

1
00:00:00,000 --> 00:00:09,099
[Music]

2
00:00:06,190 --> 00:00:13,920
welcome to the skeptic zone the podcast

3
00:00:09,099 --> 00:00:16,850
from Australia for science and reason

4
00:00:13,919 --> 00:00:22,359
[Applause]

5
00:00:16,850 --> 00:00:25,450
[Music]

6
00:00:22,359 --> 00:00:30,469
yes it's the skeptic zone episode number

7
00:00:25,449 --> 00:00:32,060
453 for the 25th of June 2017

8
00:00:30,469 --> 00:00:35,960
richardsaunders here with you from the

9
00:00:32,060 --> 00:00:37,160
Bay Area San Francisco where it's balmy

10
00:00:35,960 --> 00:00:39,429
weather Wow

11
00:00:37,159 --> 00:00:41,479
had a heat wave over the last few days

12
00:00:39,429 --> 00:00:44,750
yes it's a bit of a shock to the system

13
00:00:41,479 --> 00:00:47,329
to come out of a wintry cold rainy

14
00:00:44,750 --> 00:00:49,730
Sydney 2:00 a.m. heat wave California

15
00:00:47,329 --> 00:00:52,969
and thank you to those people who are

16
00:00:49,729 --> 00:00:55,128
worried about my health with my recent

17
00:00:52,969 --> 00:00:56,509
attack of shingles and then nasty chest

18
00:00:55,128 --> 00:00:59,268
infection

19
00:00:56,509 --> 00:01:01,939
it didn't make flying over the Pacific a

20
00:00:59,268 --> 00:01:04,370
lot of fun but thank goodness for good

21
00:01:01,939 --> 00:01:06,079
friends like dr. eugenie Scott who

22
00:01:04,370 --> 00:01:09,740
helped me out when I reach to the other

23
00:01:06,079 --> 00:01:11,689
end and speaking of dr. eugenie Scott

24
00:01:09,739 --> 00:01:15,039
this week a bit later on in the show

25
00:01:11,689 --> 00:01:19,459
we're going to be collecting honey

26
00:01:15,040 --> 00:01:22,820
collecting honey with Eugenie Scott this

27
00:01:19,459 --> 00:01:25,280
should be a book about it I was lucky

28
00:01:22,819 --> 00:01:28,038
enough to visit Jeanie in Berkeley in

29

00:01:25,280 --> 00:01:29,810
California and in her backyard there are

30
00:01:28,039 --> 00:01:33,409
a couple of bee hives and we collect

31
00:01:29,810 --> 00:01:35,118
honey it's a different I'll give you

32
00:01:33,409 --> 00:01:38,630
that it's a different report coming up a

33
00:01:35,118 --> 00:01:40,759
bit later on in the show but before we

34
00:01:38,629 --> 00:01:44,478
do that to kick off the show I go

35
00:01:40,759 --> 00:01:46,849
downtown here in San Francisco and visit

36
00:01:44,478 --> 00:01:48,649
the Exploratorium the science outreach

37
00:01:46,849 --> 00:01:52,640
museum well I don't know if you'd call

38
00:01:48,649 --> 00:01:57,679
it a museum exactly it's a yeah it's a

39
00:01:52,640 --> 00:02:00,590
vast interactive series of exhibits it's

40
00:01:57,679 --> 00:02:04,609
very famous and I have a chat and a

41
00:02:00,590 --> 00:02:06,859
private tour with Paul Doherty who you

42
00:02:04,608 --> 00:02:09,590
may remember some weeks ago I

43
00:02:06,858 --> 00:02:11,990

interviewed Paul about his book and then

44

00:02:09,590 --> 00:02:14,870

you did a scientific exploration of the

45

00:02:11,990 --> 00:02:17,540

world's most interesting ways to die and

46

00:02:14,870 --> 00:02:21,250

he co-authored that with Cody Cassidy I

47

00:02:17,539 --> 00:02:24,709

I have the book right here with me and

48

00:02:21,250 --> 00:02:26,599

it's now autographed and in fact we'll

49

00:02:24,710 --> 00:02:28,909

be having a competition soon or a prize

50

00:02:26,599 --> 00:02:31,609

or a giveaway where that book is

51

00:02:28,909 --> 00:02:32,680

the the prize more about that in the

52

00:02:31,610 --> 00:02:35,230

coming weeks when I think

53

00:02:32,680 --> 00:02:39,159

what to do anyway they kick off the show

54

00:02:35,229 --> 00:02:41,919

a tour of the Exploratorium and a chat

55

00:02:39,158 --> 00:02:46,959

to Paul about the important work they do

56

00:02:41,919 --> 00:02:49,809

there in educating science teachers also

57

00:02:46,959 --> 00:02:52,780

this week as usual it's brouhaha science

58
00:02:49,810 --> 00:02:55,449
from Australia science TV this week Ben

59
00:02:52,780 --> 00:02:58,299
Lewis talks to us about our flying

60
00:02:55,449 --> 00:03:00,218
carbon footprint our flying carbon

61
00:02:58,299 --> 00:03:03,519
footprint uh you'll understand a bit

62
00:03:00,218 --> 00:03:05,590
later on now there's not much more for

63
00:03:03,519 --> 00:03:08,829
me to say at the moment so I'm going to

64
00:03:05,590 --> 00:03:11,889
run upstairs I'm going to have a nice

65
00:03:08,829 --> 00:03:15,909
toasty bagel with some melted butter on

66
00:03:11,889 --> 00:03:18,489
top and I'm going to sprinkle that or

67
00:03:15,908 --> 00:03:21,039
drizzle that with a jar of honey well

68
00:03:18,489 --> 00:03:24,158
not the whole jar of some honey from a

69
00:03:21,039 --> 00:03:26,608
honey jar given to me by dr. eugenie

70
00:03:24,158 --> 00:03:30,310
Scott and you'll find out that adventure

71
00:03:26,609 --> 00:03:32,260
soon soon enough but while I munch that

72
00:03:30,310 --> 00:03:33,939
delicious bagel down I hope you enjoy

73
00:03:32,259 --> 00:03:49,219
the skeptic zone

74
00:03:33,939 --> 00:03:56,329
[Music]

75
00:03:49,219 --> 00:03:56,330
[Applause]

76
00:04:04,740 --> 00:04:21,220
three one two three drink now listeners

77
00:04:18,548 --> 00:04:22,469
may be confused about this strange thing

78
00:04:21,220 --> 00:04:25,000
we're doing here were actually

79
00:04:22,470 --> 00:04:26,919
Exploratorium here in San Francisco and

80
00:04:25,000 --> 00:04:28,689
I'm with dr. Paul Doherty hello hello

81
00:04:26,918 --> 00:04:30,009
it's nice to be here Richard it's

82
00:04:28,689 --> 00:04:32,050
wonderful to be here in fact the

83
00:04:30,009 --> 00:04:34,379
listeners will remember we had a chat a

84
00:04:32,050 --> 00:04:36,970
few weeks ago when we're discussing your

85
00:04:34,379 --> 00:04:39,219
fascinating book about the ridiculous

86

00:04:36,970 --> 00:04:41,080
waste entire Hall that write the science

87
00:04:39,220 --> 00:04:43,150
behind the world's most interesting ways

88
00:04:41,079 --> 00:04:45,459
to die it's the one titled and then

89
00:04:43,149 --> 00:04:47,379
you're dead and then you did yeah which

90
00:04:45,459 --> 00:04:49,418
I have a copy with me but we'll get to

91
00:04:47,379 --> 00:04:52,689
that soon and we just buy this little

92
00:04:49,418 --> 00:04:55,209
display here let's give you a partner a

93
00:04:52,689 --> 00:04:57,339
sip or a squirt right and it's an

94
00:04:55,209 --> 00:04:59,529
interesting idea of adventure in the

95
00:04:57,339 --> 00:05:01,629
psyche psychology really that's right

96
00:04:59,529 --> 00:05:04,569
it's a social science experiment it's a

97
00:05:01,629 --> 00:05:07,180
classic and it turns out you can choose

98
00:05:04,569 --> 00:05:09,339
to give your partner a sip of water or a

99
00:05:07,180 --> 00:05:12,220
squirt in the face and they choose the

100
00:05:09,339 --> 00:05:14,228

same for you if you both choose sip you

101

00:05:12,220 --> 00:05:17,560

both get a sip of water if you both

102

00:05:14,228 --> 00:05:20,649

choose squirt you get nothing but if one

103

00:05:17,560 --> 00:05:22,389

chooses sip and one chooses squirt one

104

00:05:20,649 --> 00:05:24,189

of you gets a sip and the other one gets

105

00:05:22,389 --> 00:05:26,228

squirted in the face and just yet what

106

00:05:24,189 --> 00:05:29,410

you just heard was a couple of women and

107

00:05:26,228 --> 00:05:30,639

they chose sip and squirt and one woman

108

00:05:29,410 --> 00:05:33,070

got a drink and the other one got

109

00:05:30,639 --> 00:05:35,740

squirted in the face and she reacted by

110

00:05:33,069 --> 00:05:37,569

saying you just squirted me so who can

111

00:05:35,740 --> 00:05:39,850

you trust we got some more volunteers

112

00:05:37,569 --> 00:05:40,750

ready to give this a go try it now

113

00:05:39,850 --> 00:05:43,600

they're walking up now

114

00:05:40,750 --> 00:05:44,949

what our main friends so the two

115
00:05:43,600 --> 00:05:46,759
gentlemen are sitting down now they're

116
00:05:44,949 --> 00:05:48,918
going to choose so you can

117
00:05:46,759 --> 00:05:50,960
press any button sip or squirt and

118
00:05:48,918 --> 00:05:52,519
that's what they're going to get so go

119
00:05:50,959 --> 00:05:55,399
ahead and pick what you're going to give

120
00:05:52,519 --> 00:05:57,908
the other person please lower your head

121
00:05:55,399 --> 00:06:06,318
and take a drink on the count of three

122
00:05:57,908 --> 00:06:08,569
one two three three so you got the

123
00:06:06,319 --> 00:06:09,379
squirt and you got the sip there you go

124
00:06:08,569 --> 00:06:12,229
nice

125
00:06:09,379 --> 00:06:14,689
sorry the nice person gets punished is

126
00:06:12,228 --> 00:06:17,778
there a lesson in life here there could

127
00:06:14,689 --> 00:06:19,789
be what that's a fun display yes but the

128
00:06:17,778 --> 00:06:22,999
whole idea of the Exploratorium and and

129
00:06:19,788 --> 00:06:24,288
I came to this institution many years

130
00:06:22,999 --> 00:06:27,199
ago when it was over the Palace of Fine

131
00:06:24,288 --> 00:06:29,269
Arts yes so it's wonderful to see it

132
00:06:27,199 --> 00:06:31,639
close to the downtown San Francisco oh

133
00:06:29,269 --> 00:06:34,549
yes in fact so a three years ago we

134
00:06:31,639 --> 00:06:36,889
moved the city the other building needed

135
00:06:34,550 --> 00:06:38,180
a lot of repair and the city offered us

136
00:06:36,889 --> 00:06:40,509
this building which needed even more

137
00:06:38,180 --> 00:06:43,999
repair but it's in such a great location

138
00:06:40,509 --> 00:06:46,669
it's in a 70 year old pier and we

139
00:06:43,999 --> 00:06:49,159
essentially reinforced these pilings

140
00:06:46,668 --> 00:06:51,889
under the pier 1,800 pilings had to be

141
00:06:49,158 --> 00:06:54,079
reinforced and then we restructured the

142
00:06:51,889 --> 00:06:55,939
building and as you look around you

143

00:06:54,079 --> 00:06:59,598
you'll see it's this where it's this

144
00:06:55,939 --> 00:07:01,968
giant warehouse full of exhibits 600

145
00:06:59,598 --> 00:07:03,259
exhibits allowing people to interact

146
00:07:01,968 --> 00:07:05,718
with and learn a little bit about

147
00:07:03,259 --> 00:07:08,449
different concepts and science it's it's

148
00:07:05,718 --> 00:07:11,088
a dream come true for a science educator

149
00:07:08,449 --> 00:07:15,228
really is so what I'm doing here right

150
00:07:11,088 --> 00:07:17,149
now is I have twenty high school science

151
00:07:15,228 --> 00:07:19,248
teachers in a class that come here for

152
00:07:17,149 --> 00:07:22,699
three weeks and learn how to use

153
00:07:19,249 --> 00:07:25,189
exhibits to excite to get to make their

154
00:07:22,699 --> 00:07:28,249
science classes interesting relevant fun

155
00:07:25,189 --> 00:07:30,169
and correct it's a wonderland of

156
00:07:28,249 --> 00:07:32,249
interaction in this place I must say now

157
00:07:30,168 --> 00:07:34,798

like

158

00:07:32,249 --> 00:07:36,989

to wonder what is going on here oh hello

159

00:07:34,798 --> 00:07:39,048

there are people sitting down a little

160

00:07:36,988 --> 00:07:42,149

count little displays here beating away

161

00:07:39,048 --> 00:07:43,918

yes and some of them they have a red

162

00:07:42,149 --> 00:07:46,678

button and a blue button like the red

163

00:07:43,918 --> 00:07:49,228

pill on the blue pill of notorious movie

164

00:07:46,678 --> 00:07:51,118

and there's us counter up there on the

165

00:07:49,228 --> 00:07:52,649

wall telling how many times the red has

166

00:07:51,119 --> 00:07:55,739

been hit and how many times the blue has

167

00:07:52,649 --> 00:07:59,699

been hit and they can they can compete

168

00:07:55,738 --> 00:08:01,578

or cooperate and so in this section of

169

00:07:59,699 --> 00:08:06,239

the museum we do a lot of studies of

170

00:08:01,579 --> 00:08:07,978

cooperation versus competition the kids

171

00:08:06,238 --> 00:08:09,168

they're a couple of kids really doing at

172
00:08:07,978 --> 00:08:11,308
the moment they're having a great time

173
00:08:09,168 --> 00:08:12,988
having fun they're having fun and

174
00:08:11,309 --> 00:08:16,049
there's a big counter telling me telling

175
00:08:12,988 --> 00:08:17,518
how many times it's been struck and I'm

176
00:08:16,048 --> 00:08:19,498
really impressed about this place

177
00:08:17,519 --> 00:08:22,110
because there are many reasons but it

178
00:08:19,499 --> 00:08:24,659
just goes on and on on into the distance

179
00:08:22,110 --> 00:08:26,669
yeah about 300 meters long to get to the

180
00:08:24,658 --> 00:08:30,808
far end that's that's fantastic and

181
00:08:26,668 --> 00:08:32,639
there's not a square meter not really

182
00:08:30,809 --> 00:08:35,308
being used for something that's right

183
00:08:32,639 --> 00:08:39,528
look at this display that's fantastic

184
00:08:35,308 --> 00:08:42,269
yeah so this one we're studying bird

185
00:08:39,528 --> 00:08:45,179
gatherings so there's a word in English

186
00:08:42,269 --> 00:08:46,589
called a murmuration a wonderful ratio

187
00:08:45,179 --> 00:08:48,479
and that's when you look at the sky and

188
00:08:46,589 --> 00:08:51,149
you see birds come together in a big

189
00:08:48,480 --> 00:08:54,209
cluster that fly together like a flock

190
00:08:51,149 --> 00:08:56,370
and we give the visitors a chance to

191
00:08:54,208 --> 00:08:58,469
change three parameters and program

192
00:08:56,370 --> 00:09:01,009
their birds and how they flock what

193
00:08:58,470 --> 00:09:03,839
we're looking at folks is a giant

194
00:09:01,009 --> 00:09:05,370
flat-screen TV you know bigger than

195
00:09:03,839 --> 00:09:07,610
probably the biggest one you have in

196
00:09:05,370 --> 00:09:10,620
your house and it is covered with

197
00:09:07,610 --> 00:09:12,539
computer simulated birds all flocking

198
00:09:10,620 --> 00:09:14,990
together and the kids are down here

199
00:09:12,539 --> 00:09:17,958
using the controls here for grouping

200

00:09:14,990 --> 00:09:21,680
separation and alignment and as they

201
00:09:17,958 --> 00:09:24,328
alter the parameters they get different

202
00:09:21,679 --> 00:09:26,099
flocks of birds flowing across the

203
00:09:24,328 --> 00:09:28,138
screen that's just fascinating if they

204
00:09:26,100 --> 00:09:30,600
choose some parameters are a little

205
00:09:28,139 --> 00:09:31,810
quite kamar like this what they did

206
00:09:30,600 --> 00:09:34,509
there yeah

207
00:09:31,809 --> 00:09:37,208
and some more frenetic but they have

208
00:09:34,509 --> 00:09:39,129
just three controls and it's called in

209
00:09:37,208 --> 00:09:42,399
the world of mathematics it's called

210
00:09:39,129 --> 00:09:44,740
cellular automata you tell each bird the

211
00:09:42,399 --> 00:09:47,019
rules of making a flock of birds and

212
00:09:44,740 --> 00:09:48,579
then you turn the computer loose to

213
00:09:47,019 --> 00:09:51,039
simulate what happens that there are

214
00:09:48,578 --> 00:09:53,799

thousands of birds right now on the

215

00:09:51,039 --> 00:09:55,509

screen interacting at lightning pace

216

00:09:53,799 --> 00:09:56,799

that the calculations must be

217

00:09:55,509 --> 00:09:59,199

extraordinary yeah but they're very

218

00:09:56,799 --> 00:10:02,740

simple computers are very good at simple

219

00:09:59,198 --> 00:10:04,990

calculations right valid so wow that's

220

00:10:02,740 --> 00:10:06,610

pretty that's oh it's fantastic open

221

00:10:04,990 --> 00:10:10,480

hammer called this a museum of science

222

00:10:06,610 --> 00:10:13,240

art and human perception and that one I

223

00:10:10,480 --> 00:10:17,079

thought was a nice combination of art in

224

00:10:13,240 --> 00:10:19,629

science actually art in mathematics it's

225

00:10:17,078 --> 00:10:22,628

it's high summer here in California and

226

00:10:19,629 --> 00:10:24,789

this place is crowded I mean a lot of

227

00:10:22,629 --> 00:10:27,938

the school-age children on their

228

00:10:24,789 --> 00:10:30,099

vacation at the moment and everywhere I

229
00:10:27,938 --> 00:10:33,068
look there are children everywhere I

230
00:10:30,100 --> 00:10:35,450
look of all ages mostly younger though

231
00:10:33,068 --> 00:10:37,819
which is nice yeah

232
00:10:35,450 --> 00:10:40,790
with their with their families it's

233
00:10:37,820 --> 00:10:41,120
great to have a family together enjoying

234
00:10:40,789 --> 00:10:42,740
it

235
00:10:41,120 --> 00:10:44,960
let's go over to this one here we have a

236
00:10:42,740 --> 00:10:50,000
huge group and they found something that

237
00:10:44,960 --> 00:10:52,250
they're really interested in so there

238
00:10:50,000 --> 00:10:54,230
seems there seems to be a treadmill with

239
00:10:52,250 --> 00:10:57,740
a slinky uh-huh

240
00:10:54,230 --> 00:10:59,090
so maybe and there's no instructions so

241
00:10:57,740 --> 00:11:00,889
the kids are trying to figure out what

242
00:10:59,090 --> 00:11:05,120
to do with a treadmill and a slinky oh

243
00:11:00,889 --> 00:11:07,850
they figure it out no so the treadmill

244
00:11:05,120 --> 00:11:09,259
is going up at about a thirty five

245
00:11:07,850 --> 00:11:10,340
degree angle or something like that a

246
00:11:09,259 --> 00:11:12,649
30-degree angle

247
00:11:10,340 --> 00:11:13,940
yeah and if the slinky is at the top it

248
00:11:12,649 --> 00:11:15,860
starts to walk back down as the

249
00:11:13,940 --> 00:11:18,290
treadmill goes up that's right and they

250
00:11:15,860 --> 00:11:20,060
can control the speed and right now they

251
00:11:18,289 --> 00:11:22,429
have it at the highest speed right

252
00:11:20,059 --> 00:11:24,289
that's really hard to make work but if

253
00:11:22,429 --> 00:11:26,779
they but they get the choice to slow it

254
00:11:24,289 --> 00:11:28,879
down if they want which you just did oh

255
00:11:26,779 --> 00:11:31,009
I see yes there's a control they're

256
00:11:28,879 --> 00:11:33,439
young and and at one speed the slinky

257

00:11:31,009 --> 00:11:35,419
goes downhill at exactly the same rate

258
00:11:33,440 --> 00:11:40,100
that the treadmill is going uphill so

259
00:11:35,419 --> 00:11:41,750
it's a forever exhibit so if we're gonna

260
00:11:40,100 --> 00:11:44,840
be top that their energy and we get

261
00:11:41,750 --> 00:11:46,309
perpetual motion that's right it's

262
00:11:44,840 --> 00:11:48,259
really fun we don't give them any

263
00:11:46,309 --> 00:11:51,099
instructions of how to make the exhibit

264
00:11:48,259 --> 00:11:54,439
work they they have to go up there and

265
00:11:51,100 --> 00:11:57,019
cooperate or compete and work with each

266
00:11:54,440 --> 00:11:58,880
other it's over on the left here is

267
00:11:57,019 --> 00:12:01,429
something you hardly ever see in a

268
00:11:58,879 --> 00:12:03,200
museum as you walk through this is the

269
00:12:01,429 --> 00:12:07,009
exhibits actually being built

270
00:12:03,200 --> 00:12:08,960
it's a we can view the whole of the

271
00:12:07,009 --> 00:12:11,779

workshop area from here that's right and

272

00:12:08,960 --> 00:12:15,200

there are lots of milling machine yes

273

00:12:11,779 --> 00:12:15,769

routers and maybe how'd it work putting

274

00:12:15,200 --> 00:12:17,780

things together

275

00:12:15,769 --> 00:12:21,970

here's Diane over here coming out she's

276

00:12:17,779 --> 00:12:24,939

one of our best exhibit builders and so

277

00:12:21,970 --> 00:12:27,160

it's an exhibit in itself isn't it

278

00:12:24,940 --> 00:12:28,660

and it's unique and then over here is

279

00:12:27,159 --> 00:12:31,959

something we do only for the summit

280

00:12:28,659 --> 00:12:35,439

summer this is a small workshop just for

281

00:12:31,960 --> 00:12:37,570

teachers and so I have high school and

282

00:12:35,440 --> 00:12:40,810

middle school science teachers and we

283

00:12:37,570 --> 00:12:43,540

teach them machine shop skills using

284

00:12:40,809 --> 00:12:44,859

drill presses and band saws so these

285

00:12:43,539 --> 00:12:46,809

good people here are teachers here are

286
00:12:44,860 --> 00:12:48,639
all teachers oh well and here are the

287
00:12:46,809 --> 00:12:51,699
examples of the things they can build

288
00:12:48,639 --> 00:12:54,610
yeah and if they build it they can take

289
00:12:51,700 --> 00:12:58,509
it home as their own so we drive them to

290
00:12:54,610 --> 00:13:01,600
learn the skills of building by giving

291
00:12:58,509 --> 00:13:03,129
them hands-on experiments they can do in

292
00:13:01,600 --> 00:13:05,290
their classroom that's the one on the

293
00:13:03,129 --> 00:13:08,860
left over here is a a painters tray a

294
00:13:05,289 --> 00:13:11,559
long tray and in it you would put soapy

295
00:13:08,860 --> 00:13:14,680
water and then there's a rod that you

296
00:13:11,559 --> 00:13:16,779
pull up with a pulley that will pull the

297
00:13:14,679 --> 00:13:18,879
soapy water up into a film and so you'll

298
00:13:16,779 --> 00:13:20,799
have a planer bubble instead of a

299
00:13:18,879 --> 00:13:23,230
spherical bubble like you blow normally

300
00:13:20,799 --> 00:13:25,719
as a kid it'll be a flat plane a bubble

301
00:13:23,230 --> 00:13:27,820
and it makes incredible colors with the

302
00:13:25,720 --> 00:13:30,460
light reflecting off of it it's just a

303
00:13:27,820 --> 00:13:32,379
great lesson it's fantastic yeah and so

304
00:13:30,460 --> 00:13:34,360
and the teachers are now part of the

305
00:13:32,379 --> 00:13:35,889
exhibit themselves they are as people

306
00:13:34,360 --> 00:13:37,480
like you and me walking fast and just

307
00:13:35,889 --> 00:13:39,460
stand here and look at them and ask

308
00:13:37,480 --> 00:13:41,259
questions and they ant their teachers

309
00:13:39,460 --> 00:13:44,350
you ask them a question they will talk

310
00:13:41,259 --> 00:13:47,000
to you forever we might try that in fact

311
00:13:44,350 --> 00:13:50,300
we could try that we could hello

312
00:13:47,000 --> 00:13:53,240
hi hello I'm from the Sydney Australia

313
00:13:50,299 --> 00:13:54,620
doing a podcast a scientific podcast I

314

00:13:53,240 --> 00:13:57,310
thought I'm not your name's Colleen

315
00:13:54,620 --> 00:14:00,139
yes I guess that from your badge yeah

316
00:13:57,309 --> 00:14:02,209
and your science teacher I am yes I

317
00:14:00,139 --> 00:14:04,699
teach high school science biology we're

318
00:14:02,210 --> 00:14:06,800
at Archbishop Riordan it's a boys high

319
00:14:04,700 --> 00:14:08,509
school here in San Francisco okay you

320
00:14:06,799 --> 00:14:10,099
get the thumbs-up from pull over I Drive

321
00:14:08,509 --> 00:14:12,049
by it all the time over there on Sunset

322
00:14:10,100 --> 00:14:14,060
all right yeah and so what's it like

323
00:14:12,049 --> 00:14:15,889
being part of the exhibit but learning

324
00:14:14,059 --> 00:14:18,199
stuff at the same time it's outstanding

325
00:14:15,889 --> 00:14:19,789
I mean this is the sort of stuff that

326
00:14:18,200 --> 00:14:21,170
when I was a kid I used to come to

327
00:14:19,789 --> 00:14:24,259
science Uzis I used to go to the old

328
00:14:21,169 --> 00:14:26,120

location grew up in the area and I used

329

00:14:24,259 --> 00:14:28,220

to look up to people you know the adults

330

00:14:26,120 --> 00:14:29,960

doing you know actual science things so

331

00:14:28,220 --> 00:14:31,759

to be like I'm at the Science Museum

332

00:14:29,960 --> 00:14:33,320

doing science things and kids are like

333

00:14:31,759 --> 00:14:35,120

it's just mean at the full circle sort

334

00:14:33,320 --> 00:14:38,420

of thing and be able to come here with

335

00:14:35,120 --> 00:14:40,610

all these really creative outgoing like

336

00:14:38,419 --> 00:14:42,679

energetic people that have just amazing

337

00:14:40,610 --> 00:14:44,090

ideas like I just like talking to people

338

00:14:42,679 --> 00:14:46,069

and like that's a good idea that's a

339

00:14:44,090 --> 00:14:47,690

good idea and just a whole culture of

340

00:14:46,070 --> 00:14:49,190

learning in this building just for these

341

00:14:47,690 --> 00:14:51,170

three weeks I'm just like trying to soak

342

00:14:49,190 --> 00:14:53,360

up as much as I can while I'm here well

343
00:14:51,169 --> 00:14:55,399
I wish I was one of your students thank

344
00:14:53,360 --> 00:14:57,800
you thank you so much Hillary thank you

345
00:14:55,399 --> 00:14:59,809
thank you we have armed our staff

346
00:14:57,799 --> 00:15:01,279
machine shop where we build the exhibits

347
00:14:59,809 --> 00:15:03,199
for the public and the exhibits for the

348
00:15:01,279 --> 00:15:05,899
public have to be built to withstand the

349
00:15:03,200 --> 00:15:08,060
most destructive force known to man the

350
00:15:05,899 --> 00:15:10,309
seventh grade boy little children I

351
00:15:08,059 --> 00:15:11,719
shouldn't have to say yes yeah and but

352
00:15:10,309 --> 00:15:14,929
but the ones that the teachers are

353
00:15:11,720 --> 00:15:16,850
building are very flimsy and because

354
00:15:14,929 --> 00:15:19,129
they have to know how to build them and

355
00:15:16,850 --> 00:15:20,870
repair them and so if their class

356
00:15:19,129 --> 00:15:22,669
destroys them then the class has to

357
00:15:20,870 --> 00:15:24,080
rebuild it okay and that's that's a

358
00:15:22,669 --> 00:15:26,838
great lesson

359
00:15:24,080 --> 00:15:29,778
and as we were discussing earlier that

360
00:15:26,839 --> 00:15:31,399
the place is absolutely filled with

361
00:15:29,778 --> 00:15:33,259
children but it's just filled it's full

362
00:15:31,399 --> 00:15:37,190
it's got a great attendance here what we

363
00:15:33,259 --> 00:15:39,620
do yeah they'll be today we'll have four

364
00:15:37,190 --> 00:15:40,850
thousand people here Wow yeah and all

365
00:15:39,620 --> 00:15:42,409
through the summer pretty soon in the

366
00:15:40,850 --> 00:15:44,959
summer it'll be so crowded it will be

367
00:15:42,409 --> 00:15:46,549
hard to walk and and right now it's

368
00:15:44,958 --> 00:15:47,869
great that's great and that's four

369
00:15:46,549 --> 00:15:50,088
thousand during the day right now there

370
00:15:47,870 --> 00:15:51,980
are probably a thousand people in the

371

00:15:50,089 --> 00:15:54,950
museum that's two people for every

372
00:15:51,980 --> 00:15:56,329
exhibit in the place actually here's a

373
00:15:54,950 --> 00:15:58,579
very important thing about the museum

374
00:15:56,328 --> 00:16:00,699
behind you over here oh yeah our floor

375
00:15:58,578 --> 00:16:03,949
staff is composed of high school

376
00:16:00,700 --> 00:16:06,140
students we're the largest employer of

377
00:16:03,950 --> 00:16:07,850
high school students in the city we

378
00:16:06,139 --> 00:16:09,649
bring them in we teach them there

379
00:16:07,850 --> 00:16:12,050
they're teaching about the ear and sound

380
00:16:09,649 --> 00:16:15,019
right now with the demos so we'll go

381
00:16:12,049 --> 00:16:17,319
visit how to do it and then they do it

382
00:16:15,019 --> 00:16:19,700
for the public and answer questions and

383
00:16:17,320 --> 00:16:21,320
we get they get paid for it that's

384
00:16:19,700 --> 00:16:22,670
pretty cool so there are a couple of

385
00:16:21,320 --> 00:16:23,778

high school students there are a couple

386

00:16:22,669 --> 00:16:26,299

high school students there at the moment

387

00:16:23,778 --> 00:16:28,100

and you're reassembling an ear that we

388

00:16:26,299 --> 00:16:32,689

have this giant ear about it about about

389

00:16:28,100 --> 00:16:34,339

a third of a meter high yeah it's yeah

390

00:16:32,690 --> 00:16:35,810

it's a hole if folks if you can imagine

391

00:16:34,339 --> 00:16:37,480

the classic pictures you see of the

392

00:16:35,809 --> 00:16:40,879

outer ear going into the ear canal

393

00:16:37,480 --> 00:16:44,139

eardrum that's a big model of that and

394

00:16:40,879 --> 00:16:47,149

one of the young students here is

395

00:16:44,139 --> 00:16:49,909

teaching a small group in front of her

396

00:16:47,149 --> 00:16:51,049

all about the inner ear let's listen in

397

00:16:49,909 --> 00:16:54,278

yet

398

00:16:51,049 --> 00:16:54,278

I spent around a lot

399

00:16:55,570 --> 00:17:00,760

so basically when you do that it's just

400
00:16:58,690 --> 00:17:04,029
your offsetting your balance this is

401
00:17:00,759 --> 00:17:07,930
what makes you kind of Center and in a

402
00:17:04,029 --> 00:17:09,789
way whenever you she's discussing the

403
00:17:07,930 --> 00:17:11,470
balance in her ear the inner admits that

404
00:17:09,789 --> 00:17:12,609
she was just talking about it and and

405
00:17:11,470 --> 00:17:17,230
they have in front of them an array of

406
00:17:12,609 --> 00:17:19,269
spoons and tongs metal and strings and

407
00:17:17,230 --> 00:17:21,910
they put the string in near their ear

408
00:17:19,269 --> 00:17:24,369
and then bang the spoon and they hear on

409
00:17:21,910 --> 00:17:26,170
May it sounds like Big Ben it's just

410
00:17:24,369 --> 00:17:28,000
amazing that that spoon can make that

411
00:17:26,170 --> 00:17:30,670
sound and series of student tuning folks

412
00:17:28,000 --> 00:17:32,950
there too right exactly well let's just

413
00:17:30,670 --> 00:17:34,600
make it real as our key in fact we are

414
00:17:32,950 --> 00:17:37,240
for your listeners I'm going to take

415
00:17:34,599 --> 00:17:40,000
them to a very rare thing we very often

416
00:17:37,240 --> 00:17:41,920
see visual illusions I'm going to give

417
00:17:40,000 --> 00:17:43,390
them an audio illusion it sounds

418
00:17:41,920 --> 00:17:45,700
interesting so yeah this is this is a

419
00:17:43,390 --> 00:17:49,030
break so it's called it's called Shepard

420
00:17:45,700 --> 00:17:51,880
tones and johann sebastian bach almost

421
00:17:49,029 --> 00:17:55,299
discovered it almost but he didn't but

422
00:17:51,880 --> 00:17:57,040
shepard did and so let's go I have a

423
00:17:55,299 --> 00:17:58,930
very simple question for you probably

424
00:17:57,039 --> 00:18:01,599
can tell a high-pitched sound from a low

425
00:17:58,930 --> 00:18:04,870
pitch sound I hope so yes I hope so

426
00:18:01,599 --> 00:18:08,409
let's see how you do right so we have

427
00:18:04,869 --> 00:18:10,899
this some display over here and you'll

428

00:18:08,410 --> 00:18:12,970
notice it's one octave of a piano

429
00:18:10,900 --> 00:18:15,130
keyboard but it's been wrapped in a

430
00:18:12,970 --> 00:18:16,750
circle we took a piano and wrapped it in

431
00:18:15,130 --> 00:18:19,090
a circuit it's a keyboard a circular

432
00:18:16,750 --> 00:18:20,349
keyboard yeah so I'm gonna I'm gonna

433
00:18:19,089 --> 00:18:22,389
play around all right

434
00:18:20,349 --> 00:18:24,250
series of notes yeah and you just find

435
00:18:22,390 --> 00:18:26,530
the highest one the name of the exhibit

436
00:18:24,250 --> 00:18:39,730
is fine the highest note all right could

437
00:18:26,529 --> 00:18:40,599
it be stop you when we get ringing wait

438
00:18:39,730 --> 00:18:42,279
a minute

439
00:18:40,599 --> 00:18:46,740
you've gone around once you hitting the

440
00:18:42,279 --> 00:18:50,289
same notes yeah yeah the same same time

441
00:18:46,740 --> 00:18:52,390
all right so if I say stop at any one

442
00:18:50,289 --> 00:18:54,220

yeah it's theoretically the highest note

443

00:18:52,390 --> 00:18:55,690

oh heavens no no no it matter which one

444

00:18:54,220 --> 00:18:57,028

I stopped at say you start me at this

445

00:18:55,690 --> 00:19:03,629

one

446

00:18:57,028 --> 00:19:10,679

the next one ah it's always higher you

447

00:19:03,628 --> 00:19:12,958

go around counterclockwise oh that's

448

00:19:10,679 --> 00:19:15,929

that's very golden this is my playing

449

00:19:12,959 --> 00:19:17,999

one note it's actually playing about

450

00:19:15,929 --> 00:19:21,298

seven different notes when you press the

451

00:19:17,999 --> 00:19:24,449

a C on the piano it'll play seven

452

00:19:21,298 --> 00:19:29,219

octaves of C and then when you play a D

453

00:19:24,449 --> 00:19:34,919

it plays seven octaves of D and so on

454

00:19:29,219 --> 00:19:36,328

and so each one each sub note has gone

455

00:19:34,919 --> 00:19:39,028

up a little bit and you're here said

456

00:19:36,328 --> 00:19:41,608

okay every subcomponent has gone up but

457
00:19:39,028 --> 00:19:45,628
at some point you're playing a note

458
00:19:41,608 --> 00:19:47,398
that's exactly in the middle and what

459
00:19:45,628 --> 00:19:49,948
we're doing is with the low frequency

460
00:19:47,398 --> 00:19:51,628
ones were fading in and we're increasing

461
00:19:49,949 --> 00:19:53,689
them in frequency as we go around making

462
00:19:51,628 --> 00:19:56,878
them louder and so it's a well-known

463
00:19:53,689 --> 00:19:58,499
illusion that is fantastic on this is

464
00:19:56,878 --> 00:20:01,498
I'm going to play two notes black and

465
00:19:58,499 --> 00:20:04,940
white black white ah

466
00:20:01,499 --> 00:20:07,219
black white ah the white is higher pitch

467
00:20:04,940 --> 00:20:09,659
[Music]

468
00:20:07,219 --> 00:20:16,798
okay yeah now I'm going to play black

469
00:20:09,659 --> 00:20:22,169
and white across yes one opposite yeah

470
00:20:16,798 --> 00:20:23,699
this one is lower in pitch to me but it

471
00:20:22,169 --> 00:20:24,119
might be higher in pitch to you you know

472
00:20:23,699 --> 00:20:29,149
what

473
00:20:24,118 --> 00:20:32,098
no I'm chuckling to about this exhibit I

474
00:20:29,148 --> 00:20:34,828
can show you what I'm hearing

475
00:20:32,098 --> 00:20:37,348
this exhibit lets me turn me and B you

476
00:20:34,828 --> 00:20:38,608
into me so listen to this I'm going to

477
00:20:37,348 --> 00:20:46,648
play the black one and I'm going to go

478
00:20:38,608 --> 00:20:48,568
around to the white one and now you

479
00:20:46,648 --> 00:20:51,028
heard the white one second one is lower

480
00:20:48,568 --> 00:20:53,239
yes yes yeah yes but now if I go the

481
00:20:51,028 --> 00:20:53,239
other way

482
00:20:57,210 --> 00:21:01,180
now you hear it as higher that's

483
00:20:59,230 --> 00:21:03,730
fantastic oh this is not only a

484
00:21:01,180 --> 00:21:06,610
wonderful acoustic illusion it's one

485

00:21:03,730 --> 00:21:09,610
that no matter what you hear I can show

486
00:21:06,609 --> 00:21:11,799
you what I hear by guiding you slowly

487
00:21:09,609 --> 00:21:14,229
around so if you want to look it up it's

488
00:21:11,799 --> 00:21:17,319
called a Shepard tone Shepard tone okay

489
00:21:14,230 --> 00:21:20,440
and it's a great acoustic illusion it's

490
00:21:17,319 --> 00:21:24,069
that's yeah and we use illusions here to

491
00:21:20,440 --> 00:21:25,539
to show people why you can't directly

492
00:21:24,069 --> 00:21:27,069
trust your senses you've got to do

493
00:21:25,539 --> 00:21:28,809
measure you have to understand your

494
00:21:27,069 --> 00:21:30,490
senses before you trust them and you

495
00:21:28,809 --> 00:21:34,210
have to do measurements if you're a

496
00:21:30,490 --> 00:21:36,130
scientist yes a message the skeptic zone

497
00:21:34,210 --> 00:21:37,990
fans know very well that's right don't

498
00:21:36,130 --> 00:21:40,210
trust your senses your senses

499
00:21:37,990 --> 00:21:43,390

let me then take you to one which is my

500

00:21:40,210 --> 00:21:45,610

latest creation at the Museum so and

501

00:21:43,390 --> 00:21:48,400

this one's got to be video visual so you

502

00:21:45,609 --> 00:21:51,669

ought to describe it to people but over

503

00:21:48,400 --> 00:21:53,850

here we have quite a large about a four

504

00:21:51,670 --> 00:21:56,529

meter wide and three meter high

505

00:21:53,849 --> 00:21:59,109

parabolic mirror a beautiful thing

506

00:21:56,529 --> 00:22:00,579

Wow it's fascinating and if you stand in

507

00:21:59,109 --> 00:22:02,529

front of it right all right I'm standing

508

00:22:00,579 --> 00:22:05,649

in front of the mirror and you see

509

00:22:02,529 --> 00:22:07,930

yourself now folks it's it's almost

510

00:22:05,650 --> 00:22:11,290

impossible to describe I am looking at

511

00:22:07,930 --> 00:22:13,299

myself in three dimensions a reflection

512

00:22:11,289 --> 00:22:15,279

upside down right like I'm hanging from

513

00:22:13,299 --> 00:22:17,139

the ceiling reach your hand up there it

514
00:22:15,279 --> 00:22:19,299
is right there okay you are touching

515
00:22:17,140 --> 00:22:21,070
your hand right I was my front of the

516
00:22:19,299 --> 00:22:22,869
mirror like like eight feet in front of

517
00:22:21,069 --> 00:22:25,240
the mirror your hand reached out for you

518
00:22:22,869 --> 00:22:30,399
to touch it's bizarre I'm looking at

519
00:22:25,240 --> 00:22:33,370
myself I'm reaching out and I'm now I've

520
00:22:30,400 --> 00:22:35,440
got my hand in my own hand yeah and I

521
00:22:33,369 --> 00:22:37,779
guess you just have to come here to

522
00:22:35,440 --> 00:22:40,090
really understand what we're talking but

523
00:22:37,779 --> 00:22:42,039
now this is this is a little weird

524
00:22:40,089 --> 00:22:44,649
because you're upside down but I

525
00:22:42,039 --> 00:22:47,589
discovered I'm a big fan of Lewis

526
00:22:44,650 --> 00:22:49,509
Carroll oh yeah and so Alice Through the

527
00:22:47,589 --> 00:22:51,309
Looking Glass yes so I thought about

528
00:22:49,509 --> 00:22:52,869
that and I made a new part of this

529
00:22:51,309 --> 00:22:54,879
exhibit I'm going to let you walk

530
00:22:52,869 --> 00:22:55,959
through a looking-glass I'm going to

531
00:22:54,880 --> 00:22:57,910
have you walk through a mirror you're

532
00:22:55,960 --> 00:23:01,660
going to become Alice sound let me do

533
00:22:57,910 --> 00:23:02,920
that good to me this giant mirror here I

534
00:23:01,660 --> 00:23:03,670
need to pull out the looking-glass

535
00:23:02,920 --> 00:23:05,560
itself

536
00:23:03,670 --> 00:23:08,250
oh here oh you're bringing this round

537
00:23:05,559 --> 00:23:10,500
it's a it's like a mirror

538
00:23:08,250 --> 00:23:12,750
I understand and Paul's pulling it out

539
00:23:10,500 --> 00:23:15,750
in front of everybody here like it looks

540
00:23:12,750 --> 00:23:17,880
like I might be a guinea pig and he's

541
00:23:15,750 --> 00:23:21,119
angling it so the mirror is now facing

542

00:23:17,880 --> 00:23:22,830
the giant mirror yeah I'm coming around

543
00:23:21,119 --> 00:23:27,029
the back now so there's a mirror right

544
00:23:22,829 --> 00:23:29,490
there oh and now it's very confusing

545
00:23:27,029 --> 00:23:31,678
yeah now you can walk through that

546
00:23:29,490 --> 00:23:33,000
mirror now as you walk through as you go

547
00:23:31,679 --> 00:23:35,820
through the mirror your head's going to

548
00:23:33,000 --> 00:23:37,679
explode and then reassemble upside down

549
00:23:35,819 --> 00:23:39,418
do I want to do this yes you want to do

550
00:23:37,679 --> 00:23:41,850
this so just walk right now right here

551
00:23:39,419 --> 00:23:43,380
I'm gonna be next so what I'm doing is

552
00:23:41,849 --> 00:23:44,849
I'm walking towards a reflection of a

553
00:23:43,380 --> 00:23:46,409
mirror which is upside down but I'm the

554
00:23:44,849 --> 00:23:48,269
right-side up in the upside down mirror

555
00:23:46,409 --> 00:23:53,820
yes okay here we go

556
00:23:48,269 --> 00:23:56,400

and I it's indescribable that is

557

00:23:53,819 --> 00:23:59,730
incredible well it's all done with

558

00:23:56,400 --> 00:24:01,769
mirrors and people trying was a little

559

00:23:59,730 --> 00:24:06,349
boy trying it now he's walking straight

560

00:24:01,769 --> 00:24:06,349
into the mirror and disappearing

561

00:24:06,500 --> 00:24:12,089
expression on their face becomes an AC

562

00:24:09,329 --> 00:24:14,639
lady going through

563

00:24:12,089 --> 00:24:16,230
it's like it's like nothing I've done

564

00:24:14,640 --> 00:24:21,450
and now everyone's lined up to try it

565

00:24:16,230 --> 00:24:23,250
for themselves that's it's bizarre and

566

00:24:21,450 --> 00:24:24,930
what you see as you actually walk

567

00:24:23,250 --> 00:24:27,480
through it is different that what people

568

00:24:24,930 --> 00:24:29,400
see when they're watching you absolutely

569

00:24:27,480 --> 00:24:31,829
as you walk through the mirror your head

570

00:24:29,400 --> 00:24:33,720
explodes and fills the entire space of

571
00:24:31,829 --> 00:24:36,210
the giant mirror and then comes back

572
00:24:33,720 --> 00:24:38,640
together upside down and it is mazhab

573
00:24:36,210 --> 00:24:40,500
because as you approach a mirror and if

574
00:24:38,640 --> 00:24:42,270
your brain is telling you you're walking

575
00:24:40,500 --> 00:24:44,339
into a solid mirror yeah it just

576
00:24:42,269 --> 00:24:46,680
evaporates yeah and then you walk right

577
00:24:44,339 --> 00:24:48,959
through it yeah so this one I really

578
00:24:46,680 --> 00:24:51,539
like because it really blows people's

579
00:24:48,960 --> 00:24:52,799
minds in many ways yeah and here we have

580
00:24:51,539 --> 00:24:54,359
something I'm really enjoying it

581
00:24:52,799 --> 00:24:55,950
everyone's enjoying it now they've been

582
00:24:54,359 --> 00:24:59,899
lined up to do it one thing you can do

583
00:24:55,950 --> 00:25:03,750
is mirrors work in sound as well as

584
00:24:59,900 --> 00:25:05,820
vision so as you walk up to the flat

585
00:25:03,750 --> 00:25:08,099
mirror if you stop just a little bit in

586
00:25:05,819 --> 00:25:10,019
front of the flat mirror and speak it

587
00:25:08,099 --> 00:25:12,779
it'll it'll make your voice louder ish

588
00:25:10,019 --> 00:25:14,910
it the microphone might pick up your

589
00:25:12,779 --> 00:25:16,289
voice reflecting off the mirror alright

590
00:25:14,910 --> 00:25:18,180
let's give that a go the trouble is of

591
00:25:16,289 --> 00:25:20,690
course now you brought out this other

592
00:25:18,180 --> 00:25:22,740
mirror we've got a line of people that's

593
00:25:20,690 --> 00:25:24,480
willing to give it a glitch is what

594
00:25:22,740 --> 00:25:26,670
exactly what you want it's really great

595
00:25:24,480 --> 00:25:30,660
to see yeah so we'll wait for a moment

596
00:25:26,670 --> 00:25:32,130
and see what we can do okay now I'm

597
00:25:30,660 --> 00:25:35,310
walking back towards the mirror again

598
00:25:32,130 --> 00:25:36,900
which I walked through before and hello

599

00:25:35,309 --> 00:25:40,409

yes I could hear my voice

600

00:25:36,900 --> 00:25:42,390

that's strange it's echoing back I hope

601

00:25:40,410 --> 00:25:44,400

you can hear that on the microphone and

602

00:25:42,390 --> 00:25:47,759

of course my head's exploding at the

603

00:25:44,400 --> 00:25:50,790

same time so wow that's that's something

604

00:25:47,759 --> 00:25:53,190

else and I had a bunch of high school

605

00:25:50,789 --> 00:25:55,019

physics teachers here today and they

606

00:25:53,190 --> 00:25:57,450

know about mirrors and they know about

607

00:25:55,019 --> 00:26:01,200

curved mirrors but this one blew their

608

00:25:57,450 --> 00:26:03,600

minds and made them really passionately

609

00:26:01,200 --> 00:26:06,450

want to know how to jab that how did

610

00:26:03,599 --> 00:26:08,879

that work and I had to actually go and

611

00:26:06,450 --> 00:26:12,240

we had to work through it slowly so they

612

00:26:08,880 --> 00:26:13,980

understood it now look at this we're

613

00:26:12,240 --> 00:26:15,089

back now from the mirror maybe about

614

00:26:13,980 --> 00:26:17,069
three meters right

615

00:26:15,089 --> 00:26:20,039
and we're looking at the reflections of

616

00:26:17,069 --> 00:26:21,539
other people sort of to our left but not

617

00:26:20,039 --> 00:26:22,899
only are they upside down in three

618

00:26:21,539 --> 00:26:26,558
dimensions but they're

619

00:26:22,900 --> 00:26:28,570
one and a half times sighs yeah that's

620

00:26:26,558 --> 00:26:30,940
right yeah it gets curiouser and

621

00:26:28,569 --> 00:26:33,970
curiouser said Alice that's right

622

00:26:30,940 --> 00:26:36,279
welcome to the Alice's World yeah yeah

623

00:26:33,970 --> 00:26:38,700
it much curiouser and that's the key of

624

00:26:36,279 --> 00:26:41,769
the Exploratorium is curiosity and

625

00:26:38,700 --> 00:26:45,759
inspiring people to ask questions and

626

00:26:41,769 --> 00:26:47,920
and find the answers themselves you

627

00:26:45,759 --> 00:26:52,650
notice there's no explanation here right

628
00:26:47,920 --> 00:26:55,690
right this is just okay have fun enjoy

629
00:26:52,650 --> 00:26:57,490
well without snuck into the the

630
00:26:55,690 --> 00:27:00,009
behind-the-scenes area here the

631
00:26:57,490 --> 00:27:01,660
Exploratorium misses a teachers room or

632
00:27:00,009 --> 00:27:03,700
something like that yeah this sort it's

633
00:27:01,660 --> 00:27:06,790
adjacent to a classroom and it's full of

634
00:27:03,700 --> 00:27:07,779
teaching supplies ah yes yeah it looks

635
00:27:06,789 --> 00:27:09,308
like it yeah

636
00:27:07,779 --> 00:27:12,460
but it's just a nice quiet place so we

637
00:27:09,308 --> 00:27:15,519
can have a brief talk now just for our

638
00:27:12,460 --> 00:27:17,319
listeners segment can you give a the The

639
00:27:15,519 --> 00:27:19,869
Reader's Digest version of the history

640
00:27:17,319 --> 00:27:21,609
of the Exploratorium so a Franko

641
00:27:19,869 --> 00:27:24,250
bernheimer was on the Manhattan Project

642
00:27:21,609 --> 00:27:25,629
and then after the Manhattan Project he

643
00:27:24,250 --> 00:27:29,980
went and became a high school teacher in

644
00:27:25,630 --> 00:27:32,800
Colorado and pretty soon the scientists

645
00:27:29,980 --> 00:27:36,240
in Colorado noted that these students

646
00:27:32,799 --> 00:27:40,539
from this remote district very rural

647
00:27:36,240 --> 00:27:41,980
farming district in Colorado State were

648
00:27:40,539 --> 00:27:43,720
winning all the science fair

649
00:27:41,980 --> 00:27:46,509
competitions uh-huh so they looked into

650
00:27:43,720 --> 00:27:49,269
it and they found that this this teacher

651
00:27:46,509 --> 00:27:51,640
Frank Oppenheim er was teaching the

652
00:27:49,269 --> 00:27:53,259
students better than anybody else so the

653
00:27:51,640 --> 00:27:54,910
local university the University of

654
00:27:53,259 --> 00:27:57,129
Colorado at Boulder hired him away to

655
00:27:54,910 --> 00:28:00,250
come and help them teach their students

656

00:27:57,130 --> 00:28:03,280
and Frank made the Junior Physics

657
00:28:00,250 --> 00:28:04,990
Laboratory 17 exhibits the students

658
00:28:03,279 --> 00:28:06,519
would go to one exhibit a week and then

659
00:28:04,990 --> 00:28:09,519
move to the next one in the next one

660
00:28:06,519 --> 00:28:13,329
that taught basic physics ideas but then

661
00:28:09,519 --> 00:28:15,039
Frank noted that people would would the

662
00:28:13,329 --> 00:28:17,319
students would return on the weekend and

663
00:28:15,039 --> 00:28:20,470
bring their friends to play with the

664
00:28:17,319 --> 00:28:22,178
physics experiment and he realized he

665
00:28:20,470 --> 00:28:24,730
was onto something yeah so when he

666
00:28:22,179 --> 00:28:29,140
toured the great museums of Europe the

667
00:28:24,730 --> 00:28:32,089
deutsches museum the palais des Kuvera

668
00:28:29,140 --> 00:28:34,309
and he took their best

669
00:28:32,089 --> 00:28:36,379
ideas and and then looked around the

670
00:28:34,308 --> 00:28:38,329

United States for a big building that he

671

00:28:36,380 --> 00:28:40,370

could rent and the city of San Francisco

672

00:28:38,329 --> 00:28:43,788

had this big empty building that was

673

00:28:40,369 --> 00:28:47,000

built for the World's Fair of 1916 hmm

674

00:28:43,788 --> 00:28:49,339

the Pan Pacific Exhibition had stood

675

00:28:47,000 --> 00:28:52,940

empty most of the time since then so in

676

00:28:49,339 --> 00:28:55,759

1969 he rented that building 10,000

677

00:28:52,940 --> 00:28:58,038

square meters for \$1 a year with

678

00:28:55,759 --> 00:28:58,519

electricity for free wow that's pretty

679

00:28:58,038 --> 00:29:00,769

good

680

00:28:58,519 --> 00:29:02,629

and then he he started building the

681

00:29:00,769 --> 00:29:05,629

Exploratorium and he brought in local

682

00:29:02,630 --> 00:29:08,360

artists and builders and then they

683

00:29:05,630 --> 00:29:10,399

created these things we call exhibits

684

00:29:08,359 --> 00:29:12,349

simple physics experiments that you

685
00:29:10,398 --> 00:29:14,418
could interact with but he also brought

686
00:29:12,349 --> 00:29:17,298
in local artists who had one big idea

687
00:29:14,419 --> 00:29:20,059
they always wanted to make and he would

688
00:29:17,298 --> 00:29:22,788
turn them loose with programmers and

689
00:29:20,058 --> 00:29:24,859
machinists to make their idea real and

690
00:29:22,788 --> 00:29:27,379
some of the best exhibits in this place

691
00:29:24,859 --> 00:29:29,479
to this day came from local artists who

692
00:29:27,380 --> 00:29:32,059
were passionate about one thing and

693
00:29:29,480 --> 00:29:35,240
built it at the Exploratorium

694
00:29:32,058 --> 00:29:41,210
well that was 1969 and we grew since

695
00:29:35,240 --> 00:29:42,980
then until about 2014 when this building

696
00:29:41,210 --> 00:29:45,500
we were in needed tremendous amounts of

697
00:29:42,980 --> 00:29:47,720
repairs it was a hundred years old

698
00:29:45,500 --> 00:29:50,028
mmm just about and it was in need of

699

00:29:47,720 --> 00:29:51,649

repairs so the city offered us a

700

00:29:50,028 --> 00:29:54,500

different building also in need of

701

00:29:51,648 --> 00:29:57,798

repairs but the new building was Pier 15

702

00:29:54,500 --> 00:30:01,038

in San Francisco which is which one is

703

00:29:57,798 --> 00:30:03,679

this is pier 15 that's Lucy here 15 and

704

00:30:01,038 --> 00:30:07,278

it needed a lot of repairs we fixed it

705

00:30:03,679 --> 00:30:09,919

up and now in return for us repairing it

706

00:30:07,278 --> 00:30:11,058

we have free rent for the next 60 years

707

00:30:09,919 --> 00:30:13,130

Wow

708

00:30:11,058 --> 00:30:14,869

yeah and so we'll be here now with free

709

00:30:13,130 --> 00:30:16,490

rent but we saved the building the city

710

00:30:14,869 --> 00:30:18,798

owns the building we saved it for it

711

00:30:16,490 --> 00:30:22,490

what a good situation rate situation not

712

00:30:18,798 --> 00:30:25,869

only do you do well by the city yes

713

00:30:22,490 --> 00:30:27,759
in that respect the city did too

714
00:30:25,869 --> 00:30:29,439
is gaining by the the fact that it's

715
00:30:27,759 --> 00:30:31,990
here that's right and we have huge

716
00:30:29,440 --> 00:30:33,789
retraction and we do a really good job

717
00:30:31,990 --> 00:30:36,609
of working with local teachers and

718
00:30:33,789 --> 00:30:38,859
students as we saw the students we

719
00:30:36,609 --> 00:30:42,009
employ them they come here and learn

720
00:30:38,859 --> 00:30:43,329
that science learning can be fun and

721
00:30:42,009 --> 00:30:46,480
that's the best lesson we could possibly

722
00:30:43,329 --> 00:30:49,329
and and we're doing really well right

723
00:30:46,480 --> 00:30:51,819
now we're the state of California funds

724
00:30:49,329 --> 00:30:54,399
us to train teachers and how to make

725
00:30:51,819 --> 00:30:57,429
science class more interesting and we do

726
00:30:54,400 --> 00:30:59,440
it we spend many many hours well just on

727
00:30:57,430 --> 00:31:01,990

our way here this back room we passed a

728

00:30:59,440 --> 00:31:03,100

whole B classroom full of science

729

00:31:01,990 --> 00:31:04,329

teachers I see that's right those are

730

00:31:03,099 --> 00:31:06,849

all middle and high school science

731

00:31:04,329 --> 00:31:08,379

teachers in the morning they choose

732

00:31:06,849 --> 00:31:09,909

which class they're going to go to we

733

00:31:08,380 --> 00:31:13,059

have high school biology high school

734

00:31:09,910 --> 00:31:14,440

physics and middle school science those

735

00:31:13,058 --> 00:31:16,089

are the three classes were teaching

736

00:31:14,440 --> 00:31:19,360

right now but in the afternoon we have

737

00:31:16,089 --> 00:31:20,730

specialty classes and I believe Zeke as

738

00:31:19,359 --> 00:31:23,829

we walked by was teaching a lesson on

739

00:31:20,730 --> 00:31:26,860

ultraviolet light and the teachers can

740

00:31:23,829 --> 00:31:30,490

then pick from three classes every

741

00:31:26,859 --> 00:31:32,829

afternoon with a specific topic yeah so

742
00:31:30,490 --> 00:31:34,720
yesterday I did how to measure

743
00:31:32,829 --> 00:31:36,490
electrical circuits I taught teachers

744
00:31:34,720 --> 00:31:39,069
how to measure voltage and current and

745
00:31:36,490 --> 00:31:43,089
not kill themselves very important

746
00:31:39,069 --> 00:31:44,740
lesson and and they choose to come now

747
00:31:43,089 --> 00:31:47,379
the teachers come and they come every

748
00:31:44,740 --> 00:31:49,929
day all day long for three weeks and

749
00:31:47,380 --> 00:31:51,730
then at the end of the summer we paid

750
00:31:49,929 --> 00:31:56,429
them two thousand five hundred dollars

751
00:31:51,730 --> 00:31:56,429
to come and that money is provided by

752
00:31:56,960 --> 00:32:03,950
private donors essentially charities

753
00:32:00,019 --> 00:32:05,899
philanthropies the the Hewlett

754
00:32:03,950 --> 00:32:08,450
Foundation the Packard Foundation the

755
00:32:05,898 --> 00:32:13,298
noise foundation and by the state of

756
00:32:08,450 --> 00:32:13,298
California so both the political

757
00:32:13,329 --> 00:32:17,538
politicians realize the value of science

758
00:32:15,919 --> 00:32:19,669
education and support it with money

759
00:32:17,538 --> 00:32:21,079
that's good they pay my salary and we

760
00:32:19,669 --> 00:32:22,879
give some of that money to the teachers

761
00:32:21,079 --> 00:32:24,319
because the teachers don't get paid so

762
00:32:22,878 --> 00:32:26,238
much that they can take off in the

763
00:32:24,319 --> 00:32:28,158
summer they would normally have to work

764
00:32:26,239 --> 00:32:29,929
in the summer uh-huh so this allows them

765
00:32:28,159 --> 00:32:32,659
to take three weeks of their summer and

766
00:32:29,929 --> 00:32:34,580
get better at being a science teacher so

767
00:32:32,659 --> 00:32:36,320
we think that's also a win-win that's

768
00:32:34,579 --> 00:32:37,848
that they can take off and I don't have

769
00:32:36,319 --> 00:32:40,009
to work at other things they just work

770

00:32:37,848 --> 00:32:41,538
at being a wonderful science teacher

771
00:32:40,009 --> 00:32:43,190
well here's the word folks if you're

772
00:32:41,538 --> 00:32:45,108
going to come to San Francisco don't

773
00:32:43,190 --> 00:32:47,808
worry about the flowers in your hair and

774
00:32:45,108 --> 00:32:50,598
worry about coming down here to Pier 15

775
00:32:47,808 --> 00:32:52,969
to visit the Exploratorium it's it's a

776
00:32:50,598 --> 00:32:55,038
wonderland of science and interaction

777
00:32:52,969 --> 00:32:56,778
that's right and all the things we were

778
00:32:55,038 --> 00:32:58,278
doing earlier playing with the tones and

779
00:32:56,778 --> 00:33:00,648
the mirrors in it I think yeah it's

780
00:32:58,278 --> 00:33:03,469
absolutely enthralling but before I go

781
00:33:00,648 --> 00:33:05,538
oh yeah oh yeah I love that the

782
00:33:03,469 --> 00:33:07,460
Australian version there oh that you

783
00:33:05,538 --> 00:33:09,588
it's different from the American birds

784
00:33:07,460 --> 00:33:11,838

right because I did not know I liked the

785

00:33:09,588 --> 00:33:12,319

Australian covered much better oh that's

786

00:33:11,838 --> 00:33:13,700

interesting

787

00:33:12,319 --> 00:33:16,519

what I'll get you to do if you could

788

00:33:13,700 --> 00:33:19,580

sign that to the skeptic zone and pretty

789

00:33:16,519 --> 00:33:21,588

soon we shall have a competition for our

790

00:33:19,579 --> 00:33:23,298

listeners oh wow to win a copy of this

791

00:33:21,588 --> 00:33:26,210

book which we've chatted about a few

792

00:33:23,298 --> 00:33:29,838

episodes ago so it's being autographed

793

00:33:26,210 --> 00:33:32,838

as we speak it says and then you're dead

794

00:33:29,838 --> 00:33:36,048

skeptic zone enjoy exploring science

795

00:33:32,838 --> 00:33:38,358

ould already nice well that's just one

796

00:33:36,048 --> 00:33:41,960

4-pull thank you again for the tour

797

00:33:38,358 --> 00:33:46,098

oh yeah the obvious enthusiasm you have

798

00:33:41,960 --> 00:33:47,838

I don't know I can tell and if people

799

00:33:46,098 --> 00:33:50,598

want to come and visit the Exploratorium

800

00:33:47,838 --> 00:33:52,638

it's easy to find it's easy to home yeah

801

00:33:50,598 --> 00:33:55,038

you come to Texas currency downtown San

802

00:33:52,638 --> 00:33:58,459

Francisco we're open in the summer we're

803

00:33:55,038 --> 00:34:00,739

open every day nine to five and five so

804

00:33:58,460 --> 00:34:01,829

ten to five yeah and what's the the

805

00:34:00,739 --> 00:34:06,700

website

806

00:34:01,829 --> 00:34:08,108

WWWE explore Ettore Amedeo if you get

807

00:34:06,700 --> 00:34:10,730

anywhere close it'll take you to us

808

00:34:08,108 --> 00:34:20,478

thanks again you are thank you

809

00:34:10,730 --> 00:34:20,478

[Music]

810

00:34:22,650 --> 00:34:29,108

[Music]

811

00:34:25,530 --> 00:34:31,089

and now direct from the cafe at

812

00:34:29,108 --> 00:34:38,409

Australia's Science Channel

813
00:34:31,088 --> 00:34:40,148
it's brouhaha with Ben Lewis when you

814
00:34:38,409 --> 00:34:41,858
buy a plane ticket there's that prompt

815
00:34:40,148 --> 00:34:44,230
to offset your carbon emissions by

816
00:34:41,858 --> 00:34:46,509
planting trees you click the box add

817
00:34:44,230 --> 00:34:49,449
your two bucks and you're done punching

818
00:34:46,510 --> 00:34:50,970
is cleared right unfortunately it turns

819
00:34:49,449 --> 00:34:53,980
out that's just not good enough

820
00:34:50,969 --> 00:34:56,019
according to new calculations if we keep

821
00:34:53,980 --> 00:34:58,539
steadily burning fossil fuels but later

822
00:34:56,019 --> 00:35:00,369
on get buyer's remorse it would take so

823
00:34:58,539 --> 00:35:02,619
many trees to keep climate change below

824
00:35:00,369 --> 00:35:05,050
two degrees Celsius they'll wipe out

825
00:35:02,619 --> 00:35:07,570
most natural ecosystems and wouldn't

826
00:35:05,050 --> 00:35:09,190
leave enough room for food crops it's

827

00:35:07,570 --> 00:35:11,559
about time that someone did the maths

828
00:35:09,190 --> 00:35:13,450
and worked out how much space all those

829
00:35:11,559 --> 00:35:16,210
plants would need just to offset our

830
00:35:13,449 --> 00:35:17,858
emissions even if we reduce our carbon

831
00:35:16,210 --> 00:35:19,838
emissions in line with the Paris

832
00:35:17,858 --> 00:35:21,730
agreement the calculations show that

833
00:35:19,838 --> 00:35:23,920
planting enough trees to offset this

834
00:35:21,730 --> 00:35:26,769
carbon would take over a quarter of our

835
00:35:23,920 --> 00:35:29,680
food crops the conclusion is a pretty

836
00:35:26,769 --> 00:35:31,239
obvious one we need to use every tool in

837
00:35:29,679 --> 00:35:35,399
our Arsenal to reduce the effects of

838
00:35:31,239 --> 00:35:35,399
climate change and not rely on just one

839
00:35:35,739 --> 00:35:45,359
for more brouhaha and Australian science

840
00:35:38,769 --> 00:35:45,360
ed fo w w Australia science TV

841
00:35:46,530 --> 00:35:52,000

it never ends a friend starts talking

842

00:35:49,780 --> 00:35:53,590

about his new Reiki Master and someone

843

00:35:52,000 --> 00:35:56,320

else just posted about another

844

00:35:53,590 --> 00:35:58,809

all-natural cancer cure that they don't

845

00:35:56,320 --> 00:36:01,030

want you to know about a sceptics we

846

00:35:58,809 --> 00:36:03,190

dedicate a lot of time trying to protect

847

00:36:01,030 --> 00:36:05,380

those around us but there's a way that

848

00:36:03,190 --> 00:36:07,990

you can reach millions guerrilla

849

00:36:05,380 --> 00:36:09,880

skepticism on Wikipedia is a group that

850

00:36:07,989 --> 00:36:12,309

is working to keep the best skeptical

851

00:36:09,880 --> 00:36:15,400

information at everyone's fingertips in

852

00:36:12,309 --> 00:36:18,099

all languages join us training is

853

00:36:15,400 --> 00:36:20,889

self-paced and fun and we have our very

854

00:36:18,099 --> 00:36:23,349

own super secret Facebook group you will

855

00:36:20,889 --> 00:36:27,629

be educating the world in your sleep to

856
00:36:23,349 --> 00:36:31,719
find out more email us at GS o w team at

857
00:36:27,630 --> 00:36:36,450
gmail.com guerrilla skepticism the time

858
00:36:31,719 --> 00:36:39,980
is now music by bensound.com

859
00:36:36,449 --> 00:36:39,980
[Music]

860
00:36:48,670 --> 00:36:54,818
I'm in the backyard of the house of dr.

861
00:36:52,568 --> 00:36:57,759
eugenie Scott here in Berkeley

862
00:36:54,818 --> 00:37:08,190
California where I'm delighted to see

863
00:36:57,760 --> 00:37:12,430
that there are 1 1 2 active beehives and

864
00:37:08,190 --> 00:37:15,039
today Jeanie and I are going to liberate

865
00:37:12,429 --> 00:37:17,798
some of the delicious honey from the bee

866
00:37:15,039 --> 00:37:19,450
hives and I thought it might make an

867
00:37:17,798 --> 00:37:22,420
interesting and different report for the

868
00:37:19,449 --> 00:37:24,308
skeptical zone and we can chat about some

869
00:37:22,420 --> 00:37:27,039
science along the way it's a bright

870
00:37:24,309 --> 00:37:28,720
sunny day it's the summer solstice and

871
00:37:27,039 --> 00:37:31,900
what a great day it is for collecting

872
00:37:28,719 --> 00:37:34,808
honey Eugenie Scott what is that you've

873
00:37:31,900 --> 00:37:37,358
got there that is a box of empty frames

874
00:37:34,809 --> 00:37:40,298
just in case when we get into the hive

875
00:37:37,358 --> 00:37:42,038
we discover that that there's just tons

876
00:37:40,298 --> 00:37:45,670
and tons and tons of honey and that the

877
00:37:42,039 --> 00:37:47,799
bees need more room to expand we can

878
00:37:45,670 --> 00:37:50,108
just pop it on and I've got two

879
00:37:47,798 --> 00:37:52,150
different kinds of frames in here one is

880
00:37:50,108 --> 00:37:54,848
an open frame and the other is a frame

881
00:37:52,150 --> 00:37:59,619
that has I guess you could call it

882
00:37:54,849 --> 00:38:01,930
prefab comb yeah this is a it's called

883
00:37:59,619 --> 00:38:04,019
Foundation and you can see that it's

884

00:38:01,929 --> 00:38:08,500
consists of these little kind of

885
00:38:04,018 --> 00:38:11,169
hexagonal prints again shape B honeycomb

886
00:38:08,500 --> 00:38:13,838
and it's but it's not a full drawn out

887
00:38:11,170 --> 00:38:18,278
comb but the bees will use this little

888
00:38:13,838 --> 00:38:21,548
wax template to form new comb and it'll

889
00:38:18,278 --> 00:38:23,920
be very regular the open one the open

890
00:38:21,548 --> 00:38:26,679
frame doesn't have any comb any

891
00:38:23,920 --> 00:38:28,809
foundation in it and what I'm doing is

892
00:38:26,679 --> 00:38:31,210
I'm alternating yeah when you have an

893
00:38:28,809 --> 00:38:34,960
open frame you give them the freedom to

894
00:38:31,210 --> 00:38:37,838
build a larger or a smaller cell if they

895
00:38:34,960 --> 00:38:39,849
want to and drone cells for example are

896
00:38:37,838 --> 00:38:41,798
larger than the cells that are used for

897
00:38:39,849 --> 00:38:44,680
regular workers so I'm just giving them

898
00:38:41,798 --> 00:38:47,259

some AMA okay so that's in front of us

899

00:38:44,679 --> 00:38:48,879

now and we're going to be what's the

900

00:38:47,259 --> 00:38:51,730

what do you call it do you call it

901

00:38:48,880 --> 00:38:53,140

harvesting the honey yeah it's hard it's

902

00:38:51,730 --> 00:38:55,568

a type of harvester yes

903

00:38:53,139 --> 00:38:58,748

so this hive over here

904

00:38:55,568 --> 00:39:01,268

to the right with the blue lid now

905

00:38:58,748 --> 00:39:03,458

yesterday we put a special layer in

906

00:39:01,268 --> 00:39:05,588

there so the bees would would leave a

907

00:39:03,458 --> 00:39:08,440

certain section and it's sort of like a

908

00:39:05,588 --> 00:39:09,880

one-way part for them what we wanted

909

00:39:08,440 --> 00:39:13,749

what we're going to do is we're going to

910

00:39:09,880 --> 00:39:15,880

look at the top box which is full of I

911

00:39:13,748 --> 00:39:17,558

suspect it's full of honey once we get

912

00:39:15,880 --> 00:39:19,869

in there we'll get a better idea but I'm

913
00:39:17,559 --> 00:39:22,028
pretty suspicious that it's got lots and

914
00:39:19,869 --> 00:39:24,338
lots of honey this is my chance to take

915
00:39:22,028 --> 00:39:27,639
a little bit and the bees will still

916
00:39:24,338 --> 00:39:30,009
have time between now and the fall

917
00:39:27,639 --> 00:39:31,719
winter when things slow down and they're

918
00:39:30,009 --> 00:39:33,248
going to need to you know there is not

919
00:39:31,719 --> 00:39:35,139
going to be as much nectar and pollen

920
00:39:33,248 --> 00:39:36,939
around they'll still have time to build

921
00:39:35,139 --> 00:39:41,469
up their stock so this is my chance to

922
00:39:36,940 --> 00:39:44,519
grab a little for me and yesterday we

923
00:39:41,469 --> 00:39:48,278
put a little device in between that top

924
00:39:44,518 --> 00:39:52,389
box and the lower boxes because we

925
00:39:48,278 --> 00:39:55,150
wanted to get all of the bees off of the

926
00:39:52,389 --> 00:39:57,998
frames in that top box it makes it a

927
00:39:55,150 --> 00:40:00,699
whole lot easier for us to harvest the

928
00:39:57,998 --> 00:40:02,708
honey if the frames aren't full of bees

929
00:40:00,699 --> 00:40:04,479
because that doesn't work as well so

930
00:40:02,708 --> 00:40:06,009
they're all in the bottom section now

931
00:40:04,478 --> 00:40:07,629
busily making honey and doing what they

932
00:40:06,009 --> 00:40:09,369
do and they're lying you to know

933
00:40:07,630 --> 00:40:11,920
hopefully since it's the middle of the

934
00:40:09,369 --> 00:40:14,140
afternoon on a warm and sunny day the

935
00:40:11,920 --> 00:40:16,119
majority of them will be out foraging so

936
00:40:14,139 --> 00:40:17,228
that when we start fooling around with

937
00:40:16,119 --> 00:40:19,539
the hive we're not going to be

938
00:40:17,228 --> 00:40:21,728
disturbing to many of them I think

939
00:40:19,539 --> 00:40:24,609
something that is a real surprise to

940
00:40:21,728 --> 00:40:30,218
people is how short the lifespan of a

941

00:40:24,608 --> 00:40:32,588
bee is a bee spends about 21 days round

942
00:40:30,219 --> 00:40:36,608
numbers developing from an end from an

943
00:40:32,588 --> 00:40:40,328
egg to a hatch eat they hatch in about

944
00:40:36,608 --> 00:40:42,458
21 days spends roughly 2 to 3 weeks to

945
00:40:40,329 --> 00:40:44,979
three weeks right and they progress in

946
00:40:42,458 --> 00:40:47,649
the rest of their and then one day a

947
00:40:44,978 --> 00:40:51,218
month and a half is spent out foraging

948
00:40:47,650 --> 00:40:53,979
for pollen and nectar and trying not to

949
00:40:51,219 --> 00:40:55,929
get picked off by birds and trying not

950
00:40:53,978 --> 00:40:59,858
to have other things happen to

951
00:40:55,929 --> 00:41:02,108
themselves but what happens is they

952
00:40:59,858 --> 00:41:04,389
basically just work themselves to death

953
00:41:02,108 --> 00:41:06,630
if they don't get predated upon by some

954
00:41:04,389 --> 00:41:08,259
birds or some other predator that's the

955
00:41:06,630 --> 00:41:10,809

existence yeah

956

00:41:08,260 --> 00:41:12,730

yeah you'll see older bees coming back

957

00:41:10,809 --> 00:41:15,820

and their wings will be kind of tattered

958

00:41:12,730 --> 00:41:18,010

and heavy yeah it's kind of yeah you did

959

00:41:15,820 --> 00:41:21,130

you try not to anthropomorphize because

960

00:41:18,010 --> 00:41:22,600

there's probably a hive like the one

961

00:41:21,130 --> 00:41:26,470

we're going to go into now that'll have

962

00:41:22,599 --> 00:41:28,659

probably 40 to 50,000 bees in it most of

963

00:41:26,469 --> 00:41:30,309

whom are not going to be home right now

964

00:41:28,659 --> 00:41:34,480

we hope we hope that they're out flying

965

00:41:30,309 --> 00:41:36,250

around but so a lot of you can edit off

966

00:41:34,480 --> 00:41:38,019

it control whatever look at them all

967

00:41:36,250 --> 00:41:40,239

coming in and going on coming in and

968

00:41:38,019 --> 00:41:42,789

going out it's it's constant yeah it is

969

00:41:40,239 --> 00:41:45,039

yeah we're both dressed in in our long

970
00:41:42,789 --> 00:41:47,710
trousers and long shirts with the

971
00:41:45,039 --> 00:41:50,829
sleeves done up and you're just about to

972
00:41:47,710 --> 00:41:52,630
put on your classic beekeeper hat yes

973
00:41:50,829 --> 00:41:55,000
would you like the yellow one or the

974
00:41:52,630 --> 00:41:56,680
white one oh it doesn't matter I do you

975
00:41:55,000 --> 00:41:58,449
can have that we can have the white one

976
00:41:56,679 --> 00:42:00,789
you can doesn't matter a whole lot

977
00:41:58,449 --> 00:42:03,189
no the nice thing goes over the head and

978
00:42:00,789 --> 00:42:07,269
nice thing about beekeeping with someone

979
00:42:03,190 --> 00:42:08,769
to help like you is that we can kind of

980
00:42:07,269 --> 00:42:13,119
keep an eye on each other's equipment

981
00:42:08,769 --> 00:42:19,480
and if I see a bee that's sort of nosing

982
00:42:13,119 --> 00:42:22,599
around the bottom of your hood then I

983
00:42:19,480 --> 00:42:24,460
can you know gently push it away or and

984
00:42:22,599 --> 00:42:26,529
discourage in some way and you keep an

985
00:42:24,460 --> 00:42:29,289
eye out for me as well whether the hat

986
00:42:26,530 --> 00:42:31,120
of course I'll get mine it's it's the

987
00:42:29,289 --> 00:42:34,329
Hat and it's the classic netting that

988
00:42:31,119 --> 00:42:37,059
comes down over the neck area does

989
00:42:34,329 --> 00:42:38,409
indeed if you hold that and I will now

990
00:42:37,059 --> 00:42:40,480
stick mine down and that's the front

991
00:42:38,409 --> 00:42:42,549
isn't it so I slip that on over my oops

992
00:42:40,480 --> 00:42:43,990
did like that shot for that for the

993
00:42:42,550 --> 00:42:46,690
clothesline you go to the quote an old

994
00:42:43,989 --> 00:42:49,239
fashioned around here we hang up it was

995
00:42:46,690 --> 00:42:51,550
on a day like this I'll cut my color is

996
00:42:49,239 --> 00:42:53,949
up so I can touch the knit I'll put the

997
00:42:51,550 --> 00:42:55,630
net back on my shirt and this these

998

00:42:53,949 --> 00:42:57,909
ropes come down this string comes down

999
00:42:55,630 --> 00:43:00,220
goes around my just put it around your

1000
00:42:57,909 --> 00:43:02,829
waist yeah just to kind of hold you your

1001
00:43:00,219 --> 00:43:05,619
your shirt is is fitted so it's probably

1002
00:43:02,829 --> 00:43:07,420
not going to be what I do that is to

1003
00:43:05,619 --> 00:43:12,069
kind of discourage any of these little

1004
00:43:07,420 --> 00:43:14,680
guys from hmm so I'm I'm covered head to

1005
00:43:12,070 --> 00:43:16,390
foot except except for our hands our

1006
00:43:14,679 --> 00:43:18,429
hands are not covered about to be

1007
00:43:16,389 --> 00:43:22,539
covered about to be covered

1008
00:43:18,429 --> 00:43:26,828
our gloves and I got these special Thank

1009
00:43:22,539 --> 00:43:29,259
You long gloves the gloves go up to your

1010
00:43:26,829 --> 00:43:32,130
elbow or even longer you're getting on

1011
00:43:29,260 --> 00:43:35,980
your social radius and on the length on

1012
00:43:32,130 --> 00:43:37,420

this glove now and here we go courtesy

1013

00:43:35,980 --> 00:43:41,409

of my neighbor who is kind enough to

1014

00:43:37,420 --> 00:43:45,369

have a material large men's gloves and

1015

00:43:41,409 --> 00:43:49,808

the next one so I really am now covered

1016

00:43:45,369 --> 00:43:53,220

head to foot and I'm putting my beef

1017

00:43:49,809 --> 00:43:55,990

just flexing the glove there that's it

1018

00:43:53,219 --> 00:43:57,368

these gloves are I feel quite safe now

1019

00:43:55,989 --> 00:44:01,598

what we're going to do is we're going to

1020

00:43:57,369 --> 00:44:05,349

take the box of the topmost box the box

1021

00:44:01,599 --> 00:44:08,019

of honey yep and we're going to take

1022

00:44:05,349 --> 00:44:11,099

away that little separator that we put

1023

00:44:08,019 --> 00:44:14,619

in last night and then we're going to

1024

00:44:11,099 --> 00:44:16,720

cover up the hive so are you ready to do

1025

00:44:14,619 --> 00:44:18,930

your strongman axe okay so the lid comes

1026

00:44:16,719 --> 00:44:18,929

off

1027
00:44:19,050 --> 00:44:25,120
okay just set it down gently and of

1028
00:44:22,840 --> 00:44:27,250
course it is really urgently

1029
00:44:25,119 --> 00:44:29,139
it's full of bees and honey so you

1030
00:44:27,250 --> 00:44:33,880
shouldn't take them rising out one of

1031
00:44:29,139 --> 00:44:36,279
the trays here okay that one is doesn't

1032
00:44:33,880 --> 00:44:37,900
doesn't hey it's not very it's not a lot

1033
00:44:36,280 --> 00:44:40,570
of capped honey in that too

1034
00:44:37,900 --> 00:44:43,990
so let me take a look here this one is a

1035
00:44:40,570 --> 00:44:47,620
little bitter now out comes this tray

1036
00:44:43,989 --> 00:44:49,509
very slowly okay pick it up now we can

1037
00:44:47,619 --> 00:44:51,400
introduce a lot of heat this is a lotta

1038
00:44:49,510 --> 00:44:51,790
honey that's a lot of honey hold on

1039
00:44:51,400 --> 00:44:54,190
honey

1040
00:44:51,789 --> 00:44:56,289
yeah now the one right next to it though

1041
00:44:54,190 --> 00:44:59,800
it doesn't have very much I'm going to

1042
00:44:56,289 --> 00:45:03,369
set this I'm going to set this just

1043
00:44:59,800 --> 00:45:05,500
vertically here no why is that open then

1044
00:45:03,369 --> 00:45:07,029
they're not as many bees as I hear but

1045
00:45:05,500 --> 00:45:09,099
yeah I'm quite a lot still more than I

1046
00:45:07,030 --> 00:45:09,910
would have predicted hand me that bowl

1047
00:45:09,099 --> 00:45:16,089
yep

1048
00:45:09,909 --> 00:45:17,619
and hold my hive tool today this is real

1049
00:45:16,090 --> 00:45:22,690
Aussie this is an absolutely gorgeous

1050
00:45:17,619 --> 00:45:24,429
piece of of here we go look at this

1051
00:45:22,690 --> 00:45:26,289
frame here Richard let's have a look at

1052
00:45:24,429 --> 00:45:29,559
this isn't this gorgeous gorgeous frame

1053
00:45:26,289 --> 00:45:31,840
look at that now that is that

1054
00:45:29,559 --> 00:45:33,880
magnificent look at the shape yeah this

1055

00:45:31,840 --> 00:45:36,880
one is a real this one is a real keeper

1056
00:45:33,880 --> 00:45:38,950
and again look not an overly crowded

1057
00:45:36,880 --> 00:45:43,630
well it's more than more than I'd like

1058
00:45:38,949 --> 00:45:46,149
to see this one is much less much less

1059
00:45:43,630 --> 00:45:49,119
full but then again they tend to fill up

1060
00:45:46,150 --> 00:45:51,460
the ones in the middle this is still

1061
00:45:49,119 --> 00:45:53,170
this is this is God open this see

1062
00:45:51,460 --> 00:45:54,849
there's liquid in each of those yeah

1063
00:45:53,170 --> 00:45:57,159
and they haven't put the caps on yet

1064
00:45:54,849 --> 00:45:59,079
look at the top of the frame you can see

1065
00:45:57,159 --> 00:46:01,000
the kind of waxy like things that's kept

1066
00:45:59,079 --> 00:46:03,969
right that's what they'll that's what

1067
00:46:01,000 --> 00:46:06,969
you're seeing in the ones that are down

1068
00:46:03,969 --> 00:46:07,839
below so so just inspecting frame by

1069
00:46:06,969 --> 00:46:10,659

frame of the moat

1070

00:46:07,840 --> 00:46:12,970

yeah I'm going to take a look and when I

1071

00:46:10,659 --> 00:46:16,690

just move these guys over here come on

1072

00:46:12,969 --> 00:46:19,929

girls and this one is also very full of

1073

00:46:16,690 --> 00:46:22,000

honey looks very nice so I'm not feeling

1074

00:46:19,929 --> 00:46:23,799

too bad about leaving these girls

1075

00:46:22,000 --> 00:46:26,469

without enough to eat so they go to

1076

00:46:23,800 --> 00:46:28,660

upset at the moon they have to very full

1077

00:46:26,469 --> 00:46:31,559

no I'm going being very gentle here they

1078

00:46:28,659 --> 00:46:36,059

have two very full

1079

00:46:31,559 --> 00:46:39,150

capped honey and one two three yeah I I

1080

00:46:36,059 --> 00:46:41,940

don't feel bad about taking the two full

1081

00:46:39,150 --> 00:46:43,619

frames no even guys enough so this piece

1082

00:46:41,940 --> 00:46:45,929

of I'll just take that upstairs with us

1083

00:46:43,619 --> 00:46:47,609

in Luke's Fanta yeah you can it you can

1084
00:46:45,929 --> 00:46:50,669
eat it why don't you just set it with

1085
00:46:47,610 --> 00:46:55,320
the other one and what we're going to do

1086
00:46:50,670 --> 00:47:00,630
is we'll take this off don't animal this

1087
00:46:55,320 --> 00:47:03,300
one off yeah and absolutely just chock

1088
00:47:00,630 --> 00:47:05,070
full of beans B's and what we're going

1089
00:47:03,300 --> 00:47:06,780
to do 100gb is there see they're all

1090
00:47:05,070 --> 00:47:09,269
trying to get up to the upper frame yeah

1091
00:47:06,780 --> 00:47:14,640
and so we'll just set that there for the

1092
00:47:09,269 --> 00:47:17,639
moment position of the - at this point V

1093
00:47:14,639 --> 00:47:21,299
central I really want to put what's

1094
00:47:17,639 --> 00:47:24,750
called a queen excluder which we took

1095
00:47:21,300 --> 00:47:29,310
off the green excluder is going on now

1096
00:47:24,750 --> 00:47:31,170
which is like like a wireframe sort of

1097
00:47:29,309 --> 00:47:34,710
thing but it's big enough for the

1098
00:47:31,170 --> 00:47:37,170
workers to to wiggle through yes they

1099
00:47:34,710 --> 00:47:39,449
can remodel yeah but the Queen does not

1100
00:47:37,170 --> 00:47:43,470
go through the Queen excluder the reason

1101
00:47:39,449 --> 00:47:46,319
you do that is that that is why that box

1102
00:47:43,469 --> 00:47:47,459
that we just looked at is so chock full

1103
00:47:46,320 --> 00:47:49,830
of honey

1104
00:47:47,460 --> 00:47:54,900
rather than being chock full of honey

1105
00:47:49,829 --> 00:47:56,909
and brood which is not as good now we're

1106
00:47:54,900 --> 00:47:58,950
not really being worked to worried the

1107
00:47:56,909 --> 00:48:00,449
bees aren't that upset what we're doing

1108
00:47:58,949 --> 00:48:03,179
no they're not and I didn't smoke them

1109
00:48:00,449 --> 00:48:08,159
remember so the reason why you smoke by

1110
00:48:03,179 --> 00:48:11,159
the way is because when bees do get

1111
00:48:08,159 --> 00:48:14,039
alarmed they start sending out alarm

1112

00:48:11,159 --> 00:48:16,589
pheromones and the smoke basically kind

1113
00:48:14,039 --> 00:48:18,539
of confuses them for a while they might

1114
00:48:16,590 --> 00:48:21,000
feel like putting out an alarm pheromone

1115
00:48:18,539 --> 00:48:23,190
but then they smell the smoke and that

1116
00:48:21,000 --> 00:48:25,619
kind of so they don't really notice that

1117
00:48:23,190 --> 00:48:29,179
their sisters are putting out warnings

1118
00:48:25,619 --> 00:48:34,940
okay although not exactly

1119
00:48:29,179 --> 00:48:41,710
whoa all right so I'll let these guys go

1120
00:48:34,940 --> 00:48:41,710
back but I do want to close up

1121
00:48:43,119 --> 00:48:49,869
so this is hard for me to do because I'm

1122
00:48:45,489 --> 00:48:52,960
not really tall enough for up for how

1123
00:48:49,869 --> 00:48:54,219
give me my five - oh you want to scrape

1124
00:48:52,960 --> 00:48:55,690
off some of this pro kleh now I just

1125
00:48:54,219 --> 00:48:58,588
leave those guys alone we'll just let

1126
00:48:55,690 --> 00:49:03,849

them now notice that there is a B that's

1127

00:48:58,588 --> 00:49:05,528

buzzing around my my veil and you

1128

00:49:03,849 --> 00:49:07,539

probably have some that are kind of one

1129

00:49:05,528 --> 00:49:10,449

on your hand I know that Sam yeah yeah

1130

00:49:07,539 --> 00:49:13,390

but uh particularly they're kind of

1131

00:49:10,449 --> 00:49:16,509

coming up to challenge my look it look

1132

00:49:13,389 --> 00:49:17,978

me in the face so just yeah yeah oh yes

1133

00:49:16,509 --> 00:49:21,190

I'm noticing in the other yeah but

1134

00:49:17,978 --> 00:49:21,578

you're back I'm like no I can feel my

1135

00:49:21,190 --> 00:49:25,690

legs

1136

00:49:21,579 --> 00:49:28,059

okay let's put this up yep okay so

1137

00:49:25,690 --> 00:49:30,400

they're listed okay right now here take

1138

00:49:28,059 --> 00:49:32,829

a look at this guy here girl here you

1139

00:49:30,400 --> 00:49:35,229

notice that she's she's elevating her

1140

00:49:32,829 --> 00:49:37,719

abdomen and just flapping her wings like

1141
00:49:35,228 --> 00:49:40,808
crazy she is sending out an alarm

1142
00:49:37,719 --> 00:49:43,778
pheromone huh so this is a good time

1143
00:49:40,809 --> 00:49:48,249
since we haven't smoked to just bid our

1144
00:49:43,778 --> 00:49:56,768
little friends goodbye close them up let

1145
00:49:48,248 --> 00:49:59,919
them figure out the way home there we go

1146
00:49:56,768 --> 00:50:02,768
Luke going back on now this is the

1147
00:49:59,920 --> 00:50:04,690
telescoping lid as they're called you do

1148
00:50:02,768 --> 00:50:08,219
end up killing a few bees in this

1149
00:50:04,690 --> 00:50:15,269
activity here I'm sorry to say

1150
00:50:08,219 --> 00:50:17,608
don't like to kill bees but ya know I

1151
00:50:15,269 --> 00:50:20,369
can say they live that one they live a

1152
00:50:17,608 --> 00:50:23,039
very short life so we'll put these guys

1153
00:50:20,369 --> 00:50:24,390
over here oh yeah they'll figure and

1154
00:50:23,039 --> 00:50:26,369
they will figure out where to go from

1155
00:50:24,389 --> 00:50:28,170
there real let's see I think this is

1156
00:50:26,369 --> 00:50:31,670
probably going to be steady enough good

1157
00:50:28,170 --> 00:50:34,950
all right let's take let's take these uh

1158
00:50:31,670 --> 00:50:36,740
want to take that like the hype tool and

1159
00:50:34,949 --> 00:50:39,210
you take the two bowls

1160
00:50:36,739 --> 00:50:42,078
I'll bring I actually give me the big

1161
00:50:39,210 --> 00:50:44,699
bowl because once I shake off these bees

1162
00:50:42,079 --> 00:50:46,530
I'm going to want to have something to

1163
00:50:44,699 --> 00:50:51,509
put this is one of the trays we removed

1164
00:50:46,530 --> 00:50:53,940
earlier just whacking it out to shake

1165
00:50:51,510 --> 00:50:56,520
the bees loose we're going to take this

1166
00:50:53,940 --> 00:50:58,289
into the house as soon as we can buy

1167
00:50:56,519 --> 00:50:58,769
these everybody so you kind of hold that

1168
00:50:58,289 --> 00:51:02,039
there

1169

00:50:58,769 --> 00:51:04,009
yep now help you once a yep shake off

1170
00:51:02,039 --> 00:51:06,179
these bees oh it's a beautiful comb

1171
00:51:04,010 --> 00:51:13,319
we'll take some pictures when we get

1172
00:51:06,179 --> 00:51:15,629
inside alright let's go in and the

1173
00:51:13,318 --> 00:51:19,289
sooner the better because we are being

1174
00:51:15,630 --> 00:51:22,349
followed we are being followed by some

1175
00:51:19,289 --> 00:51:26,369
bees and the quicker we do this the

1176
00:51:22,349 --> 00:51:30,359
fewer bees will get inside the house can

1177
00:51:26,369 --> 00:51:33,030
you open the door yeah we're good I

1178
00:51:30,358 --> 00:51:37,559
don't think I'm bringing any bees in let

1179
00:51:33,030 --> 00:51:40,290
me start little okay and we'll take

1180
00:51:37,559 --> 00:51:42,889
these upstairs then we can get out of

1181
00:51:40,289 --> 00:51:42,889
our bee clothes

1182
00:51:47,650 --> 00:51:58,420
so this device we've retrieved now a

1183
00:51:52,298 --> 00:52:01,880

large metal cylinder and it's called a

1184

00:51:58,420 --> 00:52:05,180

honey extract honey extractor we've got

1185

00:52:01,880 --> 00:52:07,400

the two frames now from the hive which

1186

00:52:05,179 --> 00:52:09,889

we collected a little earlier now

1187

00:52:07,400 --> 00:52:12,349

Jeannie is just using a device now to

1188

00:52:09,889 --> 00:52:14,688

break open all the little cells

1189

00:52:12,349 --> 00:52:20,119

it looks like the device that I'm using

1190

00:52:14,688 --> 00:52:22,399

is a honeycomb d capper and it sort of

1191

00:52:20,119 --> 00:52:24,798

looks like the most uncomfortable comb

1192

00:52:22,400 --> 00:52:26,930

in the world it's a bunch of little

1193

00:52:24,798 --> 00:52:30,048

metal teeth that are close together but

1194

00:52:26,929 --> 00:52:34,458

it works like a real champ to break open

1195

00:52:30,048 --> 00:52:36,528

the caps of the capped honey so we take

1196

00:52:34,458 --> 00:52:39,018

a little shot here and just honey

1197

00:52:36,528 --> 00:52:41,119

streaming down at the moment so hold

1198
00:52:39,018 --> 00:52:45,968
that one I all that and the first one

1199
00:52:41,119 --> 00:52:45,969
goes into the entity one of the sides

1200
00:52:58,929 --> 00:53:04,129
see how that goes now I think there's

1201
00:53:02,210 --> 00:53:05,510
more to spend from this side but since

1202
00:53:04,130 --> 00:53:07,789
I'm in the mood for turning them around

1203
00:53:05,510 --> 00:53:13,630
I'll do that we'll spin the other side

1204
00:53:07,789 --> 00:53:13,630
around okay

1205
00:53:20,789 --> 00:53:25,539
all right now we've been spinning our

1206
00:53:23,460 --> 00:53:30,340
trays yep

1207
00:53:25,539 --> 00:53:31,750
we centrifuge the frames and got pretty

1208
00:53:30,340 --> 00:53:34,420
much all the honey out I mean I think

1209
00:53:31,750 --> 00:53:36,039
it's you take a there's there's a

1210
00:53:34,420 --> 00:53:39,220
there's a little bit of honey left but

1211
00:53:36,039 --> 00:53:42,610
it's not worth obsessing about I always

1212
00:53:39,219 --> 00:53:46,329
really try to preserve as much comb as

1213
00:53:42,610 --> 00:53:48,190
possible because it takes this is hard

1214
00:53:46,329 --> 00:53:52,480
to believe but it takes several pounds

1215
00:53:48,190 --> 00:53:54,340
of honey to produce a comb like this so

1216
00:53:52,480 --> 00:53:58,750
you know these are expensive in terms of

1217
00:53:54,340 --> 00:54:01,510
be time and effort and calories and so

1218
00:53:58,750 --> 00:54:03,070
the more you can preserve comb through

1219
00:54:01,510 --> 00:54:05,290
for your bees the better off your bees

1220
00:54:03,070 --> 00:54:08,980
are they don't have to invest as much

1221
00:54:05,289 --> 00:54:11,679
energy in building comb they can in this

1222
00:54:08,980 --> 00:54:13,480
situation then this one's sort of yeah

1223
00:54:11,679 --> 00:54:15,819
this had a structural failure this one

1224
00:54:13,480 --> 00:54:19,469
kind of got trashed yeah and it is also

1225
00:54:15,820 --> 00:54:21,910
looking into looking into this yeah

1226

00:54:19,469 --> 00:54:25,179
cylinder again let me look down the

1227
00:54:21,909 --> 00:54:27,549
bottom oh yeah I can see all the honey

1228
00:54:25,179 --> 00:54:29,379
and the colour and some of the Condit

1229
00:54:27,550 --> 00:54:31,150
which has been spun off is down the

1230
00:54:29,380 --> 00:54:32,800
bottom there so we're going to let that

1231
00:54:31,150 --> 00:54:38,730
drain off the walls for a little while

1232
00:54:32,800 --> 00:54:38,730
and then continue on to the next step

1233
00:54:40,389 --> 00:54:46,848
it's much later on in the day now in

1234
00:54:43,548 --> 00:54:50,358
fact after dinner time and the honey has

1235
00:54:46,849 --> 00:54:54,109
had a chance to soak out of the

1236
00:54:50,358 --> 00:54:56,500
extractor descend through the sieve

1237
00:54:54,108 --> 00:54:59,568
so the sieve is collected all the

1238
00:54:56,500 --> 00:55:01,460
leftover honeycomb you can take a munch

1239
00:54:59,568 --> 00:55:03,018
it's okay it's pretty tasty that's

1240
00:55:01,460 --> 00:55:05,269

pretty tasty well then be hard for you

1241

00:55:03,018 --> 00:55:08,088
to talk so it would I better not so

1242

00:55:05,268 --> 00:55:11,929
Jeanie is now just going to unscrew the

1243

00:55:08,088 --> 00:55:14,960
oh there it goes opening up the spigot

1244

00:55:11,929 --> 00:55:19,278
at the bottom of this tub and out pours

1245

00:55:14,960 --> 00:55:21,920
the strained honey and out pours the

1246

00:55:19,278 --> 00:55:24,768
honey and out pours the honey yes well

1247

00:55:21,920 --> 00:55:26,960
it's taking its time this this is the

1248

00:55:24,768 --> 00:55:28,879
watch watching paint dry kind of credit

1249

00:55:26,960 --> 00:55:30,798
yeah yeah it's not coming out quickly

1250

00:55:28,880 --> 00:55:31,548
it's not very fast is it I wonder I

1251

00:55:30,798 --> 00:55:34,009
can't imagine

1252

00:55:31,548 --> 00:55:35,778
well it's I'm looking inside the top now

1253

00:55:34,010 --> 00:55:38,630
and it's slowing it's coming out it's

1254

00:55:35,778 --> 00:55:41,088
moving it's just it's it's an Essex it's

1255
00:55:38,630 --> 00:55:43,548
yes yes and you're filling up your first

1256
00:55:41,088 --> 00:55:45,018
job well not your first job ever but for

1257
00:55:43,548 --> 00:55:52,190
this Mass Effect yes

1258
00:55:45,018 --> 00:55:56,088
yeah why not hmm really glue we're just

1259
00:55:52,190 --> 00:56:00,409
um munching some of the honeycomb we've

1260
00:55:56,088 --> 00:56:03,909
left in the sieve mm-hmm and of course

1261
00:56:00,409 --> 00:56:03,909
it's burst still bursting with honey

1262
00:56:07,690 --> 00:56:12,789
it's the next morning now and we're

1263
00:56:09,909 --> 00:56:15,848
around the table and I'm looking at a

1264
00:56:12,789 --> 00:56:16,510
glorious batch of cookies out fresh out

1265
00:56:15,849 --> 00:56:19,720
of the oven

1266
00:56:16,510 --> 00:56:21,700
you know biscuits yeah it's going to be

1267
00:56:19,719 --> 00:56:23,558
yeah you can transfer gets something I

1268
00:56:21,699 --> 00:56:25,389
think the listeners can contract this

1269
00:56:23,559 --> 00:56:26,890
biscuits so that okay we're sitting down

1270
00:56:25,389 --> 00:56:29,048
in front of a pile of cookies there's

1271
00:56:26,889 --> 00:56:32,788
nothing like that no that's right and a

1272
00:56:29,048 --> 00:56:35,650
jar of the very honey we just harvested

1273
00:56:32,789 --> 00:56:37,839
yesterday our time is matter-of-fact and

1274
00:56:35,650 --> 00:56:40,318
we're about to give it the rigorous

1275
00:56:37,838 --> 00:56:42,818
scientific test that's right

1276
00:56:40,318 --> 00:56:47,108
double-blind I must say but never I know

1277
00:56:42,818 --> 00:56:51,909
this is a I is wide open so and now I'm

1278
00:56:47,108 --> 00:56:54,308
going to put a spoon of honey and each

1279
00:56:51,909 --> 00:56:58,449
side honey's being drizzle the leaves I

1280
00:56:54,309 --> 00:57:01,589
know it's nice it's night it's gotten

1281
00:56:58,449 --> 00:57:05,558
let's say I think it's it got a good

1282
00:57:01,588 --> 00:57:09,969
texture to it it's a little thin but

1283

00:57:05,559 --> 00:57:13,630
there you go and just kind of move a

1284
00:57:09,969 --> 00:57:17,230
dude so we'll get your own by side here

1285
00:57:13,630 --> 00:57:22,000
we go you know the taste and look for me

1286
00:57:17,230 --> 00:57:23,980
oh that would be okay yes no mmm you

1287
00:57:22,000 --> 00:57:26,920
should pick that up you should pick that

1288
00:57:23,980 --> 00:57:29,579
up and taste you know I'm the guinea pig

1289
00:57:26,920 --> 00:57:29,579
today here we go

1290
00:57:31,429 --> 00:57:42,119
hmm what a classic honey tasted is too

1291
00:57:36,949 --> 00:57:44,579
and then is like the scum absolutely

1292
00:57:42,119 --> 00:57:47,480
delicious I think this the science test

1293
00:57:44,579 --> 00:57:50,009
is possible with flying colors

1294
00:57:47,480 --> 00:57:53,010
science bats last think of it that way

1295
00:57:50,010 --> 00:57:54,960
we science always wins and we have

1296
00:57:53,010 --> 00:57:57,060
performed the proper we haven't had a

1297
00:57:54,960 --> 00:57:58,860

control we didn't have a control

1298

00:57:57,059 --> 00:58:03,210

I guess the control would be you have to

1299

00:57:58,860 --> 00:58:05,070

eat the next biscuit without honey but

1300

00:58:03,210 --> 00:58:07,530

yes thank you so much for all your help

1301

00:58:05,070 --> 00:58:10,320

yesterday I could not have done it

1302

00:58:07,530 --> 00:58:12,090

nearly as efficiently and quickly

1303

00:58:10,320 --> 00:58:12,660

without your help and I sure appreciate

1304

00:58:12,090 --> 00:58:14,910

it

1305

00:58:12,659 --> 00:58:17,969

we had fun too and it seems to me that

1306

00:58:14,909 --> 00:58:20,309

that it with two people that's a much

1307

00:58:17,969 --> 00:58:22,169

better of a two people job than lifting

1308

00:58:20,309 --> 00:58:24,360

up the hives and replacing things and

1309

00:58:22,170 --> 00:58:26,970

and all the rest of it but in the

1310

00:58:24,360 --> 00:58:29,750

meantime I think I will enjoy the rest

1311

00:58:26,969 --> 00:58:29,750

of my biscuit

1312
00:58:31,389 --> 00:58:35,989
tune in next week for part two of this

1313
00:58:33,800 --> 00:58:37,820
story with Eugenie Scott where she

1314
00:58:35,989 --> 00:58:40,879
discusses some of the science behind

1315
00:58:37,820 --> 00:58:43,940
beekeeping and some of the very real

1316
00:58:40,880 --> 00:58:47,320
problems faced by beekeepers including

1317
00:58:43,940 --> 00:58:47,320
bee mites

1318
00:58:53,610 --> 00:58:57,409
[Music]

1319
00:59:03,849 --> 00:59:08,989
thank you for listening to the skeptic

1320
00:59:06,079 --> 00:59:10,909
zone of different episode this week I do

1321
00:59:08,989 --> 00:59:13,579
like doing those field reports and what

1322
00:59:10,909 --> 00:59:15,739
a pleasure it was to spend time with the

1323
00:59:13,579 --> 00:59:19,480
Eugenie Scott and Paul Doherty at the

1324
00:59:15,739 --> 00:59:22,069
Exploratorium as the as I hope you

1325
00:59:19,480 --> 00:59:23,210
gathered by listening to those reports I

1326
00:59:22,070 --> 00:59:25,010
had a wonderful time

1327
00:59:23,210 --> 00:59:27,199
I was certainly getting my head together

1328
00:59:25,010 --> 00:59:29,570
with jet lag and just getting over the

1329
00:59:27,199 --> 00:59:31,519
the infection in the cough and all the

1330
00:59:29,570 --> 00:59:34,190
rest of it but nevertheless what a

1331
00:59:31,519 --> 00:59:38,900
wonderful couple of days I've had so far

1332
00:59:34,190 --> 00:59:41,090
and pretty soon I'll be getting getting

1333
00:59:38,900 --> 00:59:44,750
down to San Francisco Airport to catch a

1334
00:59:41,090 --> 00:59:47,660
red-eye / - let me see Dulles then

1335
00:59:44,750 --> 00:59:51,019
change up to New Jersey then I catch a

1336
00:59:47,659 --> 00:59:53,420
series of transports and Airport Express

1337
00:59:51,019 --> 00:59:55,670
and then I catch a metro line or

1338
00:59:53,420 --> 00:59:57,829
something up to Connecticut wow that's

1339
00:59:55,670 --> 00:59:59,150
going to be an adventure - and finally

1340

00:59:57,829 --> 01:00:01,190
I'm going to end up of course back in

1341
00:59:59,150 --> 01:00:03,500
New York for the Northeast Conference of

1342
01:00:01,190 --> 01:00:04,730
science and skepticism certainly looking

1343
01:00:03,500 --> 01:00:06,110
forward to that and I'll be running

1344
01:00:04,730 --> 01:00:09,769
around trying to get you as many

1345
01:00:06,110 --> 01:00:12,500
interviews and behind-the-scenes maybe

1346
01:00:09,769 --> 01:00:14,509
as I can thank you to those people who

1347
01:00:12,500 --> 01:00:18,860
continue to support the skeptic zone in

1348
01:00:14,510 --> 01:00:20,300
fact the roving roving raving microphone

1349
01:00:18,860 --> 01:00:23,059
I'm using at the moment which is an

1350
01:00:20,300 --> 01:00:25,280
attachment to my iPhone was paid for

1351
01:00:23,059 --> 01:00:27,500
through the generous support of skeptic

1352
01:00:25,280 --> 01:00:30,380
zone listeners and it's this microphone

1353
01:00:27,500 --> 01:00:33,019
it's a zoom microphone which I for those

1354
01:00:30,380 --> 01:00:35,720

who want to know iq5 which I used to

1355

01:00:33,019 --> 01:00:37,400

interview Paul and Eugenie Scott this

1356

01:00:35,719 --> 01:00:39,709

week so I'm pretty impressed by the

1357

01:00:37,400 --> 01:00:41,780

quality and this is not your a paid

1358

01:00:39,710 --> 01:00:44,210

endorsement for zoom microphones but I

1359

01:00:41,780 --> 01:00:47,120

do like to use them a big shout out to

1360

01:00:44,210 --> 01:00:48,710

Maynard still there in Australia I mean

1361

01:00:47,119 --> 01:00:51,949

hello to all my reporters around the

1362

01:00:48,710 --> 01:00:54,019

world especially in Australia in fact I

1363

01:00:51,949 --> 01:00:55,549

know our reporter Heidi has been very

1364

01:00:54,019 --> 01:00:58,579

busy she went to the starstuff

1365

01:00:55,550 --> 01:01:00,289

conference in Byron Bay attended by dr.

1366

01:00:58,579 --> 01:01:01,880

Karl in fact she I think she gave dr.

1367

01:01:00,289 --> 01:01:04,159

Carol a lift in her car that's pretty

1368

01:01:01,880 --> 01:01:05,869

cool anyway she says some interviews are

1369
01:01:04,159 --> 01:01:08,269
on the way so I'm looking forward to

1370
01:01:05,869 --> 01:01:12,769
hearing those and then bringing those to

1371
01:01:08,269 --> 01:01:14,309
you very soon but for this week from the

1372
01:01:12,769 --> 01:01:19,278
San Francisco Bay

1373
01:01:14,309 --> 01:01:19,278
this is Richard Saunders signing off

1374
01:01:21,349 --> 01:01:27,568
you've been listening to the skeptic

1375
01:01:23,759 --> 01:01:30,478
zone podcast visit our website at WWF

1376
01:01:27,568 --> 01:01:34,380
tech zone TV for contacts an archive of

1377
01:01:30,478 --> 01:01:37,048
all episodes since 2008 and our online

1378
01:01:34,380 --> 01:01:39,769
store please support the skeptic zone by

1379
01:01:37,048 --> 01:01:42,778
following us on Twitter at skeptic zone

1380
01:01:39,768 --> 01:01:45,808
liking us on Facebook and leaving a

1381
01:01:42,778 --> 01:01:48,688
review on iTunes you can also show your

1382
01:01:45,809 --> 01:01:52,170
support by subscribing via PayPal for as

1383
01:01:48,688 --> 01:01:54,509
little as 99 cents a week the skeptic

1384
01:01:52,170 --> 01:01:56,309
zone is an independent production the

1385
01:01:54,509 --> 01:01:58,438
views and opinions expressed on the

1386
01:01:56,309 --> 01:02:01,009
skeptic zone and not necessarily those

1387
01:01:58,438 --> 01:02:04,788
of Australian skeptic Inc or any other

1388
01:02:01,009 --> 01:02:04,789
skeptical organisation

1389
01:02:05,289 --> 01:02:07,320
Oh