

1  
00:00:00,000 --> 00:00:09,679  
I'm happy to be here and thrilled to be  
given the august task of introducing our

2  
00:00:09,679 --> 00:00:16,180  
speakers in serving as timekeeper. So you  
know, I have my little signs already so

3  
00:00:16,180 --> 00:00:22,080  
speakers when you have five minutes left,  
I'll flash you. Hopefully you won't be

4  
00:00:22,080 --> 00:00:28,660  
too offended by that. The speakers will  
each deliver they're talk in about 15

5  
00:00:28,660 --> 00:00:33,800  
minutes then that will leave us about  
five minutes or so for questions after

6  
00:00:33,800 --> 00:00:40,450  
each talk and then a few minutes to  
shuffle things around from speaker to

7  
00:00:40,450 --> 00:00:48,829  
speaker. And one last housekeeping item.  
Please make sure your cell phones are

8  
00:00:48,829 --> 00:00:58,219  
off or on silent or you know tossed out  
the window or otherwise not here. Now

9  
00:00:58,219 --> 00:01:02,870  
I'd like to introduce our first speaker  
Eric banks who is a Professor of

10  
00:01:02,870 --> 00:01:08,549  
Philosophy. He received his PhD from the  
City University of New York Graduate

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00:01:08,549 --> 00:01:14,760  
Center and came to Wright State in 2006

after receiving a Fulbright Senior

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00:01:14,760 --> 00:01:20,479

Scholar Award for Study in Berlin. He is interested in the history and philosophy

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00:01:20,479 --> 00:01:26,110

of science and established a minor program in that subject for Wright State

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00:01:26,110 --> 00:01:32,770

in 2012. He has published two books. The most recent titled, The Realistic

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00:01:32,770 --> 00:01:38,259

Empiricism of Mach, James, and Russell published by Cambridge University Press

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00:01:38,259 --> 00:01:45,149

in 2014. His present work explores the intersection of philosophy and physics,

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00:01:45,149 --> 00:01:49,189

the subject of a new course he is co-teaching with a member of the Physics

18

00:01:49,189 --> 00:01:55,360

Department. Eric reports that he used his sabbatical in part to brush up on

19

00:01:55,360 --> 00:02:02,060

differential equations, linear algebra, and relativity and quantum theory to

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00:02:02,060 --> 00:02:07,189

support his research interests in the blend of -- again, that's what I thought, his

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00:02:07,189 --> 00:02:10,890

spare time you know just brush up on differential equations whatever

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00:02:10,890 --> 00:02:17,490

those are -- He will tell us  
about some of those interests in his

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00:02:17,490 --> 00:02:24,670

talk that's titled Realistic Empiricism:  
Some Open Problems. Eric.

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00:02:24,670 --> 00:02:29,670

[Applause]

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00:02:29,670 --> 00:02:38,050

Thanks for that embarrassing introduction, I appreciate it.

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00:02:38,050 --> 00:02:42,400

So that's probably a little bit small

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00:02:42,400 --> 00:02:54,160

I'll start out by showing you that the book did in fact appear in late 2014 and it's called a realistic empiricism of Mach,

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00:02:54,170 --> 00:02:59,070

James, and Russell and it's a broadening  
of what I call the realistic empiricist

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00:02:59,070 --> 00:03:05,730

movement across these three historical  
figures and it also features an update

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00:03:05,730 --> 00:03:10,040

of the position in contemporary terms  
and applications to problems in the

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00:03:10,040 --> 00:03:15,630

philosophy of mind and the philosophy of  
science. So the last two

32

00:03:15,630 --> 00:03:20,610

chapters were about that. I was supposed  
to take two years and ended up taking

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00:03:20,610 --> 00:03:25,020

eight. So mathematically that's an  
indeterminate problem is the actual

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00:03:25,020 --> 00:03:31,260

composition time times four or times or  
to the third power and if it's the

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00:03:31,260 --> 00:03:37,160

latter I'm in big trouble, so. I can tell  
you just a little bit today about the

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00:03:37,160 --> 00:03:39,390

field of history and philosophy of  
science,

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00:03:39,390 --> 00:03:44,310

a relatively new field in academia and  
one of the fastest growing. I'm happy

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00:03:44,310 --> 00:03:48,250

to say and I'm also happy to say that we  
have this now at Write State in a

39

00:03:48,250 --> 00:03:52,519

minor program. If you happen to run  
across students who have this interest

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00:03:52,519 --> 00:03:57,850

and they don't have to tell their  
parents their majoring in philosophy, so

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00:03:57,850 --> 00:04:03,900

they might actually do this. Some of the  
things I've gotten out of out of HPS

42

00:04:03,900 --> 00:04:10,070

over the years, some of the best  
philosophers are scientists. In the turn

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00:04:10,070 --> 00:04:15,630

of the 20th century some famous wit  
quoted the following remark:

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00:04:15,630 --> 00:04:19,600

"it is not true that there are no more  
philosophers in our century, they are all

45  
00:04:19,609 --> 00:04:26,570  
in the physics department". So that's a nice  
thing to say about my field right off the bat. I do think

46  
00:04:26,570 --> 00:04:29,630  
that some of the best ideas even for  
contemporary philosophers and problems

47  
00:04:29,630 --> 00:04:34,340  
do come from the history of science and  
philosophy and I think that old ideas

48  
00:04:34,340 --> 00:04:37,560  
and research programs are not always  
wrong turns, that often you can

49  
00:04:37,560 --> 00:04:41,700  
reformulate them in a contemporary way  
that's really quite useful even if

50  
00:04:41,700 --> 00:04:43,260  
they've fallen out of fashion

51  
00:04:43,260 --> 00:04:48,990  
and my personal reaction to the field  
and of others, philosophers of my

52  
00:04:48,990 --> 00:04:54,000  
generation I think I'm pretty right  
in saying that a lot of the contemporary

53  
00:04:54,000 --> 00:04:57,820  
philosophy of language or some of the  
logico-conceptual analysis that philosophers

54  
00:04:57,820 --> 00:05:01,380  
have been doing of over the last  
hundred years, you know it's really quite

55  
00:05:01,380 --> 00:05:05,630  
sterile and makes no connection  
with real-world problems. So a lot of the

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00:05:05,630 --> 00:05:14,110

people who study philosophy sort of ended up doing what I do, you know, today. So let me

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00:05:14,110 --> 00:05:19,540

just give you a little bit of a rundown  
on what realistic empiricism is.

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00:05:19,540 --> 00:05:24,270

Actually it's a sort of an oxymoron  
because realism is you know,

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00:05:24,270 --> 00:05:28,740

caricatured as the view is, it exists  
whether you can see it or not and

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00:05:28,740 --> 00:05:33,100

empiricism is often characterized as the view of it can only exist if you can see it. So

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00:05:33,100 --> 00:05:36,990

those two mutually contradict each other  
you know we should be left with nothing

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00:05:36,990 --> 00:05:41,930

and my book is to just sort of show that there is this very interesting position that's

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00:05:41,930 --> 00:05:45,640

even in the history of philosophy, which that is  
not true and which these two

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00:05:45,640 --> 00:05:50,870

opposites can sort of live together and  
what I ended up discovering was in

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00:05:50,870 --> 00:05:54,250

the work of these three  
philosophers scientists Mach, James, and

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00:05:54,250 --> 00:05:59,290

Russell is that we end up with a quote  
unquote umbrella view of philosophy

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00:05:59,290 --> 00:06:05,170

that's continuous with natural science, that is not a form of speculative metaphysics,

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00:06:05,170 --> 00:06:09,860

except insofar as metaphysics and the old Aristotelian sense is sort of Science

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00:06:09,860 --> 00:06:15,460

at a greater level of generality by other means and it revolves around

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00:06:15,460 --> 00:06:19,900

this kind of unified event in function framework. It is not divided

71

00:06:19,900 --> 00:06:24,530

into separate compartments like perceptual psychology, which would deal

72

00:06:24,530 --> 00:06:28,580

with colors and sounds and individual experiences versus the kinds of things

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00:06:28,580 --> 00:06:33,780

you study physics like particles and forces. And just as science predicts data,

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00:06:33,780 --> 00:06:38,870

realistic empiricists predict the general form of new theories or theory

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00:06:38,870 --> 00:06:43,750

design as Mach's empiricism provided a framework for Einstein's 1905

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00:06:43,750 --> 00:06:48,600

breakthrough in special relativity and then again in 1925 when Heisenberg broke

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00:06:48,600 --> 00:06:50,950

through to his matrix mechanics.

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00:06:50,950 --> 00:06:55,980

Actually, what happened was that Mach sort of provided the template for Einstein, Einstein

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00:06:55,980 --> 00:06:58,500

provided the template for  
Heisenberg.

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00:06:58,500 --> 00:07:04,330

But this was actually very common at the  
time in early 20th century physics for

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00:07:04,330 --> 00:07:09,040

physicists to have a great deal of  
commerce with philosophers and

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00:07:09,040 --> 00:07:13,530

philosophical views and it's sort of an  
unfortunate feature of work in science

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00:07:13,530 --> 00:07:19,210

today that that kind of  
cross fertilization doesn't take place

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00:07:19,210 --> 00:07:22,410

the way they did in the early 20th  
century when some of these great

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00:07:22,410 --> 00:07:24,570

breakthroughs were made.

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00:07:24,570 --> 00:07:29,970

Realistic empiricism is a form of  
empiricism, it does stress the primacy of

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00:07:29,970 --> 00:07:35,470

experience and observed events in data,  
but insists that behind observation is

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00:07:35,470 --> 00:07:41,200

simply, you know, figuratively put more  
observation also in an event and

89

00:07:41,200 --> 00:07:47,380

function form. The theory does not predict specifics. The frame must be open to perpetual

90  
00:07:47,380 --> 00:07:51,730  
revision in the light of new discoveries and  
I must say, one of the challenges of this

91  
00:07:51,730 --> 00:07:55,880  
view is to give a kind of you know  
meta-scientific philosophical view

92  
00:07:55,880 --> 00:08:01,070  
that both has some meat on the bones and  
does predict the form of maybe future

93  
00:08:01,070 --> 00:08:04,670  
of -- in a general way -- the form of future  
scientific theories in physics or

94  
00:08:04,670 --> 00:08:09,430  
psychology, but also is not so  
abstract as just to be empty,

95  
00:08:09,430 --> 00:08:17,910  
that actually does have some as I said,  
some meat on the bones. So these

96  
00:08:17,910 --> 00:08:23,190  
are just some details as I said the view  
revolves around a very sparse set of

97  
00:08:23,190 --> 00:08:28,940  
things events and functions and it is a  
common view to the historical figures

98  
00:08:28,940 --> 00:08:33,500  
that make up the first part of my book  
that they thought that you didn't

99  
00:08:33,500 --> 00:08:39,060  
actually need much you could get a lot  
of what physics or psychology studies

100  
00:08:39,060 --> 00:08:44,360  
through various forms of construction. So

Russell's event particulars as he called

101

00:08:44,360 --> 00:08:48,820

them, take the place of objects. An object becomes a function of the history of its

102

00:08:48,820 --> 00:08:51,520

interactions bound up by a law.

103

00:08:51,520 --> 00:08:56,040

And the other interesting breakthrough specifically related to these

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00:08:56,040 --> 00:09:01,760

figures is the view in the philosophy of mind known as neutral monism that natural

105

00:09:01,760 --> 00:09:05,940

events are neutral and become grouped into different categories based upon

106

00:09:05,940 --> 00:09:11,610

their functional variations. So I don't know if you can see what's at the intersection of those two circles up

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00:09:11,610 --> 00:09:16,790

there, but it's... the idea is that you could have something that was a

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00:09:16,790 --> 00:09:22,100

sensation / natural element and the idea would be that a

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00:09:22,100 --> 00:09:27,040

color for example, or any experience would be a sensation insofar as it

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00:09:27,040 --> 00:09:31,020

depends upon the retina and other colors in the state of the brain and is a

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00:09:31,020 --> 00:09:34,110

physical event in so far as it depends upon the wavelength of the light and

112

00:09:34,110 --> 00:09:38,160

electrochemical nature of the brain  
state and so you could give both

113

00:09:38,160 --> 00:09:43,650

descriptions and the neutral element is  
neutral between the two because it fits

114

00:09:43,650 --> 00:09:48,500

into either category depending on which  
set of variations you emphasize as a

115

00:09:48,500 --> 00:09:53,050

scientist or an investigator, but in  
reality it belongs to both in there is

116

00:09:53,050 --> 00:10:00,320

no hard-and-fast division between the  
one and the other. Some of the editions that I made

117

00:10:00,320 --> 00:10:03,940

in my chapter 5 when I was developing  
this view into a real philosophy of mind

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00:10:03,940 --> 00:10:09,940

was to characterize a natural event as the  
manifestation of a power and the

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00:10:09,940 --> 00:10:14,250

frustration of event or an equilibrium  
between events is also the manifestation

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00:10:14,250 --> 00:10:20,310

of a power, of mutually offsetting powers  
and what I mean by powers is nothing

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00:10:20,310 --> 00:10:25,350

more than what a physicist would mean by you know, a natural potential function or

122

00:10:25,350 --> 00:10:29,930

something of that sort, so that you can  
give a sort of mathematical description

123

00:10:29,930 --> 00:10:33,350

of what goes on and then when you want to characterize an event you can

124

00:10:33,350 --> 00:10:38,210

characterize it as a crossing across two potential lines of what a physicist would

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00:10:38,210 --> 00:10:43,390

characterized as a force, a realistic empiricist could characterize as just a

126

00:10:43,390 --> 00:10:51,180

natural event and the analysis of mental events which I carried forward in the

127

00:10:51,180 --> 00:10:56,400

chapter 5 was at the same power would be generally recognized as a same type

128

00:10:56,400 --> 00:11:00,190

acrossed many different individual token manifestation events,

129

00:11:00,190 --> 00:11:04,830

which are not the same. So for example, the same powers and network neurons to

130

00:11:04,830 --> 00:11:09,180

collectively manifest or electric chemical energy says a color could be

131

00:11:09,180 --> 00:11:13,200

manifested individually by inserting electrodes and siphoning off the energy

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00:11:13,200 --> 00:11:17,990

of the individual cells into individual physical events and readings. The same

133

00:11:17,990 --> 00:11:21,710

energies, two individually different and

mutually exclusive

134

00:11:21,710 --> 00:11:26,810

manifestation events, which explains why you can't observe both at the same time. I did

135

00:11:26,810 --> 00:11:32,820

get a recent review from a sort of cheeky graduate student at Cambridge and some student

136

00:11:32,820 --> 00:11:38,280

magazine or something and he characterized my chapter 5 as the

137

00:11:38,280 --> 00:11:46,610

work of the dull technician. I'll take that any day actually. [laughing] They're not enough

138

00:11:46,610 --> 00:11:52,990

philosophers that are dull technicians. As I said, the functional connections

139

00:11:52,990 --> 00:11:58,560

between events are grounded in the mathematical description of powers, potentials,

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00:11:58,560 --> 00:12:02,080

and the events are characterized by potential differences as they are in

141

00:12:02,080 --> 00:12:06,740

physics not mere mathematical functions relating anything to anything. So there

142

00:12:06,740 --> 00:12:10,780

is some attempt to provide a little more structured than just saying that

143

00:12:10,780 --> 00:12:14,100

something as a function of something. A famous counterexample people always

144

00:12:14,100 --> 00:12:18,390

give is the price of bread and rising water levels in Venice. These two things

145

00:12:18,390 --> 00:12:24,579

are absolutely a function of one another  
you know?

146

00:12:24,579 --> 00:12:29,239

And here's a sort of graphic characterization of on the left hand

147

00:12:29,239 --> 00:12:33,589

side what a potential jump looks like  
in the science of physics. A sample when an

148

00:12:33,589 --> 00:12:39,249

electron jumps between energy levels in an atom and the kind of proposal that I made in

149

00:12:39,249 --> 00:12:44,350

my book for how to characterize an event  
via all its potential jumps, actual and

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00:12:44,350 --> 00:12:49,850

possible from the center where the event  
P is located to all possible Os that

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00:12:49,850 --> 00:12:54,749

could be identified whether those jumps  
take place or not and if you collect

152

00:12:54,749 --> 00:12:59,649

them up the series of sort of spokes  
that stick out of P kind of characterize

153

00:12:59,649 --> 00:13:06,540

it as an individual and that is the sort  
of principium individuationis for how

154

00:13:06,540 --> 00:13:14,299

you differentiate one individual event  
from another. Another innovation which I

155

00:13:14,299 --> 00:13:19,269

really think is more due to my  
historical forerunners, are the Machian-

156

00:13:19,269 --> 00:13:25,129

Russellian Causal Graphs where  
events of pure as nodes and spokes

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00:13:25,129 --> 00:13:30,749

appear as functional connections and the  
particular some laws are to be filled in

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00:13:30,749 --> 00:13:35,619

by natural science so realistic  
empiricism gives you the grid and then

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00:13:35,619 --> 00:13:38,459

when you actually do some empirical work  
and discover how these things are

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00:13:38,459 --> 00:13:44,759

connected to one another you find out  
how to fill in the content of that grid,

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00:13:44,759 --> 00:13:51,350

but everything even across different  
departments can all be graphed side to

162

00:13:51,350 --> 00:13:56,329

side like that. There are no departments  
that are fundamentally segregated from

163

00:13:56,329 --> 00:14:03,139

each other and that's the aspect of  
monism that most drew me to this view.

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00:14:03,139 --> 00:14:06,559

I suppose one of the things that  
naturalistic philosophers like myself do

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00:14:06,559 --> 00:14:11,610

is we tend to look for the unity of  
science in a way that you cannot do if

166

00:14:11,610 --> 00:14:15,279

you're actually working scientists,  
because you're too busy getting grant

167

00:14:15,279 --> 00:14:20,419

money and all the other interesting stuff that those people do, but in the

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00:14:20,419 --> 00:14:24,189

early 20th century it's very interesting. You had a lot of very very developed

169

00:14:24,189 --> 00:14:27,010

sciences on the on the forefront.

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00:14:27,010 --> 00:14:31,300

They were just beginning to to unlock things about the brain and they wondered

171

00:14:31,300 --> 00:14:35,720

about these questions, how individual experiences or psychological data could

172

00:14:35,720 --> 00:14:40,780

be related to the data of physics and in a way I don't think, I think the

173

00:14:40,780 --> 00:14:44,950

results they've reached where right, that there needs to be more

174

00:14:44,950 --> 00:14:49,570

of an effort to combine those departments and come up with a working

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00:14:49,570 --> 00:14:53,250

unified view which doesn't mean that you anticipate the results of empirical

176

00:14:53,250 --> 00:14:56,250

science in advance.

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00:14:56,250 --> 00:15:00,590

Well I can't get to my other open problem. Well I'll just talk about them really

178

00:15:00,590 --> 00:15:04,540

quick. My first open problem is I think  
one that every naturalistic philosopher

179

00:15:04,540 --> 00:15:09,390

should face and this struck me after I  
finished the book and got down to the

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00:15:09,390 --> 00:15:13,080

real research of my of my PDL, which was  
finding holes in it, which is what

181

00:15:13,080 --> 00:15:19,000

philosophers do with our work and I  
think the one main challenge that I

182

00:15:19,000 --> 00:15:23,570

think has to be faced in the  
coming years and months is what about

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00:15:23,570 --> 00:15:27,570

everything else, you know? I mean is  
everything really to be characterized

184

00:15:27,570 --> 00:15:32,920

just in a hardcore, you know sort of  
naturalistic way and I sort of have an

185

00:15:32,920 --> 00:15:37,230

idea about what to do with that, maybe  
drawing on some ideas from Wittgenstein.

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00:15:37,230 --> 00:15:43,060

And problem 2 is a problem of extension, which is my own intellectual

187

00:15:43,060 --> 00:15:48,760

problem child, my very own ten years and  
running and I think I might be getting

188

00:15:48,760 --> 00:15:55,880

closer to maybe making some progress on  
this. Certainly having the PDL really

189

00:15:55,880 --> 00:16:06,560

helped. So that's all I have time for I think. Can we take questions? Yeah.

190

00:16:06,560 --> 00:16:16,660

So again using the deep philosophy that you've got, something leaks out as you're presenting this, an area we can talk more about later.

191

00:16:16,660 --> 00:16:24,000

At the beginning of the Cold War when the United States reveals the extent of the atom bomb private publishes of the Manhattan report final project.

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00:16:24,000 --> 00:16:31,760

What they decided to do was to make certain that the Soviets and no one else could relevantly gain anything from the intelligence of "here's how we did it",

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00:16:31,760 --> 00:16:40,080

because they carefully wrote it in such a way as to not show the full direction of the way in which it solved the scientific problem of splitting the atom.

194

00:16:40,080 --> 00:16:49,980

But they had to do it in such a way that scientists could read it and say "okay this makes sense, we do this and then assume by a jump that we know what it's like and then we solve it".

195

00:16:49,980 --> 00:16:56,000

And the Soviets end up.. and historians of science are now working [inaudible]

196

00:16:56,000 --> 00:17:04,820

and the way in which the Americans chose what not to emphasize was itself a way for us to understand what was most important,

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00:17:04,820 --> 00:17:14,460

because if it was important they wouldn't want to talk about it. If it was not important they wouldn't want to obviously mislead us by showing us a lie.

198

00:17:14,460 --> 00:17:21,780

So we had to figure out [inaudible]

199

00:17:21,780 --> 00:17:29,340

I'm really glad you aid that Johnathan, because this is what makes the field so exciting. Especially when you do get into those archival projects.

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00:17:29,340 --> 00:17:37,280

I haven't done that kind of skullduggery since I was you know, doing my dissertation and I as you heard a little bit like digging through

201  
00:17:37,289 --> 00:17:44,280  
German archives and reading old German  
handwriting which is illegible completely.

202  
00:17:44,280 --> 00:17:50,870  
But you find out and I think the  
surprise is that the story you discover

203  
00:17:50,870 --> 00:17:54,730  
is completely different from the story  
that that you've heard and that you

204  
00:17:54,730 --> 00:17:58,250  
think. It'd be interesting to find out  
what really went on in that in that bomb

205  
00:17:58,250 --> 00:18:01,950  
project, you know, because we still probably don't know everything

206  
00:18:01,950 --> 00:18:09,890

207  
00:18:09,890 --> 00:18:16,390  
Just an observation listening to the question that you answered,

208  
00:18:16,390 --> 00:18:35,420  
is it true that to think about the gaps, what's missing is more informative than what's there. In any case [inaudible] is a  
lot about the spaces in between.

209  
00:18:35,420 --> 00:18:40,560  
I work on nothing but the spaces in between things. It seems so sometimes.

210  
00:18:40,560 --> 00:18:47,460  
All the liberal arts [laughing] work on things in between things and that's what brings us together and what makes it fun.

211  
00:18:47,460 --> 00:18:50,900  
I quite agree with that. In the back.

212  
00:18:50,900 --> 00:19:03,620  
Recently on the extensions, your second problem, what it was such a long one in coming?

213

00:19:03,620 --> 00:19:10,500

Well as I said, one of the virtues of the view is that you start out with things that are very simple, events and functions and

214

00:19:10,500 --> 00:19:20,340

the world doesn't look like a bundle of events and functions, it looks like spacio-temporally extended objects and processes and things like that

215

00:19:20,340 --> 00:19:27,260

and one of the you know, problems of my view is characterize what the

216

00:19:27,260 --> 00:19:33,809

notion of extension or raw extended-ness, the apart-ness of different parts of an

217

00:19:33,809 --> 00:19:39,640

object or different stages of the process in time. My research has been on

218

00:19:39,640 --> 00:19:47,090

whether there's a way of analyzing that in a very deep kind of conceptual way so

219

00:19:47,090 --> 00:19:52,580

that it dovetails with the earlier part of the view and gets you from individual

220

00:19:52,580 --> 00:19:57,530

events and functions to a fully extended physical and natural universe and as I

221

00:19:57,530 --> 00:20:01,170

said, I don't have time to show you all of the details, but I've been working on

222

00:20:01,170 --> 00:20:06,790

an area called geometric algebra and most of the work that I did during my

223

00:20:06,790 --> 00:20:12,790

PDL was on this mathematical language of geometric algebra and it promises a kind

224

00:20:12,790 --> 00:20:19,210  
of a construction of how you extend say  
between that point alpha and beta when you're extending

225  
00:20:19,210 --> 00:20:24,440  
across a line or when you're sweeping one  
vector across another to extend an area

226  
00:20:24,440 --> 00:20:31,460  
and most of my work has been about about that mechanism.

227  
00:20:31,460 --> 00:20:39,720  
You talk about this being your problem child that's ten years running. How long do you think this will take?

228  
00:20:39,720 --> 00:20:49,500  
I hope it's not ten to the third. I forget the options that I gave you. It's either three times or to the third power.

229  
00:20:49,500 --> 00:20:51,500  
Well at least one more PDL.

230  
00:20:51,500 --> 00:20:57,440  
Oh sure. [laughing] We will definitely fit one of those in for sure. Kelli.

231  
00:20:57,440 --> 00:21:06,320  
I'm just wondering [inaudible] how new research gravitational [inaudible]

232  
00:21:06,320 --> 00:21:09,160  
[laughing] Oh I know what all about that.

233  
00:21:09,160 --> 00:21:10,860  
... implications?

234  
00:21:10,860 --> 00:21:21,880  
I haven't the foggiest, I mean I know what the discovery was. I mean it's been coming for at least a hundred years. In fact, it is a hundred years.

235  
00:21:21,880 --> 00:21:26,210  
I'll make an example of this. You know,  
it often takes us a hundred years to really

236  
00:21:26,210 --> 00:21:30,790  
verify and understand something and

that's kind of in line with my

237

00:21:30,790 --> 00:21:34,820

research, I mean I'm working on ideas  
there are a hundred years old as well so

238

00:21:34,820 --> 00:21:44,800

the short answer is I don't know, but... Yes.

239

00:21:44,800 --> 00:21:55,320

Yeah, you seem to be working a lot with mathematics. Have you thought about collaborating with a mathematician and to get that mathematician to do all this stuff and then you're just the brain?

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00:21:55,320 --> 00:21:57,500

It would be great to have somebody to do the work

241

00:21:57,500 --> 00:22:04,460

and it would be lovely to find someone who would do it for free, but it just doesn't work that way. The

242

00:22:04,470 --> 00:22:13,170

channels of communication are really  
difficult. It's hard to find working mathematicians who aren't allergic to philosophers and

243

00:22:13,170 --> 00:22:16,660

I have made progress. I made a couple of  
breakthroughs and there are two that I

244

00:22:16,670 --> 00:22:22,650

correspond with in this area. So I also have a colleague in the Physics Department who

245

00:22:22,650 --> 00:22:28,140

who teaches with me and we bounce ideas  
off of each other. I can say that about

246

00:22:28,140 --> 00:22:31,530

Wright State, we have great  
interdisciplinary collaboration with our

247

00:22:31,530 --> 00:22:36,130

sciences. So thank you for the idea. It's a ...

248

00:22:36,130 --> 00:22:52,200

Do you see mathematics as a sort of more fundamental truth than I don't know, language or ideas? I mean in the sense, is there something more basic about the reality of mathematics that sets it apart from something else?

249

00:22:52,200 --> 00:22:58,240

It's just clear, it's not more true  
actually true doesn't admit to more or

250

00:22:58,250 --> 00:23:04,980

less anyway, right? So I don't know, but when you when you get

251

00:23:04,980 --> 00:23:11,730

into to one of these concepts and you really want to get to the bottom of it, I have found

252

00:23:11,730 --> 00:23:18,520

math to be really quite useful, yes, but  
it's not to use a stick to beat people

253

00:23:18,520 --> 00:23:28,900

with like "I do math, what do you do?" you know kind of business. It's a language.

254

00:23:28,900 --> 00:23:30,890

But less ambiguous, right?

255

00:23:30,890 --> 00:23:35,990

It's clearer. Carol.

256

00:23:35,990 --> 00:23:41,760

If you went to Indian University, you'd know that the HPS has a long history.

257

00:23:41,760 --> 00:23:43,460

I gave a talk there actually.

258

00:23:43,460 --> 00:23:53,580

You did? Oh. I have friends in HPS there, but I wonder in following up on Liam's question too, because I was thinking that too, collaborating with mathematicians and physicists.

259

00:23:53,580 --> 00:24:03,560

I mean their work is as theoretical as yours, so do they not want to talk to philosophers, because they don't want to... I mean they know work is...

260

00:24:03,560 --> 00:24:06,560

Well to pick up on what Liam said, it's a language problem.

261  
00:24:06,560 --> 00:24:13,700  
I mean it's often just... once you  
communicate, everything goes really quite well and the thing that's

262  
00:24:13,700 --> 00:24:19,440  
amazing about mathematicians is how fast they are. I mean really, it doesn't take much time until

263  
00:24:19,440 --> 00:24:20,430  
you get the idea across.

264  
00:24:20,430 --> 00:24:26,500  
It's just getting it in language that you  
both can understand that's difficult.

265  
00:24:26,500 --> 00:24:31,840  
Thank you.

266  
00:24:31,840 --> 00:24:35,700  
[applause]