

come up to halfway yeah yeah how long

761

00:31:49,250 --> 00:31:45,140

does this mean this facility been here

762

00:31:52,760 --> 00:31:49,260

19 years opened in August of 2000 so

763

00:31:55,580 --> 00:31:52,770

this is that our newest exhibit it's a

764

00:31:57,980 --> 00:31:55,590

just for this summer called luminous

765

00:32:00,790 --> 00:31:57,990

moon done in partnership with the NASA

766

00:32:03,830 --> 00:32:00,800

Ames Research Center and they are

767

00:32:07,130 --> 00:32:03,840

exquisitely high-resolution beautifully

768

00:32:08,960 --> 00:32:07,140

printed images from of the moon most

769

00:32:11,450 --> 00:32:08,970

from the Lunar Reconnaissance Orbiter

770

00:32:13,280 --> 00:32:11,460

they're they're stunning all right

771

00:32:18,010 --> 00:32:13,290

that's exciting we're just walking up

772

00:32:20,570 --> 00:32:18,020

these stairs now to have a look we are

773

00:32:24,260 --> 00:32:20,580

immediately presented with the giant

774

00:32:30,080 --> 00:32:24,270

photograph of the moon properly with

775

00:32:31,730 --> 00:32:30,090

North up okay buta we are in the

776

00:32:34,190 --> 00:32:31,740

northern hemisphere all right I'll give

777

00:32:36,950 --> 00:32:34,200

you that and and what I find is

778

00:32:38,360 --> 00:32:36,960

fascinating is when we look here to the

779

00:32:40,220 --> 00:32:38,370

edge of the moon we can see the

780

00:32:43,250 --> 00:32:40,230

mountains and the craters yeah

781

00:32:45,080 --> 00:32:43,260

against the blackness of space and this

782

00:32:47,520 --> 00:32:45,090

is a this is a good shot that's a very

783

00:32:56,740 --> 00:32:53,049

so this exhibit is set up mostly like an

784

00:33:00,279 --> 00:32:56,750

art gallery uh-huh because the pictures

785

00:33:02,080 --> 00:33:00,289

are just exquisitely gorgeous this is

786

00:33:06,399 --> 00:33:02,090

exciting we're looking into the big hole

787

00:33:08,970 --> 00:33:06,409

here take a look to your right another

788

00:33:14,860 --> 00:33:08,980

picture of the moon the backside ah

789

00:33:17,680 --> 00:33:14,870

right yeah yeah it's it's very different

790

00:33:19,930 --> 00:33:17,690

very different I mean I wouldn't

791

00:33:21,460 --> 00:33:19,940

immediately recognize that as the moon

792

00:33:24,159 --> 00:33:21,470

because we're so used to seeing the

793

00:33:26,980 --> 00:33:24,169

right mottle pattern this is very

794

00:33:29,520 --> 00:33:26,990

consistent like mercury yeah yeah as a

795

00:33:32,230 --> 00:33:29,530

few dark areas but basically it's it's

796

00:33:35,740 --> 00:33:32,240

the contrast isn't there that's a

797

00:33:39,909 --> 00:33:35,750

picture taken by a handheld camera huh

798

00:33:41,590 --> 00:33:39,919

if you happen to be on Apollo 12 okay so

799

00:33:44,020 --> 00:33:41,600

close up to the side of the edge of the

800

00:33:46,450 --> 00:33:44,030

moon here we can see the craters like

801  
00:33:49,080 --> 00:33:46,460  
quite close to the surface yeah it was

802  
00:33:54,760 --> 00:33:49,090  
probably while they were coming back up

803  
00:33:57,789 --> 00:33:54,770  
now this take pictures this looks like

804  
00:34:00,370 --> 00:33:57,799  
it's can't be real yeah doesn't it moon

805  
00:34:04,210 --> 00:34:00,380  
scene from the but no that's real that's

806  
00:34:09,639 --> 00:34:04,220  
real yeah so this is a composite

807  
00:34:13,389 --> 00:34:09,649  
photograph taken with data from the

808  
00:34:16,810 --> 00:34:13,399  
Lunar Reconnaissance Orbiter the detail

809  
00:34:19,030 --> 00:34:16,820  
was from the narrow angle camera which

810  
00:34:21,700 --> 00:34:19,040  
is black-and-white and then they

811  
00:34:24,339 --> 00:34:21,710  
colorized it with simultaneous data

812  
00:34:26,109 --> 00:34:24,349  
taken by the wide-angle camera which is

813  
00:34:28,780 --> 00:34:26,119

how you get the color of Earth what

814

00:34:30,820 --> 00:34:28,790

we're looking at folks is a view looking

815

00:34:32,379 --> 00:34:30,830

down upon the moon from an orbiter I

816

00:34:36,639 --> 00:34:32,389

could see some mountains here some

817

00:34:40,180 --> 00:34:36,649

shadows being cast and then looming over

818

00:34:43,180 --> 00:34:40,190

the horizon is a giant earth with Africa

819

00:34:45,849 --> 00:34:43,190

prominently displayed here the Sun fully

820

00:34:48,430 --> 00:34:45,859

on this side of the planet and it's huge

821

00:34:50,409 --> 00:34:48,440

it's absolutely enormous in the then the

822

00:34:53,230 --> 00:34:50,419

print is large and the resolution is

823

00:34:55,350 --> 00:34:53,240

amazing and it's real that's mine

824

00:34:59,460 --> 00:34:55,360

snapping that's amazing

825

00:35:02,790 --> 00:34:59,470

is a composite of images from Apollo 16

826

00:35:05,340 --> 00:35:02,800

that's gorgeous we could the little the

827

00:35:08,640 --> 00:35:05,350

famous lunar rover lunar buggy here with

828

00:35:10,470 --> 00:35:08,650

an astronaut just buy it and we can see

829

00:35:13,800 --> 00:35:10,480

right across the lunar surface to a deep

830

00:35:15,900 --> 00:35:13,810

crater filled with rocks Wow it's

831

00:35:18,660 --> 00:35:15,910

exquisite Wow and just look at the

832

00:35:21,780 --> 00:35:18,670

resolution of these ah gets better folks

833

00:35:24,900 --> 00:35:21,790

oh that's insane this is a giant crater

834

00:35:27,900 --> 00:35:24,910

we'll hear it in fine detail with the

835

00:35:29,310 --> 00:35:27,910

shadow being cast going deep inside we

836

00:35:33,150 --> 00:35:29,320

can see all the little rocks around the

837

00:35:36,210 --> 00:35:33,160

rim of the crater the ejecta oh my

838

00:35:39,510 --> 00:35:36,220

goodness yeah it's it's amazing it's

839

00:35:43,290 --> 00:35:39,520

amazing and more mountains and craters

840

00:35:48,890 --> 00:35:43,300

here we are looking at in giant

841

00:35:52,470 --> 00:35:48,900

photographs you look up close and the oh

842

00:35:56,520 --> 00:35:52,480

my goodness a detail is just absolutely

843

00:36:00,540 --> 00:35:56,530

right this is more than a meter across

844

00:36:01,680 --> 00:36:00,550

yeah yeah and you can stand up you're

845

00:36:04,800 --> 00:36:01,690

close enough that you think you need a

846

00:36:07,290 --> 00:36:04,810

magnifying glass yes and there still yes

847

00:36:09,780 --> 00:36:07,300

intricate detail yes that's that's

848

00:36:11,370 --> 00:36:09,790

stunning I had no idea but the closer I

849

00:36:12,960 --> 00:36:11,380

get in my eyes to study and go out of

850

00:36:15,210 --> 00:36:12,970

focus no because I can't get any closer

851  
00:36:18,440 --> 00:36:15,220  
there's still detail there to be seen

852  
00:36:21,540 --> 00:36:18,450  
Wow Wow now here's an interesting one

853  
00:36:25,280 --> 00:36:21,550  
another huge sort of panorama here from

854  
00:36:28,050 --> 00:36:25,290  
the moon it gives you an idea of the

855  
00:36:30,090 --> 00:36:28,060  
scale I guess in this in and also the

856  
00:36:32,460 --> 00:36:30,100  
way the the the mountain ranges and so

857  
00:36:34,080 --> 00:36:32,470  
forth on the moon so a lot of these most

858  
00:36:37,110 --> 00:36:34,090  
of the pictures here were taken from a

859  
00:36:40,050 --> 00:36:37,120  
fairly oblique angle so that you can see

860  
00:36:42,780 --> 00:36:40,060  
the topology yeah yeah that really

861  
00:36:45,630 --> 00:36:42,790  
brings it out into stark detail well the

862  
00:36:47,130 --> 00:36:45,640  
one thing I must say that I remember

863  
00:36:49,380 --> 00:36:47,140

reading about in the seeing is that the

864

00:36:51,240 --> 00:36:49,390

astronauts on the moon really didn't

865

00:36:53,160 --> 00:36:51,250

have a concept of distance right because

866

00:36:54,870 --> 00:36:53,170

they our eyes don't work that way where

867

00:36:57,900 --> 00:36:54,880

there's no atmosphere we can't tell how

868

00:36:59,160 --> 00:36:57,910

far something is away right and you get

869

00:37:01,920 --> 00:36:59,170

that impression here by looking at these

870

00:37:03,900 --> 00:37:01,930

photographs too we move along a

871

00:37:04,860 --> 00:37:03,910

beautiful photograph of another crater

872

00:37:07,170 --> 00:37:04,870

these rills

873

00:37:09,090 --> 00:37:07,180

yeah particularly this these are

874

00:37:11,580 --> 00:37:09,100

probably collapsed lava tubes

875

00:37:13,890 --> 00:37:11,590

oh wow that's fascinating look at them

876

00:37:16,680 --> 00:37:13,900

there's like a meandering River yeah

877

00:37:19,940 --> 00:37:16,690

going across there that's fascinating

878

00:37:22,950 --> 00:37:19,950

with the vulcanization caused by

879

00:37:27,270 --> 00:37:22,960

eruption of magma or whatever the right

880

00:37:30,950 --> 00:37:27,280

word is for lunar magma after the impact

881

00:37:35,100 --> 00:37:30,960

of a meteor forming the crater yeah yeah

882

00:37:37,560 --> 00:37:35,110

some undetermined time in the distant

883

00:37:40,770 --> 00:37:37,570

past long time a long time ago

884

00:37:42,960 --> 00:37:40,780

so lunar orbiter Lunar Reconnaissance

885

00:37:46,500 --> 00:37:42,970

Orbiter picture and then a couple of

886

00:37:51,240 --> 00:37:46,510

photographs taken here at Chabot for

887

00:37:55,530 --> 00:37:51,250

context okay nice pictures nice pictures

888

00:37:56,910 --> 00:37:55,540

but that one again gives you an idea of

889

00:37:59,430 --> 00:37:56,920

how many craters there must be on the

890

00:38:04,740 --> 00:37:59,440

moon going into the billions must be a

891

00:38:06,750 --> 00:38:04,750

couple yeah oh my goodness it's so this

892

00:38:10,200 --> 00:38:06,760

is the one that I took a picture of as a

893

00:38:12,660 --> 00:38:10,210

no that's on my on my Facebook feed okay

894

00:38:14,910 --> 00:38:12,670

you're responding yeah yeah and I said

895

00:38:17,820 --> 00:38:14,920

that the image that the Facebook image

896

00:38:19,860 --> 00:38:17,830

does it no just it's just it's this

897

00:38:22,860 --> 00:38:19,870

again you walk up to this yeah and it's

898

00:38:25,970 --> 00:38:22,870

got the same levels about two meter long

899

00:38:28,410 --> 00:38:25,980

panoramas here folks of a crater with

900

00:38:29,940 --> 00:38:28,420

mountains in it and again I can't

901  
00:38:31,890 --> 00:38:29,950  
understand the scale I don't know if

902  
00:38:33,780 --> 00:38:31,900  
what I'm looking at is two three four or

903  
00:38:37,530 --> 00:38:33,790  
five six ten kilometers across or

904  
00:38:40,490 --> 00:38:37,540  
whatever it is it's some 53 miles which

905  
00:38:43,890 --> 00:38:40,500  
makes it about 60 km

906  
00:38:45,660 --> 00:38:43,900  
so this is scale yes that's 53 miles

907  
00:38:49,539 --> 00:38:45,670  
across so these these are big mountains

908  
00:38:55,190 --> 00:38:53,269  
he's breathtaking yeah I just I when I

909  
00:38:57,140 --> 00:38:55,200  
first saw these pictures I just yeah

910  
00:39:00,229 --> 00:38:57,150  
just stood here without the gape yeah

911  
00:39:02,599 --> 00:39:00,239  
yeah let's and this is the most

912  
00:39:04,759 --> 00:39:02,609  
spectacular okay

913  
00:39:07,400 --> 00:39:04,769

physics now we're looking at a mountain

914

00:39:10,789 --> 00:39:07,410

range with the the shadow of these

915

00:39:13,700 --> 00:39:10,799

mountains cast it must be well again I

916

00:39:16,729 --> 00:39:13,710

who knows what scale is the size of

917

00:39:19,459 --> 00:39:16,739

about fast up in yeah yeah so it's a

918

00:39:22,819 --> 00:39:19,469

couple of miles high okay so this is

919

00:39:24,680 --> 00:39:22,829

actually the central peak of one of the

920

00:39:26,180 --> 00:39:24,690

most prominent craters on the front side

921

00:39:30,589 --> 00:39:26,190

of the moon and I'll show it to you on

922

00:39:33,739 --> 00:39:30,599

the on the big image so when a object

923

00:39:37,339 --> 00:39:33,749

comes in slams into the moon it forms an

924

00:39:42,019 --> 00:39:37,349

explosion a shockwave radiates out when

925

00:39:46,900 --> 00:39:42,029

that shockwave slows when the rock can

926

00:39:49,579 --> 00:39:46,910

resist its expansion it reflects and it

927

00:39:51,499 --> 00:39:49,589

concentrates back in the center and it

928

00:39:53,239 --> 00:39:51,509

pushes a mountain up in the middle

929

00:39:56,150 --> 00:39:53,249

that's how these central Peaks are

930

00:39:58,670 --> 00:39:56,160

formed but that's a violent action and

931

00:40:01,670 --> 00:39:58,680

stuff gets thrown up so here is a

932

00:40:03,620 --> 00:40:01,680

boulder that went up and came back down

933

00:40:05,479 --> 00:40:03,630

and landed right on the top of the right

934

00:40:09,349 --> 00:40:05,489

hip hop right on the top of the peak

935

00:40:10,630 --> 00:40:09,359

good grief and again it's got incredible

936

00:40:15,380 --> 00:40:10,640

detail yeah

937

00:40:17,390 --> 00:40:15,390

stunning stunning stunning stunning Wow

938

00:40:19,569 --> 00:40:17,400

what it would be like to just fly over

939

00:40:24,380 --> 00:40:19,579

this this terrain yeah

940

00:40:28,339 --> 00:40:24,390

the effect of solar ultraviolet is to

941

00:40:30,400 --> 00:40:28,349

darken the rock so new craters are

942

00:40:34,339 --> 00:40:30,410

brighter because they haven't been

943

00:40:37,069 --> 00:40:34,349

darkened so you can see something came

944

00:40:40,749 --> 00:40:37,079

slamming in here and those light stuff

945

00:40:43,099 --> 00:40:40,759

that's blast over is the ejecta yeah

946

00:40:45,979 --> 00:40:43,109

that's very beautiful isn't it it's

947

00:40:47,539 --> 00:40:45,989

black and white well these are blocking

948

00:40:49,249 --> 00:40:47,549

one black and white but it's beautiful I

949

00:40:51,079 --> 00:40:49,259

mean the moon is more or less black and

950

00:40:52,700 --> 00:40:51,089

white like this so these are the

951  
00:40:55,309 --> 00:40:52,710  
pictures I told you about of the North

952  
00:40:58,219 --> 00:40:55,319  
and South Pole okay here we go and these

953  
00:41:00,589 --> 00:40:58,229  
are constructed so that you're seeing

954  
00:41:01,339 --> 00:41:00,599  
each spot when it was under maximum

955  
00:41:04,009 --> 00:41:01,349  
illumination

956  
00:41:05,749 --> 00:41:04,019  
okay yeah that makes sense YUM it

957  
00:41:07,759 --> 00:41:05,759  
wouldn't look like normally ever yeah

958  
00:41:09,680 --> 00:41:07,769  
Dex light here now right in the middle

959  
00:41:11,660 --> 00:41:09,690  
here there's never gets like the Sun

960  
00:41:13,489 --> 00:41:11,670  
never shines the Sun never shines and

961  
00:41:14,930 --> 00:41:13,499  
there's ice at the bottom yes I

962  
00:41:16,370 --> 00:41:14,940  
understand this is the South Pole

963  
00:41:17,959 --> 00:41:16,380

yes South Pole here we are looking at

964

00:41:23,019 --> 00:41:17,969

the South Pole and depending on where

965

00:41:28,729 --> 00:41:25,579

all right and this is the North Pole

966

00:41:32,890 --> 00:41:28,739

right yeah here we go looks like a giant

967

00:41:36,589 --> 00:41:32,900

cookie it may not be that tasty yeah

968

00:41:39,439 --> 00:41:36,599

it's a whole string of panoramas here

969

00:41:42,680 --> 00:41:39,449

like get up nice and close and the first

970

00:41:44,299 --> 00:41:42,690

one shows us one of the lunar landers

971

00:41:48,319 --> 00:41:44,309

I'm not sure which one it is but this is

972

00:41:50,359 --> 00:41:48,329

power 15 or 15 okay sort of landed

973

00:41:53,059 --> 00:41:50,369

slightly on an angle as far as I can

974

00:41:54,620 --> 00:41:53,069

tell here and we can scan right across

975

00:41:56,269 --> 00:41:54,630

and see the mountains nearby and the

976  
00:41:58,069 --> 00:41:56,279  
lunar buggy tracks going everywhere

977  
00:42:00,920 --> 00:41:58,079  
right but the lunar lander is

978  
00:42:03,529 --> 00:42:00,930  
brilliantly colored this gold foil there

979  
00:42:05,120 --> 00:42:03,539  
and the rest of the American flag and as

980  
00:42:08,689 --> 00:42:05,130  
soon as we leave that it's just black

981  
00:42:13,029 --> 00:42:08,699  
and white and and look at this you know

982  
00:42:16,039 --> 00:42:13,039  
snow stars no switch is one of the

983  
00:42:17,719 --> 00:42:16,049  
conspiracy theories yes oldest's gripes

984  
00:42:20,299 --> 00:42:17,729  
of course there are no star and we know

985  
00:42:21,829 --> 00:42:20,309  
why we won't go into it now why there

986  
00:42:23,239 --> 00:42:21,839  
are no stars in photographs from the

987  
00:42:25,309 --> 00:42:23,249  
moon but you can look that up folks if

988  
00:42:26,660 --> 00:42:25,319

you're not sure and again we come across

989

00:42:28,519 --> 00:42:26,670

and there's another one another

990

00:42:31,279 --> 00:42:28,529

astronaut by some boulders here with the

991

00:42:33,829 --> 00:42:31,289

buggy parked on the other side oh I want

992

00:42:36,949 --> 00:42:33,839

these in my house I want gorgeous it's

993

00:42:40,160 --> 00:42:36,959

just beautiful it's I can't do these

994

00:42:42,620 --> 00:42:40,170

justice by talking about them but I love

995

00:42:45,949 --> 00:42:42,630

this one another panorama but this time

996

00:42:47,479 --> 00:42:45,959

the what is that that's the buggy okay

997

00:42:50,660 --> 00:42:47,489

with a little satellite dish and an

998

00:42:53,299 --> 00:42:50,670

astronaut just buy it but there on the

999

00:42:55,400 --> 00:42:53,309

horizon there on the top right so there

1000

00:42:56,790 --> 00:42:55,410

you can see space directly behind the

1001

00:42:59,850 --> 00:42:56,800

buggy in the astronaut

1002

00:43:02,190 --> 00:42:59,860

a 3d printed model is another display

1003

00:43:04,470 --> 00:43:02,200

here we've got a crater with a little

1004

00:43:07,110 --> 00:43:04,480

mat is that the same mountain ranges

1005

00:43:10,680 --> 00:43:07,120

nope no it's not but what we do have

1006

00:43:13,200 --> 00:43:10,690

next to this 3d printed oh it is printed

1007

00:43:14,310 --> 00:43:13,210

look at that in sections and it's I

1008

00:43:16,020 --> 00:43:14,320

suppose this as an accurate

1009

00:43:18,510 --> 00:43:16,030

representation of part of the moon we've

1010

00:43:21,350 --> 00:43:18,520

got a light source here we can move to

1011

00:43:24,930 --> 00:43:21,360

give you a scale that's the Bay Area

1012

00:43:27,120 --> 00:43:24,940

okay to scale so it's huge yeah it's a

1013

00:43:30,150 --> 00:43:27,130

huge crater and with this light we can

1014

00:43:33,120 --> 00:43:30,160

move it across noisily don't see how

1015

00:43:34,440 --> 00:43:33,130

different it looks at different yeah so

1016

00:43:35,970 --> 00:43:34,450

the sun's over here we can see the

1017

00:43:42,980 --> 00:43:35,980

shadows being cast by the mountains in

1018

00:43:49,080 --> 00:43:46,770

step outside here now we go to my

1019

00:43:51,720 --> 00:43:49,090

favorite part of this once that wasn't

1020

00:43:54,060 --> 00:43:51,730

your favorite part no whoa that is

1021

00:43:55,500 --> 00:43:54,070

magnificent that is magnificent amazing

1022

00:43:58,230 --> 00:43:55,510

that's one of the best displays I've

1023

00:44:00,150 --> 00:43:58,240

ever seen I just stood and gaped at

1024

00:44:02,190 --> 00:44:00,160

those pictures I could go back in Cape

1025

00:44:07,100 --> 00:44:02,200

for another two hours and we will go

1026

00:44:10,950 --> 00:44:07,110

back but these our these are our

1027

00:44:14,670 --> 00:44:10,960

telescopes ah suddenly I'm surrounded by

1028

00:44:17,610 --> 00:44:14,680

by domes tell us telescope domes so

1029

00:44:20,460 --> 00:44:17,620

Anthony Shabo the benefactor of this

1030

00:44:25,530 --> 00:44:20,470

good morning the benefactor of this

1031

00:44:28,110 --> 00:44:25,540

facility back in 1883 purchased a

1032

00:44:32,910 --> 00:44:28,120

telescope for the Oakland School

1033

00:44:35,780 --> 00:44:32,920

District and it's in the dome here

1034

00:44:38,790 --> 00:44:35,790

okay so we're walking across a little

1035

00:44:40,500 --> 00:44:38,800

middle of down to look down to carefully

1036

00:44:43,320 --> 00:44:40,510

five it's about ten meters down and

1037

00:44:43,860 --> 00:44:43,330

we're entering a wonderful little dome

1038

00:44:52,760 --> 00:44:43,870

here

1039

00:44:59,430 --> 00:44:52,770

this telescope

1040

00:45:03,870 --> 00:44:59,440

grieved on the back 1883 1883

1041

00:45:05,700 --> 00:45:03,880

yeah and like all these telescopes are

1042

00:45:07,350 --> 00:45:05,710

the domes you get this weird acoustic

1043

00:45:09,300 --> 00:45:07,360

effect yeah depending on where you stand

1044

00:45:12,390 --> 00:45:09,310

you're not sure where they the sounds

1045

00:45:16,410 --> 00:45:12,400

coming from it's brilliant

1046

00:45:20,010 --> 00:45:16,420

yeah so it's a beautiful telescope it's

1047

00:45:23,670 --> 00:45:20,020

a magnificent telescope so it's one of

1048

00:45:28,950 --> 00:45:23,680

the directors of this facility back in

1049

00:45:31,190 --> 00:45:28,960

the 1920s named the the two refractors

1050

00:45:34,320 --> 00:45:31,200

you'll see the other large ones soon

1051  
00:45:47,010 --> 00:45:34,330  
after the sisters in the Bible Rachel

1052  
00:45:51,300 --> 00:45:47,020  
and Leah hmm so this is this is the

1053  
00:45:56,420 --> 00:45:51,310  
school months we will have a couple of

1054  
00:46:00,750 --> 00:45:56,430  
hundred kids a day now I've picked up a

1055  
00:46:03,390 --> 00:46:00,760  
sun viewing device here I can look

1056  
00:46:08,610 --> 00:46:03,400  
directly at the Sun through special

1057  
00:46:10,930 --> 00:46:08,620  
tinted glass Wow there it is a disco and

1058  
00:46:14,230 --> 00:46:10,940  
not on my eyes

1059  
00:46:17,620 --> 00:46:14,240  
it's beautiful it's just a white round

1060  
00:46:20,620 --> 00:46:17,630  
light somewhat distorted through the

1061  
00:46:22,109 --> 00:46:20,630  
cloud but there it is looking directly

1062  
00:46:25,150 --> 00:46:22,119  
at the Sun I'll put that down

1063  
00:46:27,279 --> 00:46:25,160

that's very good and in a few years when

1064

00:46:29,109 --> 00:46:27,289

we're back at a active part of the

1065

00:46:30,819 --> 00:46:29,119

sunspot cycle you'll be able to do that

1066

00:46:34,480 --> 00:46:30,829

and occasionally actually see a sunspot

1067

00:46:39,609 --> 00:46:34,490

oh wow cool very cool probably no

1068

00:46:43,299 --> 00:46:39,619

sunspots at all today this is unexpected

1069

00:46:44,440 --> 00:46:43,309

but it is a space and science facility

1070

00:46:47,520 --> 00:46:44,450

of course and we've come across a

1071

00:46:50,160 --> 00:46:47,530

display here Archaeopteryx

1072

00:46:52,359 --> 00:46:50,170

these are a whole bunch of dinosaurs and

1073

00:46:54,880 --> 00:46:52,369

we've got some local high school

1074

00:46:57,160 --> 00:46:54,890

students and yeah I'm doing a podcast

1075

00:47:00,010 --> 00:46:57,170

from Australia a scientific podcast and

1076

00:47:01,960 --> 00:47:00,020

you're in here today to explain what

1077

00:47:04,210 --> 00:47:01,970

exactly so we're over here we're talking

1078

00:47:06,910 --> 00:47:04,220

about cladistics which is the study of

1079

00:47:09,039 --> 00:47:06,920

how the person of the visual and

1080

00:47:11,260 --> 00:47:09,049

physical traits of different animals can

1081

00:47:12,910 --> 00:47:11,270

help identify what they are based on

1082

00:47:15,339 --> 00:47:12,920

their schools are other parts of the

1083

00:47:17,980 --> 00:47:15,349

animal so over here we have a variety of

1084

00:47:20,370 --> 00:47:17,990

schools from different creatures some of

1085

00:47:23,140 --> 00:47:20,380

them are very modern features others are

1086

00:47:25,930 --> 00:47:23,150

prehistoric such as the ear after there

1087

00:47:27,970 --> 00:47:25,940

we have them all laid out here but the

1088

00:47:30,670 --> 00:47:27,980

they are scrambled with respect to their

1089

00:47:33,700 --> 00:47:30,680

cards so the objective here is to try to

1090

00:47:36,519 --> 00:47:33,710

match their cards to the skulls based on

1091

00:47:38,170 --> 00:47:36,529

the very characteristic I know I

1092

00:47:40,690 --> 00:47:38,180

understand okay we got the photographs

1093

00:47:42,940 --> 00:47:40,700

here we've got various animals going

1094

00:47:45,640 --> 00:47:42,950

back to prehistory of course dinosaurs

1095

00:47:47,140 --> 00:47:45,650

and whatever and models of the skulls

1096

00:47:49,180 --> 00:47:47,150

behind them you have to swap them around

1097

00:47:51,309 --> 00:47:49,190

- well I'm not going to make a fool out

1098

00:47:53,279 --> 00:47:51,319

of myself and try it right now but that

1099

00:47:56,900 --> 00:47:53,289

that makes a fascinating exhibition

1100

00:47:59,390 --> 00:47:56,910

that's a great model of a skull -

1101  
00:48:01,549 --> 00:47:59,400  
so you can use that it's a very spongy

1102  
00:48:03,650 --> 00:48:01,559  
school that came in school and that's

1103  
00:48:05,059 --> 00:48:03,660  
one way that you can identify it I have

1104  
00:48:07,069 --> 00:48:05,069  
something which floats in the water a

1105  
00:48:09,170 --> 00:48:07,079  
lot because I have so much air it helps

1106  
00:48:13,339 --> 00:48:09,180  
it stay boy am i right

1107  
00:48:14,930 --> 00:48:13,349  
it also has a characteristic nose that

1108  
00:48:17,450 --> 00:48:14,940  
bumps up as you can see on the store it

1109  
00:48:23,140 --> 00:48:17,460  
here as well as large eyes and of course

1110  
00:48:25,519 --> 00:48:23,150  
very pointy together great exhibition

1111  
00:48:28,069 --> 00:48:25,529  
wonder it's good and we're traveling to

1112  
00:48:30,710 --> 00:48:28,079  
space with a weight and mass exhibition

1113  
00:48:32,749 --> 00:48:30,720

here or a little table with little

1114

00:48:34,809 --> 00:48:32,759

suitcases each suitcase is labeled with

1115

00:48:39,769 --> 00:48:34,819

the name of a planet Saturn Uranus

1116

00:48:41,990 --> 00:48:39,779

Neptune Venus Mars Mercury Pluto the

1117

00:48:43,999 --> 00:48:42,000

moon Pluto snuck in there somehow but

1118

00:48:46,069 --> 00:48:44,009

that's alright we'll let that have we'll

1119

00:48:48,230 --> 00:48:46,079

call these worlds instead of planets all

1120

00:48:51,289 --> 00:48:48,240

right I'm with you so pick up the moon

1121

00:48:53,269 --> 00:48:51,299

moves quite light really but let me

1122

00:48:58,400 --> 00:48:53,279

attempt to fade here and go for

1123

00:48:59,990 --> 00:48:58,410

something like Saturn blimey it's the

1124

00:49:02,930 --> 00:49:00,000

same size they're all the same size and

1125

00:49:05,120 --> 00:49:02,940

we can check out oh that's quite heavy

1126

00:49:07,509 --> 00:49:05,130

surprisingly heavy we can check out

1127

00:49:10,819 --> 00:49:07,519

Neptune's heavy the relative weight as

1128

00:49:14,240 --> 00:49:10,829

Mars it's like Mars is very light

1129

00:49:17,749 --> 00:49:14,250

Mercury's light and Pluto nearly floats

1130

00:49:20,319 --> 00:49:17,759

away by itself and you guys are here to

1131

00:49:22,999 --> 00:49:20,329

help explain the difference or the

1132

00:49:25,249 --> 00:49:23,009

difference in weight and the difference

1133

00:49:27,019 --> 00:49:25,259

between weight and mass yes so the idea

1134

00:49:29,599 --> 00:49:27,029

here is that each two case holds the

1135

00:49:32,240 --> 00:49:29,609

same mass but the way you feel is on

1136

00:49:34,400 --> 00:49:32,250

different planets so you have a good

1137

00:49:36,289 --> 00:49:34,410

sense for earth as this earth yeah you

1138

00:49:38,930 --> 00:49:36,299

have a good sense of earth for scale and

1139

00:49:41,410 --> 00:49:38,940

then you get to feel what your anus

1140

00:49:44,140 --> 00:49:41,420

would be and Saturn

1141

00:49:47,050 --> 00:49:44,150

and you're able to tell how gravity

1142

00:49:49,420 --> 00:49:47,060

affects mass or mass and gravity affect

1143

00:49:51,070 --> 00:49:49,430

weight rather right so if you were to

1144

00:49:53,110 --> 00:49:51,080

happen to carry that suitcase to a

1145

00:49:57,070 --> 00:49:53,120

different planet or world would it took

1146

00:50:00,100 --> 00:49:57,080

this suitcase to mercury it would be

1147

00:50:03,010 --> 00:50:00,110

like that so the earth is the base level

1148

00:50:06,790 --> 00:50:03,020

I guess you'd say and who came up with

1149

00:50:08,860 --> 00:50:06,800

this idea it was a an older gas Explorer

1150

00:50:11,890 --> 00:50:08,870

volunteer they're not here anymore but

1151  
00:50:13,510 --> 00:50:11,900  
they created this demo and so it's

1152  
00:50:14,860 --> 00:50:13,520  
beyond the fluorescence I love it I

1153  
00:50:19,990 --> 00:50:14,870  
think that's a terrific idea

1154  
00:50:22,830 --> 00:50:20,000  
oh it just gets better and better what's

1155  
00:50:25,300 --> 00:50:22,840  
this so the science of tidal waves

1156  
00:50:29,440 --> 00:50:25,310  
we've got spoons something close to my

1157  
00:50:32,620 --> 00:50:29,450  
heart okay taking yeah I think this I'll

1158  
00:50:34,660 --> 00:50:32,630  
have to put your fingers through loops

1159  
00:50:36,310 --> 00:50:34,670  
yeah you'll demonstrate it to me then

1160  
00:50:41,020 --> 00:50:36,320  
I'll do it yeah then put it in your ear

1161  
00:50:44,830 --> 00:50:41,030  
what and then bang it against the side

1162  
00:50:46,810 --> 00:50:44,840  
of the table okay trust me it's worth

1163  
00:50:48,700 --> 00:50:46,820

alright so I'll get you to hold the

1164

00:50:50,800 --> 00:50:48,710

microphone all right I've got a fork

1165

00:50:52,720 --> 00:50:50,810

dangling on the end of the string but I

1166

00:50:54,460 --> 00:50:52,730

put one loop of the string through this

1167

00:50:55,810 --> 00:50:54,470

finger right one loop of the string

1168

00:50:57,880 --> 00:50:55,820

through the other thing right so the

1169

00:50:59,200 --> 00:50:57,890

forks in the middle right put my fingers

1170

00:51:01,300 --> 00:50:59,210

in my ears such a fingers in your ears

1171

00:51:03,460 --> 00:51:01,310

they're looking at me like I'm crazy and

1172

00:51:09,500 --> 00:51:03,470

then I bang the fork against the table

1173

00:51:12,590 --> 00:51:09,510

yes I'm on candid camera here we go

1174

00:51:14,030 --> 00:51:12,600

right now do it do it do it software

1175

00:51:17,410 --> 00:51:14,040

let's see and keep your fingers in there

1176

00:51:24,190 --> 00:51:21,750

isn't that zoning is ridiculous I could

1177

00:51:26,590 --> 00:51:24,200

feel the sound traveling through the

1178

00:51:32,609 --> 00:51:26,600

string through my fingers into my ears

1179

00:51:39,339 --> 00:51:35,319

you can do this at home I can do this at

1180

00:51:41,200 --> 00:51:39,349

home a wire hanger Wow and it's amazing

1181

00:51:45,220 --> 00:51:41,210

and this is something we can talk to

1182

00:51:45,230 --> 00:51:52,490

hello we're going to descriptive day

1183

00:51:58,349 --> 00:51:54,499

[Music]

1184

00:52:00,839 --> 00:51:58,359

yobbo's space and Science Center open

1185

00:52:09,750 --> 00:52:00,849

from Wednesdays to Sunday 10:00 a.m. to

1186

00:52:09,760 --> 00:52:22,940

[Music]

1187

00:52:29,880 --> 00:52:26,730

[www.opm.gov/health](http://www.opm.gov/health) install cognitive

1188

00:52:32,370 --> 00:52:29,890

psychology tells us about why we lay

1189

00:52:34,680 --> 00:52:32,380

awake worrying at night instead of

1190

00:52:36,839 --> 00:52:34,690

sleeping and this will be addy Belconnen

1191

00:52:39,839 --> 00:52:36,849

community service which is in Chandler

1192

00:52:42,989 --> 00:52:39,849

Street Belconnen in the AC t the cost is

1193

00:52:45,319 --> 00:52:42,999

free Bronwen Milken's is a PhD candidate

1194

00:52:48,329 --> 00:52:45,329

at the University of Western Australia

1195

00:52:50,069 --> 00:52:48,339

the PhD research begins with the

1196

00:52:54,120 --> 00:52:50,079

situation that many people are familiar

1197

00:52:56,730 --> 00:52:54,130

with worrying in bed at night instead of

1198

00:52:59,999 --> 00:52:56,740

sleeping the study she has conducted

1199

00:53:02,400 --> 00:53:00,009

throughout her PhD have tried to work

1200

00:53:04,890 --> 00:53:02,410

out whether anomalies in the way our

1201

00:53:08,309 --> 00:53:04,900

brain processes information drives the

1202

00:53:10,180 --> 00:53:08,319

worry keeping us up at night dinner will

1203

00:53:12,430 --> 00:53:10,190

follow the lecture

1204

00:53:15,730 --> 00:53:12,440

then on the 13th of August we have

1205

00:53:18,910 --> 00:53:15,740

woman's woo pseudoscience and woman's

1206

00:53:22,779 --> 00:53:18,920

health with Trish hand that's from 6

1207

00:53:26,470 --> 00:53:22,789

p.m. and the venue is the law lecture

1208

00:53:28,690 --> 00:53:26,480

theatre fellows Road Australian National

1209

00:53:32,500 --> 00:53:28,700

University and the cost is also free

1210

00:53:35,620 --> 00:53:32,510

this talk is a tour through the world of

1211

00:53:37,510 --> 00:53:35,630

woman's womb there's probably more of it

1212

00:53:39,730 --> 00:53:37,520

than youth realize and it's often

1213

00:53:41,980 --> 00:53:39,740

weirder than you expect there are the

1214

00:53:45,069 --> 00:53:41,990

obvious ones which are skewed towards

1215

00:53:47,609 --> 00:53:45,079

women but technically gender neutral

1216

00:53:51,849 --> 00:53:47,619

such as essential oils naturopathy

1217

00:53:54,970 --> 00:53:51,859

psychics mediums etc which generally

1218

00:53:58,000 --> 00:53:54,980

have more female customers than male but

1219

00:54:00,609 --> 00:53:58,010

not necessarily by design Trish Han is a

1220

00:54:03,010 --> 00:54:00,619

clinical educator in diagnostic

1221

00:54:05,680 --> 00:54:03,020

radiology at Royal Prince Alfred

1222

00:54:07,750 --> 00:54:05,690

Hospital in Sydney and vice-president of

1223

00:54:09,930 --> 00:54:07,760

Australian skeptics and of course a

1224

00:54:13,000 --> 00:54:09,940

reporter right here on the sceptic zone

1225

00:54:16,390 --> 00:54:13,010

for more information just head to the

1226  
00:54:18,250 --> 00:54:16,400  
social skeptics Canberra meetup page or

1227  
00:54:18,520 --> 00:54:18,260  
follow the link in this week's show

1228  
00:54:32,530 --> 00:54:18,530  
notes

1229  
00:54:37,400 --> 00:54:35,030  
thank you for listening to the skeptic

1230  
00:54:39,290 --> 00:54:37,410  
zone and thank you to those people who

1231  
00:54:41,780 --> 00:54:39,300  
went along to skeptics in the pub in

1232  
00:54:43,550 --> 00:54:41,790  
Sydney a few days ago I I couldn't make

1233  
00:54:46,370 --> 00:54:43,560  
it which is a great pity because it was

1234  
00:54:48,590 --> 00:54:46,380  
a talk by dr. Karl crucial miss key and

1235  
00:54:50,360 --> 00:54:48,600  
judging by the photographs it was a full

1236  
00:54:51,560 --> 00:54:50,370  
house but don't forget if you're in

1237  
00:54:54,040 --> 00:54:51,570  
Sydney there's lots of fun to be had

1238  
00:54:56,780 --> 00:54:54,050

with Maynard at Maynard comdataís you

1239

00:54:59,420 --> 00:54:56,790

including movie nights and Maynard's

1240

00:55:02,900 --> 00:54:59,430

Love Shack and by the way the next Love

1241

00:55:05,240 --> 00:55:02,910

Shack is on the 17th of August Saturday

1242

00:55:07,250 --> 00:55:05,250

the 17th of August at the red bar which

1243

00:55:09,920 --> 00:55:07,260

is at the end of Glee Point Road near

1244

00:55:11,510 --> 00:55:09,930

the Broadway more information at Maynard

1245

00:55:13,970 --> 00:55:11,520

com Donei you

1246

00:55:15,740 --> 00:55:13,980

and speaking of Maynard and skeptics in

1247

00:55:17,900 --> 00:55:15,750

the pub and dr. Karl coming up on next

1248

00:55:19,790 --> 00:55:17,910

week's show a special report another

1249

00:55:21,890 --> 00:55:19,800

special report from may not who was at

1250

00:55:24,470 --> 00:55:21,900

skeptics in the pub and spoke to lots of

1251  
00:55:27,910 --> 00:55:24,480  
pub goers and dr. Karl Cruz on whiskey

1252  
00:55:30,950 --> 00:55:27,920  
himself no stranger to the sceptic zone

1253  
00:55:32,740 --> 00:55:30,960  
but for this week from the San Francisco

1254  
00:55:39,740 --> 00:55:32,750  
Bay Area this is Richard Saunders

1255  
00:55:42,440 --> 00:55:39,750  
signing off you've been listening to the

1256  
00:55:47,030 --> 00:55:42,450  
skeptic zone podcast please visit our

1257  
00:55:50,330 --> 00:55:47,040  
website at WWDC be for show notes

1258  
00:55:54,530 --> 00:55:50,340  
contacts and to access the bat catalog

1259  
00:55:56,240 --> 00:55:54,540  
of episodes going back to 2008 you can

1260  
00:55:59,300 --> 00:55:56,250  
follow the skeptic zone podcast on

1261  
00:56:01,580 --> 00:55:59,310  
twitter at skeptic zone visit our

1262  
00:56:02,470 --> 00:56:01,590  
facebook page or leave a review on

1263  
00:56:05,150 --> 00:56:02,480

itunes

1264

00:56:08,540 --> 00:56:05,160

you can also support the skeptic zone

1265

00:56:11,260 --> 00:56:08,550

via patreon or PayPal the skeptic zone

1266

00:56:13,640 --> 00:56:11,270

podcast is an independent production

1267

00:56:15,740 --> 00:56:13,650

reviews and opinions expressed on the

1268

00:56:18,110 --> 00:56:15,750

skeptic zone are not necessarily those

1269

00:56:19,950 --> 00:56:18,120

of Australian skeptics or any other

1270

00:56:30,980 --> 00:56:19,960

skeptical organization

1271

00:56:36,130 --> 00:56:33,080

hello everybody who keeps listening

1272

00:56:39,560 --> 00:56:36,140

after the music maybe you're asleep

1273

00:56:42,470 --> 00:56:39,570

hello wake up wake up it's time for the

1274

00:56:44,860 --> 00:56:42,480

dice game asleep how dare you fall

1275

00:56:47,120 --> 00:56:44,870

asleep during the sceptic zone anyway

1276

00:56:51,040 --> 00:56:47,130

for those of you don't know I've got a

1277

00:56:54,560 --> 00:56:51,050

10 sided die here no it's this one sir

1278

00:56:57,190 --> 00:56:54,570

sort of a yellow transparent yellow I'm

1279

00:57:00,140 --> 00:56:57,200

going to roll it three times and

1280

00:57:03,440 --> 00:57:00,150

grabbing my pen and paper here I want

1281

00:57:06,290 --> 00:57:03,450

you to use your psychic powers hmm

1282

00:57:09,140 --> 00:57:06,300

you're predicting powers or your

1283

00:57:11,060 --> 00:57:09,150

mathematical odds something like that

1284

00:57:13,610 --> 00:57:11,070

yeah this see if you can guess what

1285

00:57:14,960 --> 00:57:13,620

numbers come up shaking it now here

1286

00:57:18,250 --> 00:57:14,970

comes the first roll so it'll be a

1287

00:57:24,620 --> 00:57:18,260

number from 1 to 10

1288

00:57:26,920 --> 00:57:24,630

today's first number is 3 ok ok next

1289

00:57:32,570 --> 00:57:26,930

number

1290

00:57:36,260 --> 00:57:32,580

it's a 903 and 9 whatever that means

1291

00:57:43,820 --> 00:57:36,270

last one and to get all three numbers is