



THE OVERWHELMING EVIDENCE FOR LIFE AS A COSMIC PHENOMENON

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SOCIETY
FOR
SCIENTIFIC
EXPLORATION

1

00:00:02,400 --> 00:00:08,700

hello and welcome to the SSC Community discussion\h
hour my name is Annalisa ventola I'm the chief\h\h

2

00:00:08,700 --> 00:00:13,440

editor editor of edge science and I will\h
be your host for this event I have with\h\h

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00:00:13,440 --> 00:00:20,040

me Professor Nolan Chandra the grandma\h
Singa he was a world-renowned astronomer\h\h

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00:00:20,040 --> 00:00:28,560

astrophysicist and Pioneer of astrobiology in 1977\h
together with the late sir Fred Hoyle he proposed\h\h

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00:00:28,560 --> 00:00:34,200

a theory of commentary commentary panspermia\h
the theory that comets carry the seeds of life\h\h

6

00:00:34,200 --> 00:00:40,260

and that life is distributed throughout the\h
Universe discoveries in geology and astronomy\h\h

7

00:00:40,260 --> 00:00:45,540

continued to provide evidence supporting\h
his theory known as cometary panspermia\h\h

8

00:00:46,260 --> 00:00:55,620

from 1963 to 1973 he was a form former fellow\h
of the Jesus College Cambridge and a founding\h\h

9

00:00:55,620 --> 00:01:03,180

member of The Institute of astronomy in Cambridge\h
from 1973 to 2010 he was professor at Cardiff\h\h

10

00:01:03,180 --> 00:01:10,500

University he has published over 450 peer-reviewed\h
papers and scientific journals and over 30 books\h\h

11
00:01:11,340 --> 00:01:16,860
the professor's talk is pre-recorded however he is
here as you can see and he's going to be joining

12
00:01:16,860 --> 00:01:25,020
us at the end for live q a we will now begin
the presentation because today an angel conflict

13
00:01:25,020 --> 00:01:34,800
between two rival ideas rival theories about how
we that is to say life came to be in the universe

14
00:01:35,760 --> 00:01:43,800
and I would like to cite this as just one
example of a situation where culture religion

15
00:01:43,800 --> 00:01:53,940
and tradition apparently trumps all facts relating
to the the problems that we have at hand foreign

16
00:02:01,320 --> 00:02:08,520
take for instance the case of the the Roman
numerals I mean this is maybe a little bit of

17
00:02:08,520 --> 00:02:14,760
distraction but I think it is relevant if you look
at these Roman numerals they're they're hideous

18
00:02:14,760 --> 00:02:26,520
mean they are 1 1 1 1 1 1 i v v i and so on and
these are numbers that were in Vogue throughout

19
00:02:26,520 --> 00:02:36,600
the uh European State system until about the
18th century and it is really remarkable that

20
00:02:36,600 --> 00:02:44,160
one could just imagine doing long division and
calculus Etc uh with these Roman numerals and

21
00:02:44,160 --> 00:02:49,140
there were mathematicians in the 17th 18th
centuries who really protested against the

22
00:02:49,140 --> 00:02:57,660
use of the Roman numerals and uh but as I said
they were used throughout Europe uh sort of on

23
00:02:57,660 --> 00:03:08,520
abashedly from about a thousand uh the ad that
was in Common Era to about 880. even though

24
00:03:08,520 --> 00:03:14,340
the the number system that you and I are all
accustomed now which is called the Hindu Arabic

25
00:03:14,340 --> 00:03:21,720
number system was actually brought to the notice
of European uh practitioners European scientists

26
00:03:23,040 --> 00:03:31,500
uh but they rejected the idea because it was
connected with with the Deep rooted suspicion of

27
00:03:31,500 --> 00:03:39,480
non-Christian non-uh European origins of this
system so this is the reason why it was not

28
00:03:39,480 --> 00:03:47,160
readily accepted by philosophers mathematicians
accountants and so on in Europe until the 18th

29
00:03:47,160 --> 00:03:56,400
century uh this is an interesting story in
the 7th Century uh A.D of Common Era an Arab

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00:03:56,400 --> 00:04:06,060
scholar called Severus sebuct uh brought this to
everybody's notice and he wrote to his friends

31
00:04:06,060 --> 00:04:12,720
and colleagues and and so on everywhere in the
so-called civilized world he wrote The Following

32
00:04:13,560 --> 00:04:21,300
I will omit all discussion of the science of the
Hindus the people not the same as the Syrians

33
00:04:21,300 --> 00:04:27,240
there are subtle discoveries in the science of
astronomy discoveries that are more ingenious than

34
00:04:27,240 --> 00:04:33,120
those of the Greeks and the Babylonians they're
valuable methods of calculation they're Computing

35
00:04:33,120 --> 00:04:42,060
that surpasses description I wish only to say that
this computation is done by means of nine signs

36
00:04:42,720 --> 00:04:47,280
if those who believe because they speak
Greek that they have reached the limits

37
00:04:47,280 --> 00:04:53,160
of science should know these things they
should be convinced that there are also

38
00:04:53,160 --> 00:04:57,600
others who know something and the other thing
was something of course knew something much

39
00:04:57,600 --> 00:05:02,400
better the number system that we are all
familiar with one two three four and so on

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00:05:02,400 --> 00:05:10,260
has come to be the the Cornerstone of all our
cultural development since the enlightenment

41
00:05:11,280 --> 00:05:17,580
anyway but Europe as I said did not adopt this
Hindu Arabic nervous system until well into the

42
00:05:17,580 --> 00:05:24,300
18th century so that's the the background uh
so I would really like in a more General sense

43
00:05:24,300 --> 00:05:31,080
to bust the myth that scientific truths are
always secure and invaluable and independent

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00:05:31,080 --> 00:05:37,380
of cultural constraints that's what we are led to
believe when we are taught science in our schools

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00:05:38,820 --> 00:05:44,040
in the modern technological age that we live
in of course such a belief is understandable

46
00:05:44,700 --> 00:05:50,640
uh take uh cell phones our computers
and so on this is marvelous things

47
00:05:50,640 --> 00:05:57,120
and we all enjoy the marvels of scientific
achievement that Prevail in the year 2022

48
00:05:58,380 --> 00:06:06,600
but the greater and deeper truths about the
world we live in are far from secure and this

49
00:06:06,600 --> 00:06:13,620
uh includes of course the origins of life in the
cosmos the origins of Consciousness which I think

50
00:06:13,620 --> 00:06:20,340
you have discussed in your Journal many on many
occasions and the origin of the universe itself

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00:06:21,600 --> 00:06:29,820
uh but I should add at this point to caveat
that portions of sun the scientific Canon

52
00:06:29,820 --> 00:06:35,820
the Orthodox sense that we believe or we
think is really definite and are secure

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00:06:35,820 --> 00:06:41,280
there are several of these and they include
Newtonian Dynamics nucleophysics for example

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00:06:41,280 --> 00:06:49,500
uh anatomy and and a lot of others but
based on firmly on the empirical method

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00:06:51,360 --> 00:07:02,280
a recent terms for instance in uh in In classical
mechanics which is a skill science from well from

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00:07:02,280 --> 00:07:10,620
the 16th century onwards uh is is really shown
almost day by day with the various achievements

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00:07:10,620 --> 00:07:17,820
that we are making for instance this September a
few a few weeks ago in fact the dance Mission uh

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00:07:17,820 --> 00:07:27,180
sent a probe since sentiment an object essentially
a large object to hit an asteroid seven over seven

59
00:07:27,180 --> 00:07:35,400
million years uh sorry so many kilometers from
from Earth and the success of this mission to

60
00:07:35,400 --> 00:07:46,380
send this object all the way to the um the the the
moon of the of the asteroid called dimorphos was

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00:07:46,380 --> 00:07:52,140

really a great feat of scientific achievement so\h
there are many things like that that are based own\h\h

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00:07:52,140 --> 00:07:59,700

areas of science that are secure like Newtonian\h
mechanics then there is for instance nucleophysics\h\h

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00:07:59,700 --> 00:08:07,260

which is a definite sense that tells us how the\h
Sun Shines and how the stars shine how we all get\h\h

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00:08:07,260 --> 00:08:13,500

our energy from the Sun and this is these are hard\h
facts and they're beyond refutation in the case of\h\h

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00:08:13,500 --> 00:08:21,360

the Sun for instance for protons linked together\h
at the very high pressures that exist in the Deep\h\h

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00:08:21,360 --> 00:08:28,860

interior of the sun they link together in the\h
nuclear reaction that produces helium releases\h\h

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00:08:28,860 --> 00:08:36,600

a neutral neutrino positron and of course the\h
energy that that we enjoy the solar energy\h\h

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00:08:36,600 --> 00:08:44,820

that that we depend upon and all life on Earth\h
depends on the radiation the light from the sun\h\h

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00:08:45,900 --> 00:08:52,740

but similar certainty does not apply for ideas\h
or theories about the origin of life and the\h\h

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00:08:52,740 --> 00:08:58,740

origin of the universe these are matters as I\h
said earlier that are inextricably linked to\h\h

71
00:08:58,740 --> 00:09:06,960
culture and religion and are still unfortunately
rigidly controlled by the force of authority in

72
00:09:06,960 --> 00:09:15,600
the modern world and force of authority means uh
institutions uh universities teaching systems and

73
00:09:15,600 --> 00:09:20,700
Perth most importantly the academies like
the Royal Society the French Academy of

74
00:09:20,700 --> 00:09:27,900
Science and so on and these started in the
early stages of the European enlightenment

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00:09:31,440 --> 00:09:39,780
theories about the the origin of Life how life
began of course has a very deep history that goes

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00:09:39,780 --> 00:09:49,980
back several millennia the basic choice that we
have as we shall see is between two propositions

77
00:09:49,980 --> 00:09:57,780
one the idea of spontaneous generation that's
called the theory of spontaneous generation

78
00:09:57,780 --> 00:10:09,000
which says that life started from none non-life
spontaneously and the competing theory that

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00:10:09,000 --> 00:10:14,940
have been working on and subscribing to
for over 40 days or four decades is the

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00:10:14,940 --> 00:10:21,300
theory of panspermia which says that life is
a cosmic phenomenon eternally present in the

81
00:10:21,300 --> 00:10:28,800
cosmos and taking root whenever and wherever\h
the conditions for for Life become suitable

82
00:10:31,080 --> 00:10:42,900
uh as I said so this goes back a long time and\h
and the the idea of of panspermia dates back in\h\h

83
00:10:42,900 --> 00:10:49,620
the western Tradition at any rate to a Greek\h
pre-socratic philosopher called Anna exergus

84
00:10:50,160 --> 00:10:59,760
proposed that life appears spontaneously from\h
non-life whenever the conditions the ambient\h\h

85
00:10:59,760 --> 00:11:06,660
conditions are satisfied so this is as I said in\h
the western tradition goes back to pre-socratic\h\h

86
00:11:06,660 --> 00:11:13,020
terms but in the older traditions of for\h
instance in Ancient India the way that as\h\h

87
00:11:13,020 --> 00:11:21,300
it goes back even further to about 2000 BCE\h
and that's the uh in The Vedas for example

88
00:11:25,980 --> 00:11:31,800
the the idea of spontaneous generation\h
that Life Starts spontaneously whenever\h\h

89
00:11:31,800 --> 00:11:39,000
conditions are appropriate for example on\h
this planet this is a much later idea that\h\h

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00:11:39,000 --> 00:11:45,600
came into Western Traditions Western\h
philosophy about 150 years after the\h\h

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00:11:45,600 --> 00:11:50,520
inventor the European inventor\h
a Greek inventor of uh or pants

92
00:11:50,520 --> 00:12:00,360
it was due so spontaneous generation\h
was signed firmly to a philosopher\h\h

93
00:12:01,080 --> 00:12:06,720
perhaps a greater philosopher in the history\h
of Science and History of philosophy and his\h\h

94
00:12:06,720 --> 00:12:15,060
name is Aristotle who lived in the um the 3rd\h
Century BCE he was a pupil of Plato the great\h\h

95
00:12:15,060 --> 00:12:22,260
philosopher Plato he was a teacher of Alexander\h
the Great who was of course a tower and he was a\h\h

96
00:12:22,260 --> 00:12:29,100
towering influence on Western philosophy it was\h
he who introduced the Earth centered cosmology\h\h

97
00:12:29,100 --> 00:12:40,140
also the idea that the Earth is the center of our\h
solar system and also spontaneous generation which\h\h

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00:12:40,140 --> 00:12:48,780
implies earth-centered biology so these ideas um\h
all that is totally in the Western World were to\h\h

99
00:12:48,780 --> 00:12:56,880
dominate Western thinking for over 2000 years\h
but this is important the stress at this point\h\h

100
00:12:56,880 --> 00:13:05,160
that it was greatly assisted the dominance of\h
these ideas this earth-centered solar system\h\h

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00:13:05,160 --> 00:13:13,860

the earth-centered life system and so on was
greatly assisted by the rise of Christianity

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00:13:15,000 --> 00:13:25,320

Christendom uh it was this guy Thomas Saint
Thomas Aquinas who in the 13th century uh

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00:13:25,320 --> 00:13:31,200

provided institutional support for almost
the whole of Aristotle in philosophy

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00:13:31,920 --> 00:13:37,680

he adopted every bit of Aristotle in
philosophy into Christian Theology and

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00:13:37,680 --> 00:13:47,340

so that was the starting point of a very rigid
belief in Aristotle's ideas of the uh this role

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00:13:47,340 --> 00:13:54,660

of the Earth in in this in the universe in the
role of life being centered on the planet Earth

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00:13:55,740 --> 00:14:03,360

and most important questions then thereafter
concerns concerning our existence and so on became

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00:14:03,360 --> 00:14:12,840

inextricably linked with Theology and culture so
that's the story and I think we all know that the

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00:14:12,840 --> 00:14:22,380

the attempt to dismantle Aristotle started in
the beginning of the 15th century of the Common

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00:14:22,380 --> 00:14:30,240

Era began with Copernicus and Copernicus Galileo
and Copernicus challenged the idea that the Earth

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00:14:30,240 --> 00:14:35,580

was at the center of the solar system center\h
of the universe and this of course was taken\h\h

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00:14:35,580 --> 00:14:42,900

very very seriously by the church establishment\h
by the people that establishment and there were\h\h

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00:14:42,900 --> 00:14:50,700

many casualties Galileo was imprisoned that was\h
not a great punishment but Bruno the philosopher\h\h

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00:14:50,700 --> 00:15:02,940

poet mathematician lost his life in the process\h
he was burned at his stake in 16 1600. dirty

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00:15:04,860 --> 00:15:12,480

so this is a children of Giordano Bruno my\h
philosophical today for saying that there\h\h

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00:15:12,480 --> 00:15:17,280

were other inhabited planets with\h
life on them orbiting other stars\h\h

117

00:15:18,180 --> 00:15:20,940

and there on the right hand side is the statue of

118

00:15:23,220 --> 00:15:27,960

Jordan or Bruner with us myself in Italy

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00:15:31,800 --> 00:15:42,360

uh the loan debate about uh where the Life\h
starts on the Earth or was brought from outside\h\h

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00:15:42,360 --> 00:15:48,600

so the debate between spontaneous generation the\h
intellectual debate between spontaneous generation\h\h

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00:15:48,600 --> 00:15:56,820

and Paris Premier began to take a very serious
turn in 1865 when the French biologist Louis

122

00:15:56,820 --> 00:16:04,980

Pasteur made a groundbreaking discovery and I think
in that Discovery he decisively disproved

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00:16:04,980 --> 00:16:12,600

the idea of spontaneous generation so he had this
system where he had brought a nutrient broth that

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00:16:12,600 --> 00:16:22,860

brought that microbes like to grow in and he had
a uh he then boiled the broth in a flask with

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00:16:22,860 --> 00:16:31,260

hooked with a hooked neck that you can see on top
there and this was this was the uh the neck that

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00:16:31,260 --> 00:16:38,760

prevented bacteria from the air falling into the
broth and when the when the when the broth was

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00:16:38,760 --> 00:16:46,740

sterilize which means that all the bugs in the
broth were killed and the uh and and remained with

128

00:16:46,740 --> 00:16:56,400

this hooked um neck uh laid on the top there was
no microbes to be found under the microscope when

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00:16:56,400 --> 00:17:03,540

the curved neck was broken and therefore the
broth uh this terrible broth was exposed to there

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00:17:03,540 --> 00:17:10,800

then microbes grew and so microbes grew only when
the viable microbes when pre-existing microbes

131

00:17:10,800 --> 00:17:17,940

were able to find their way into the into the
broth and this I think was the first experiment

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00:17:17,940 --> 00:17:25,140

that paved the way to prove transperimia in the
laboratory and Pence and pastille Louis paste

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00:17:25,140 --> 00:17:34,440

had this dictum omnivo in Latin which says that
all life comes from life and that was a doctrine

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00:17:34,440 --> 00:17:42,480

that really ripped through the intellectual scene
in Europe for about two or three decades before it

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00:17:42,480 --> 00:17:52,320

also was abandoned uh the conflict uh so as
I said the conflict between these two ideas

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00:17:52,320 --> 00:18:00,240

transformation versus spontaneous generation has
lasted from essentially until the present day uh

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00:18:00,240 --> 00:18:07,620

every scientific establishment has found a reason
to say that pansperimia is not established we don't

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00:18:07,620 --> 00:18:15,300

like it we prefer the Aristotle in theory
of spontaneous generation life just emerging

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00:18:15,300 --> 00:18:21,660

from nothing when conditions
on a planet becomes appropriate

140

00:18:22,380 --> 00:18:29,400

uh so it was really a conflict that was pro
trade as between Superstition Superstition

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00:18:29,400 --> 00:18:38,520

being panspermia and signs being the um the idea
that um that likes the Springs from non-life

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00:18:39,240 --> 00:18:45,420

when I myself personally visited revisit their
parents permia in 1980 it had already been

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00:18:45,420 --> 00:18:53,700

assigned to the category of superstition so that's
the bad start to to begin with so Aristotle's

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00:18:53,700 --> 00:18:59,820

primary serpent that time and right from the
beginning of the 20th century took this form

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00:18:59,820 --> 00:19:10,020

which is a soup of mixture of organic chemicals
thrown into an early primitive Earth undergoing a

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00:19:10,020 --> 00:19:16,620

set of chemical reactions ending up with the first
microbial cell from which everything else Frank

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00:19:18,300 --> 00:19:28,560

uh this was taken further by the work of the
1950s by uh the famous geologists had a theory

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00:19:28,560 --> 00:19:37,740

and chemist Sandy Miller who in the laboratory
was able to show that simple organic chemicals

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00:19:37,740 --> 00:19:46,980

like amino acids and some carbohydrates and so
on could be formed in the laboratory they took

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00:19:46,980 --> 00:19:53,700

simple inorganic chemicals like methane water
methane ammonia put them into a flask and they

151

00:19:53,700 --> 00:20:01,260

sure he showed that these could be formed but
these are very simple biochemicals very simple

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00:20:01,260 --> 00:20:07,740

components of biology but it's a very far
cry from Life amino acids and nucleotides

153

00:20:07,740 --> 00:20:12,960

are nothing they have they are the components
the building blocks of life but they're a far

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00:20:12,960 --> 00:20:21,660

cry from Life the important aspect of life is the
way that these molecules are arranged in different

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00:20:21,660 --> 00:20:30,060

systems for instance in DNA in the enzymes
and the proteins that are made by the DNA and

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00:20:30,960 --> 00:20:40,260

these cannot be assembled by random processes
except against a huge probability hurdle

157

00:20:40,800 --> 00:20:47,400

the probability that given all the right simple
building blocks amino acids nucleotides and so

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00:20:47,400 --> 00:20:56,400

on the probability that life would emerge
just spontaneously is like giving a 2-2

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00:20:56,400 --> 00:21:04,920

unbiased die like these six phase six phased
dies that you throw in ludoans in the kids

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00:21:04,920 --> 00:21:13,080

games board games and give it to 500 people
and they simultaneously through a double six

161

00:21:14,220 --> 00:21:20,880

then that's a really incredible improbability to
be totally impossible the total number of atoms

162

00:21:20,880 --> 00:21:28,320

in the entire observable universe is only 10 to
the 80. so the probability of one in 10 to the

163

00:21:28,320 --> 00:21:35,580

Thousand is the Surplus and I think it is bizarre
that science still perceives this proposition

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00:21:37,140 --> 00:21:42,480

so I think it is not surprising that many
Laboratories in the world many high really

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00:21:42,480 --> 00:21:51,180

quite sophisticated Laboratories have for nearly
two not two how many half a century being doing

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00:21:51,180 --> 00:21:57,060

experiments to try to prove that spontaneous
generation might take place and all such

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00:21:57,060 --> 00:22:05,940

experiments have been a dismal failure uh the the
the two guys who originated put the modern version

168

00:22:05,940 --> 00:22:13,380

of panspermia the modern version of that is an
exergica suspense Vermeer into the uh into the

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00:22:13,380 --> 00:22:20,520

mix was uh we called it commentary transpermia and
I'll tell you why in a minute this involves the

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00:22:20,520 --> 00:22:30,480

synthesis the coming together of well-established
Sciences geology astronomy and biology that is

171

00:22:30,480 --> 00:22:39,120

Fred Hart from 1915 to 2001 and uh me starting
this Venture on the right hand side from 1981.

172

00:22:41,460 --> 00:22:46,800

let's start with geology what is the evidence
we have the most recent evidence from geology

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00:22:46,800 --> 00:22:53,460

that spontaneous generation is wrong and
and uh transplanting is the right answer it

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00:22:53,460 --> 00:22:59,460

is in 2015 when the very first evidence of
microbial life on the Earth was discovered

175

00:23:00,180 --> 00:23:10,740

to be locked away in crystals of a mineral called
zirconium they condense these minerals condensed

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00:23:10,740 --> 00:23:17,820

on the Earth from materials on the earth 4.2
billion years ago very close to the time that

177

00:23:17,820 --> 00:23:27,480

the Earth is formed as a planet and these are
exposed now these little Blobs of microbes inside

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00:23:27,480 --> 00:23:35,760

the crystals of zirconium which I point to with
those errors they're included in uh in the in the

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00:23:35,760 --> 00:23:42,120

crystal zirconium that is exposed in a outcrop we
invest in Australia that's one of the most recent

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00:23:42,120 --> 00:23:48,960

discoveries pushing back the Antiquity of life
to the very first moment that life could survive

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00:23:48,960 --> 00:23:57,180

because we know that this time 4.2 billion years ago was a dreadful time in the Earth's history

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00:23:57,180 --> 00:24:04,200

Dreadful because it was the most inhospitable situation for anything like life to emerge

183

00:24:05,040 --> 00:24:12,840

uh it was hit by comets ferociously the comets and asteroids it was just a fiery furnace and to

184

00:24:12,840 --> 00:24:19,980

find that the rocks that formed at this time carry uh little bits of microbes is just uncanny

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00:24:21,720 --> 00:24:27,840

the theory of cometary panspermia is what we proposed over over several decades now

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00:24:27,840 --> 00:24:34,980

and it has many uh predictions it is the science we make predictions we look for uh

187

00:24:34,980 --> 00:24:44,340

verification of those predictions in astronomy geology and biology and they have been found on

188

00:24:44,880 --> 00:24:52,080

unquestionably found over the past four decades so we have primordial microbes and bacteria and

189

00:24:52,080 --> 00:24:59,580

viruses that are just in the universe and uh as part and past of the cosmos they are incorporated

190

00:24:59,580 --> 00:25:07,200

in planets that form around stars and the planets and the Comets that are responsible for amplifying

191

00:25:07,200 --> 00:25:12,300

for increasing these numbers of bacteria throw
them back into space and there is a positive

192

00:25:13,200 --> 00:25:22,680

feedback loop where an initial Cosmic Legacy of
microbes is continuously Amplified inside the warm

193

00:25:22,680 --> 00:25:31,500

liquid Interiors of Commerce so this prediction
uh we make a very firm prediction on the basis of

194

00:25:31,500 --> 00:25:38,460

this theory that Interstellar does the dust that
you see between the stars in the Milky Way in vast

195

00:25:38,460 --> 00:25:44,040

quantity I mean all of the dark strations
and patches that you see in the night sky

196

00:25:44,700 --> 00:25:54,600

on a dark night is made of trillions and trillions
of Interstellar dust particles and we predict that

197

00:25:54,600 --> 00:26:00,960

these dust particles should reveal the signs of
bacteria and who are very enviruses in various

198

00:26:00,960 --> 00:26:10,140

states of Decay and that's what we began to
find from 1981 onwards uh this is the first

199

00:26:10,980 --> 00:26:21,240

prediction that was verified the curve is
a prediction of the spectral signature of

200

00:26:21,240 --> 00:26:28,260

Interstellar dust if it were bacteria if the
cosmic does the dark material in space was largely

201

00:26:28,260 --> 00:26:35,520

bacteria and viruses this was what we would expect the Curve uh the signature of spectroscopy

202

00:26:35,520 --> 00:26:44,100
signature from 2.9 micrometers to 4 micrometers and the the points are the observations of

203

00:26:44,100 --> 00:26:52,380
a source of radiation in this deep Universe in this in fact very close to center of our galaxy

204

00:26:52,380 --> 00:27:01,500
that was discovered in 1981 and when we put these two together they sat so precisely one out of the

205

00:27:01,500 --> 00:27:10,260
other that uh we just essentially cheered and said this is it we approve that bacteria the

206

00:27:10,260 --> 00:27:16,740
main component of bacteria and their degradation products are the main components of cosmic dust

207

00:27:17,760 --> 00:27:23,520
so the theory of that we then developed thereafter with comets these comments are

208

00:27:23,520 --> 00:27:31,080
the Distributors incubators Distributors of luck in the cosmos in recent scientific

209

00:27:31,080 --> 00:27:39,420
uh astronomical discoveries have shown that cometary material material from that are related

210

00:27:39,420 --> 00:27:46,140
of derived from Commerce like asteroids bits of estrogen and so on have all the signatures of

211

00:27:46,140 --> 00:27:52,800

of primitive primordial oceans within them\h
and it is in Within These oceans Within These\h\h

212

00:27:52,800 --> 00:27:59,640

warm liquid Interiors heated by radioactive\h
heat sources that microbes in the universe\h\h

213

00:27:59,640 --> 00:28:08,820

essentially survive and are distributed and\h
these pictures of of hair cometail bob in 1997.

214

00:28:10,320 --> 00:28:18,360

the first evidence that the Comets really contain\h
living particles also came very closely followed\h\h

215

00:28:18,360 --> 00:28:25,800

quite a few just a few years after we made the\h
prediction that comets should carry microorganisms\h\h

216

00:28:25,800 --> 00:28:34,980

there was the first exploration of a comet uh\h
in the space age and that was uh comatelli in\h\h

217

00:28:34,980 --> 00:28:43,980

1986 made his first periodian passage of the over\h
80 years and there were missions European space\h\h

218

00:28:43,980 --> 00:28:49,740

missions and so on to essentially photograph the\h
nucleus of a comment that had not been seen until\h\h

219

00:28:49,740 --> 00:28:58,560

that time so on the left hand side the orange\h
picture the dark patch there is the comet uh which\h\h

220

00:28:58,560 --> 00:29:05,340

was surprisingly found to be very dark astronomers\h
didn't expect it to be that they thought it was it\h\h

221

00:29:05,340 --> 00:29:12,600

was an Isis like a snow field and they were really
shocked and surprised to find that you know it was

222

00:29:12,600 --> 00:29:20,040

so dark and then we had a spectrum of the comment
taken by my brother in fact in Australia and David

223

00:29:20,040 --> 00:29:28,140

Allen and again the points in the curve under uh
um that matched the curve is the correspondence

224

00:29:28,140 --> 00:29:38,400

between the spectrum of the dust that flow that
flowed out from cometary in 1986 and the uh the

225

00:29:38,400 --> 00:29:45,300

prediction of a bacterium so so there are two
two hits that essentially came within a couple

226

00:29:45,300 --> 00:29:51,720

of years of each other proving in our minds
that this is the right idea for the existence

227

00:29:51,720 --> 00:29:59,400

of life in the universe where ever since then ever
since 19 the 1980s comets have been the focus of

228

00:29:59,400 --> 00:30:06,060

astronomical investigation and the most recent
mission to accommet was of course the Rosetta

229

00:30:06,060 --> 00:30:14,760

Mission which ended in in 2016 and in that mission
uh complex organic molecules that were relevant to

230

00:30:14,760 --> 00:30:21,900

life were discovered in great quantity and an
exceedingly dark surface was also found similar

231

00:30:21,900 --> 00:30:30,420

to the situation we found in a commentary in
1986 so this is the the Rosetta Mission common

232

00:30:30,420 --> 00:30:42,480

to Comet 67p CG and it also led to a detection of
the surface reflectivity of the comet the Matilda

233

00:30:42,480 --> 00:30:49,260

the comment how how does the comet reflect
infrared light and again these curves uh

234

00:30:49,260 --> 00:30:57,240

don't want to go into details but because show
how closely the ex the the the they observed

235

00:30:58,440 --> 00:31:03,540

um reflection spectrum and the infrared
matched the properties of a bacterium

236

00:31:06,180 --> 00:31:11,820

uh I think I should maybe this is to do with
culture and so on so as you make make a mention

237

00:31:11,820 --> 00:31:18,300

of this I along with my colleague in Canada
Max Wallace was on part of the the science

238

00:31:18,300 --> 00:31:24,120

uh planning team for the Rosetta Mission before it
was launched and we support basically we suggested

239

00:31:24,120 --> 00:31:32,100

that they put on the landing device which is
called which is called filler the Lander that

240

00:31:32,100 --> 00:31:40,260

landed in in 2014 on the services we suggested
that they put a simple life detection system where

241

00:31:40,260 --> 00:31:46,380

you pour nutrient onto the soil and see where
the the nutrient is taken up of course cultural

242

00:31:46,380 --> 00:31:54,000

constraints were strongly operative at the time
and these prevented the inclusion of a simple ten

243

00:31:54,000 --> 00:32:02,400

ten thousand dollar experiment which may have uh
proved once and for all that the comments are sort

244

00:32:02,400 --> 00:32:08,820

of full of living particles anyway that's
the way that uh that science proceeds and

245

00:32:09,600 --> 00:32:17,640

recently or no not before rosetta in fact
there were several instances where the the

246

00:32:17,640 --> 00:32:23,220

living Comet idea was was essentially
proved by astronomical observations

247

00:32:24,060 --> 00:32:30,780

we had a comment and that already showed the
picture of this comment here about in 1981 when

248

00:32:30,780 --> 00:32:39,840

it was way past the orbit of Jupiter in the cold
depths of space uh it was essentially exploding

249

00:32:40,440 --> 00:32:48,480

popping just sort of the clothing and producing
huge huge Comas Tales reflecting material around

250

00:32:48,480 --> 00:32:55,800

and that really baffled scientists because uh
at at six astronomic reunions or distance of

251

00:32:55,800 --> 00:33:03,060

uh beyond beyond the orbit of Jupiter uh the the\h
comet was so cold that they could not have led to\h\h

252

00:33:03,060 --> 00:33:09,420

it there could not have been any evaporation or\h
material from this surface so what was happening\h\h

253

00:33:09,420 --> 00:33:17,880

was that biology was taking place underneath the\h
surface of the of the comet uh there was high\h\h

254

00:33:17,880 --> 00:33:24,720

pressure Pockets developed and and just sort of\h
popping out popping out like like a fermenting\h\h

255

00:33:24,720 --> 00:33:33,720

broth and then that was repeated again uh this\h
is a story of uh a famous London Brewery and a\h\h

256

00:33:33,720 --> 00:33:41,520

classic incident in 1814 showing that fermenting\h
beer could explode and produce a huge flood of\h\h

257

00:33:41,520 --> 00:33:48,420

material and that's exactly what happened in the\h
case of the Comets in September 2021 this last\h\h

258

00:33:48,420 --> 00:33:55,140

year a giant Comet a very large comet called\h
bernadelli Bernstein was that even the greater\h\h

259

00:33:55,140 --> 00:34:01,260

distance than the hail above Comet was when it\h
was near the orbit of Jupiter it was at 2 billion\h\h

260

00:34:01,260 --> 00:34:07,260

kilometers from the Sun and acted in a very\h
similar way it exploded it became very luminous\h\h

261

00:34:07,260 --> 00:34:12,540

and it should not have been luminous at that point when the temperature surface temperatures

262

00:34:12,540 --> 00:34:23,700

was minus 210 degrees Celsius Celsius it flared up on one day in on the 19th of September this

263

00:34:23,700 --> 00:34:30,000

this is tillem great mystery for guys who don't like to think that comets have biology exploding

264

00:34:30,000 --> 00:34:36,240

within their Interiors but this was explosion that was detected only a year or two ago

265

00:34:38,640 --> 00:34:45,000

uh then I think this is an interesting this last month there was a as I referred to or

266

00:34:45,000 --> 00:34:53,580

the the dark mission of the mission to deflect a commenter or an asteroid if it was heading

267

00:34:53,580 --> 00:35:01,500

towards us towards the Earth uh so this led to the collision between between the

268

00:35:01,500 --> 00:35:11,160

um the uh the this this is dim office the moon of this this asteroid and the dart Mission hit

269

00:35:11,160 --> 00:35:18,300

this uh spot on and this ex and the whole stuff the whole thing that exploded it should be left

270

00:35:18,300 --> 00:35:24,840

to be seen whether the these filaments that are coming out essentially contains again the Spectra

271

00:35:24,840 --> 00:35:32,880

of living material whether that would ever be done\h
for cultural reasons remains to be seen so the\h\h

272

00:35:32,880 --> 00:35:40,020

question then that I want to pose is are microbes\h
viruses from comets coming to the Earth today\h\h

273

00:35:40,980 --> 00:35:46,740

and I want to I would like to maintain that\h
this question can be answered decisively and\h\h

274

00:35:46,740 --> 00:35:54,120

precisely and we can get a definite answer\h
tomorrow but culture and Prejudice and even\h\h

275

00:35:55,200 --> 00:36:04,860

religion that stands in the way uh to to step\h
back a little bit in the 1980s when we first\h\h

276

00:36:05,700 --> 00:36:12,480

expanded and wrote about the idea of the Comets\h
bringing life and we regarded comments as being an\h\h

277

00:36:12,480 --> 00:36:19,680

integral part of the evolution of Life Evolution\h
uh biological Revelation being directed from space\h\h

278

00:36:19,680 --> 00:36:29,940

from the uh coming from Commerce causing pandemics\h
like influenza and in more recent times uh\h\h

279

00:36:30,540 --> 00:36:38,580

the coronavirus pandemic and also the idea that\h
viruses are responsible or plays an important part\h\h

280

00:36:39,120 --> 00:36:46,020

in the entire evolution of life from its first\h
Inception in those bacteria that you saw 4.2\h\h

281

00:36:46,020 --> 00:36:54,420

billion years ago to the present answers and and\h
to answer the question whether comets have been\h\h

282

00:36:54,420 --> 00:37:01,980

connected with the evolution I should mention that\h
the crucial step that was involved in this whole\h\h

283

00:37:01,980 --> 00:37:10,320

process of connecting comets virus in space and\h
evolution was the unraveling of the human genome\h\h

284

00:37:10,320 --> 00:37:18,600

in the year 2000 we now know that the human genome\h
our DNA contains over five percent of sequences\h\h

285

00:37:18,600 --> 00:37:29,460

that are actually derived from viruses and that\h
interacted genetically with our ancestors with\h\h

286

00:37:29,460 --> 00:37:36,960

the ancestors that led to us eventually ancestors\h
also of all the plants and animals and in case of\h\h

287

00:37:36,960 --> 00:37:42,360

humans I think there's also growing evidence\h
that these viruses that were responsible for\h\h

288

00:37:42,360 --> 00:37:52,560

evolution was also responsible for bringing genes\h
that permitted speech Consciousness even and and\h\h

289

00:37:52,560 --> 00:37:58,920

brain function and that's this is ongoing research\h
so the evolutionary harmonies for instance over\h\h

290

00:37:58,920 --> 00:38:06,960

a million years this month we think by successive\h
pandemics from space like the coronavirus pandemic\h\h

291

00:38:06,960 --> 00:38:16,680

recently and each of these pandemics turned out to be a very close call to Total Extinction but we

292

00:38:16,680 --> 00:38:25,320

survived through this sequence and we essentially emerged and the present um as homo sapiens

293

00:38:27,360 --> 00:38:32,880

Samara says as a state have contributed to the evolution of our brain even to the

294

00:38:32,880 --> 00:38:38,520

evolution of consciousness uh in relation to the evolution Consciousness it's interesting

295

00:38:38,520 --> 00:38:44,880

that the human brain doubled in size in volume and just half a million years ago

296

00:38:45,720 --> 00:38:53,280

and what caused it we don't know I think it could be of viruses that were brought from from outside

297

00:38:54,000 --> 00:38:59,820

foreign well I think having said all this the important question is how could we

298

00:39:00,540 --> 00:39:07,440

prove that this is happening even at the present time we know that the Earth this is the Earth is a

299

00:39:07,440 --> 00:39:13,260

picture of all the commentary over it's a short period comments and the red circle here is the

300

00:39:13,260 --> 00:39:20,040

orbit of the Earth the Sun is at the center the Earth's orbits then is clearly in the midst of

301

00:39:20,040 --> 00:39:26,700

all the debris that uh sort of thrown out from the
comets and so these come with the Earth is picking

302

00:39:26,700 --> 00:39:36,180

up this debris on a regular basis uh so could
it be could it be verified could we collect this

303

00:39:36,180 --> 00:39:44,100

commentary debris gently before it became mixed up
with the Earth's uh Mark or its bacteria and so on

304

00:39:44,100 --> 00:39:51,660

and examine it and we try to do this in the run
up to the New Millennium we didn't have any luck

305

00:39:51,660 --> 00:40:00,300

from European American British space agencies
but the Indian space agency called ISRO Indian

306

00:40:00,300 --> 00:40:08,460

space research organization came to the rescue
and they the very sophisticated organization the

307

00:40:08,460 --> 00:40:14,520

Indians are have been great scientists in
the past and also now so they decided that

308

00:40:14,520 --> 00:40:22,080

they would go for this and they sent a very very
sophisticated collect collection devices these are

309

00:40:22,080 --> 00:40:29,700

the collection devices that was lofted by balloon
uh where the balloon here shown here to a height

310

00:40:29,700 --> 00:40:36,840

of 41 kilometers is in the atmosphere in the
stratosphere on the 20th of January 2001 and what

311

00:40:36,840 --> 00:40:46,500

they did was essentially to the these cylinders\h
were evacuated to begin with this as a vacuum the\h\h

312
00:40:46,500 --> 00:40:54,540
Requiem was open here the valve was open and when\h
it was in the stratosphere all the stuff that was\h\h

313
00:40:54,540 --> 00:41:00,780
around was sucked into the into the cylinders\h
and the cylinders were brought back parachuted\h\h

314
00:41:00,780 --> 00:41:07,020
back to ground examined in the laboratory so this\h
was a a very very important experiment that was\h\h

315
00:41:07,020 --> 00:41:15,660
done in 2001 led to a large number of scientific\h
papers said oh in the literature and are being\h\h

316
00:41:15,660 --> 00:41:25,620
just marginalized or ignored we found evidence of\h
bacilli of nanobacteria or viruses and the height\h\h

317
00:41:25,620 --> 00:41:32,520
of and these structures are fluorescent because\h
they are living and height of 41 kilometers we\h\h

318
00:41:32,520 --> 00:41:38,400
reckoned was too high for lofting microbes from\h
the earth I mean there are processes that take\h\h

319
00:41:38,400 --> 00:41:44,460
microbes on the earth to the high atmosphere\h
but 41 kilometers you don't get very much except\h\h

320
00:41:44,460 --> 00:41:51,060
perhaps and Times of volcanoes and there was no\h
volcano at the time the estimated daily input of\h\h

321
00:41:51,060 --> 00:41:57,780

microbes over the whole earth on the basis of
this experiment that we did and we can we can

322

00:41:57,780 --> 00:42:02,760

do a sampling experiment we can take a little
volume of of this Stratosphere see how much

323

00:42:02,760 --> 00:42:13,800

stuff has been injected in one day and it lay it
leads that calculation leads to 0.3 to 3 tons of

324

00:42:13,800 --> 00:42:21,540

microbiometer coming in from space every single
day now that is a tremendous amount of bacteria

325

00:42:21,540 --> 00:42:29,040

and it's mind-boggling to think that that uh that
has not been investigated with all the techniques

326

00:42:29,040 --> 00:42:34,260

that we have uh today or the biological
techniques all the experimental techniques

327

00:42:35,520 --> 00:42:44,880

uh from the evidence from what we did in 2001 and
and the known speed at which these things fall you

328

00:42:44,880 --> 00:42:52,800

know our first uh particles can drift through the
air we can estimate that something like 0.3 to 3

329

00:42:52,800 --> 00:43:00,120

tons as I say the bacterial viral material falls
through the sky or Stratosphere every single day

330

00:43:00,120 --> 00:43:09,360

and that translates to 20 to 200 million bacteria
per square meter every square meter of the ground

331

00:43:09,360 --> 00:43:18,120

per day and this flux of bacteria would normally
go unnoticed because there's a huge amount of

332

00:43:18,120 --> 00:43:25,020

Indian sort of local bacteria on the earth as
we know uh we are this full of bacteria from

333

00:43:25,020 --> 00:43:32,160

all sources but it's a an amount of 20 to 200
million bacteria per square meter a day from

334

00:43:32,160 --> 00:43:40,500

space is an amount that we cannot afford to ignore
and yet science has ignored it to the present time

335

00:43:41,460 --> 00:43:50,400

uh two three years ago four years ago a team of
European American scientists rich is a principal

336

00:43:50,400 --> 00:43:58,980

investigator have recently shown that the above so
two to three kilometers there's a downward flux of

337

00:43:58,980 --> 00:44:08,640

viruses that could be an excellent in excess of
7 billion per square centimeter I know I said per

338

00:44:08,640 --> 00:44:18,240

square meter now it's per square centimeter per
day and viruses in excess of seven uh 70 billion

339

00:44:18,240 --> 00:44:26,760

per square meter a day so that's a lot of viruses
and undoubtedly anything falling from height to

340

00:44:26,760 --> 00:44:33,960

two or three kilometers would include stuff that
is pulled up from the surface but it also includes

341

00:44:33,960 --> 00:44:40,620

the the material that is coming from much higher
up as I said the the three to one three to three

342

00:44:40,620 --> 00:44:47,340

tons that are coming from space so it's all mixed
up and it is again mind-boggling then no attempt

343

00:44:47,340 --> 00:44:55,020

has been made to separate the the stuff from me
from space from the stuff that is on the Earth

344

00:44:55,920 --> 00:45:02,580

so that's the uh the bottom line is that
Technologies are available but they're

345

00:45:02,580 --> 00:45:10,500

available only in few not many Laboratories in
the world to essentially to to separate the the

346

00:45:10,500 --> 00:45:19,380

space bacteria space incident bacteria from the
indigenous bacteria on the Earth so there's as

347

00:45:19,380 --> 00:45:25,140

far as the skeptic is concerned as far as the guy
who wants to believe in spontaneous generation is

348

00:45:25,140 --> 00:45:32,040

concerned there is a convenient uncertainty that
prevails in regard to the origin of these entities

349

00:45:34,140 --> 00:45:42,840

finally uh let's come to the question whether
there was ever a beginning of the universe this

350

00:45:42,840 --> 00:45:49,320

is connected because if life was ever present
in the universe uh when did it start was there

351

00:45:49,320 --> 00:45:57,540

a beginning of the the universe was there a\h
beginning of Life in the universe the current\h\h

352

00:45:57,540 --> 00:46:04,260

uh culturally of course the situation is that\h
there was a big bang which is uh essentially\h\h

353

00:46:04,260 --> 00:46:11,580

a scientific rendering of the Judea Christian\h
story of creation Big Bang 13.8 billion years\h\h

354

00:46:11,580 --> 00:46:20,220

ago and there's a huge catalog of events that have\h
been chartered some supported by observation the\h\h

355

00:46:20,220 --> 00:46:28,740

Islamic observations some through spec pure\h
speculation uh so 13.8 billion years ago is\h\h

356

00:46:28,740 --> 00:46:39,240

the current preferred date for the origin of the\h
big bang universe but the James Webb Telescope\h\h

357

00:46:39,240 --> 00:46:45,720

that began to function only a few months ago is\h
already threatening this picture very seriously\h\h

358

00:46:47,040 --> 00:46:56,940

this is an object called c c e e r s 93316\h
presumed to be the most distant Galaxy\h\h

359

00:46:58,440 --> 00:47:06,240

and it is now at what is called a redshift it's\h
moving away from from Earth uh at a redshift at\h\h

360

00:47:06,240 --> 00:47:16,440

6 16.7 implying that it's at a distance of 35\h
billion light years from the year that that\h\h

361

00:47:16,440 --> 00:47:22,680

should not be there at that point in the history
of the so-called Big Bang idea there should be no

362

00:47:22,680 --> 00:47:28,560

Galaxy there should be no atoms even so what is
this new Galaxy doing here and I think they're

363

00:47:28,560 --> 00:47:34,380

going to be more and more of these things
found how the the astronomical establishment

364

00:47:34,380 --> 00:47:40,380

cosmological establishment Corps copes with
these new discoveries is still left to be seen

365

00:47:41,340 --> 00:47:49,380

ideas relating to the Antiquity of the universe
uh has a very long history and a very long-known

366

00:47:49,380 --> 00:47:57,840

European history and for instance in The
Vedic Hindu philosophies an infinite sequence

367

00:47:57,840 --> 00:48:05,700

of creation and destruction is is posited and
these are essentially ancient Vedic Indian ideas

368

00:48:06,420 --> 00:48:15,360

according to Carl Sagan Carl Sagan has written
this about 20 years ago the Hindu religion we

369

00:48:15,360 --> 00:48:20,580

refer to Hindu religion earlier at the beginning
of my talk uh in connection with the number system

370

00:48:20,580 --> 00:48:26,940

into Arabic number system but this is now in
relation to cosmology so Carl Sagan says the

371

00:48:26,940 --> 00:48:32,160

Hindu religion is not only one of the world's
great faiths dedicated to the idea that the

372

00:48:32,160 --> 00:48:38,880

cosmos itself undergoes and immense indeed an
infinite number of deaths and rebirths it is the

373

00:48:38,880 --> 00:48:45,660

only religion in which time skills correspond
to those of modern scientific cosmology its

374

00:48:45,660 --> 00:48:53,640

Cycles run from an ordinary day and night to
the day and night of Brahma 8.64 billion years

375

00:48:53,640 --> 00:49:00,780

long longer than the age of the Year to all the
Sun and about half the time since the Big Bang

376

00:49:00,780 --> 00:49:06,060

took place if there was ever a big man that
is and there are much longer time scale still

377

00:49:06,660 --> 00:49:16,140

so the current models that are being discussed
uh in the economic literacy uh is won by

378

00:49:17,100 --> 00:49:24,420

Rosa Penrose Nobel Laureate Rosa Penrose and his
students where they there is a sort of sequence

379

00:49:24,420 --> 00:49:32,400

of expansions and contractions and the ideas of
Fred Hall berbies and giant Nautica where there

380

00:49:32,400 --> 00:49:39,840

was some kind of similar system to watch and
what Penrose is revived in more recent times

381

00:49:39,840 --> 00:49:45,480

so they were no they couldn't maybe there\h
was never a beginning maybe life was always\h\h

382

00:49:45,480 --> 00:49:56,880
present in the universe and the creation cycle of\h
Hindu cosmology is just a poetic expression of an\h\h

383

00:49:56,880 --> 00:50:06,720
eternal Universe which is oscillating in this\h
endless series of um of creation and rebirths\h\h

384

00:50:07,680 --> 00:50:15,420
so the alarming tendency uh into 2020 is\h
to ignore this entire body of evidence that\h\h

385

00:50:15,420 --> 00:50:23,460
supports not only parents permia but an infinite\h
age of cosmology Infinity Edge to the universe\h\h

386

00:50:24,360 --> 00:50:33,540
the idea that viruses microorganisms bacteria are\h
continually uh arrive arriving from space despite\h\h

387

00:50:33,540 --> 00:50:39,180
all the evidence that we have accumulated\h
all the very powerful evidence uh this is\h\h

388

00:50:39,180 --> 00:50:46,980
being essentially marginalized and regarded\h
as not admissible inadmissible evidence so\h\h

389

00:50:46,980 --> 00:50:55,200
this vast body of new data is disregarded as\h
being controversial culturally inadmissible\h\h

390

00:50:55,200 --> 00:51:02,940
belonging essentially to a non-standard perhaps\h
a non-european knowledge tradition this attitude\h\h

391

00:51:02,940 --> 00:51:11,100

I maintain poses and imminent danger not just the
sons but for the well-being of humanity as a whole

392

00:51:14,700 --> 00:51:20,820

perhaps the worst casualty of all once we had
made that we are not unique in the universe

393

00:51:20,820 --> 00:51:28,620

that life is Cosmos Cosmic and so on will be our
self-images as a supreme life form in the cosmos

394

00:51:28,620 --> 00:51:35,400

which would of course be shattered and require
major efforts in psychological Readjustment

395

00:51:36,180 --> 00:51:43,440

when this paradigm shift is fully conceded I
hope it is going to be considered it is likely

396

00:51:43,440 --> 00:51:49,680

that the entire structure of human society will
undergo a transformation more fundamental more

397

00:51:49,680 --> 00:52:00,000

profound than any that has taken place so far in
2022 the cultural accepted culturally accepted

398

00:52:00,000 --> 00:52:06,300

Big Bang bandwagon and the origin of life on
Earth bandwagon is close to falling over the age

399

00:52:07,140 --> 00:52:12,000

would we have the courage to
admit it thank you very much

400

00:52:21,600 --> 00:52:23,040

hello

401

00:52:28,320 --> 00:52:35,760

okay and we are back so um thank you

so much for your excellent talk um

402

00:52:38,760 --> 00:52:43,800

uh and and my voice was a bit hose\h
but I think it came across okay\h\h

403

00:52:45,540 --> 00:52:50,160

no I was thinking you know I would let the\h
audience know that earlier today I had the\h\h

404

00:52:50,160 --> 00:52:53,760

option to edit this down uh and I saw the\h
entire lecture and I wouldn't have changed\h\h

405

00:52:53,760 --> 00:53:01,440

to things so we get to watch it in its entirety\h
so um uh I just want to remind those of us here\h\h

406

00:53:01,440 --> 00:53:07,320

at air meet these uh our SSC members and patrons\h
um please put your questions in the designated q\h\h

407

00:53:07,320 --> 00:53:12,480

a and if you are camera ready you may also use\h
the raised hand feature to ask your question\h\h

408

00:53:12,480 --> 00:53:18,600

directly but do keep in mind that this event\h
is being recorded and live streamed so um

409

00:53:21,420 --> 00:53:25,080

okay um we have a question\h
actually from the soc president\h\h

410

00:53:26,820 --> 00:53:32,400

um and I'm going to go ahead and show this on\h
stage she says this is from Margaret Moga can\h\h

411

00:53:32,400 --> 00:53:38,040

you discuss Advanced panspermia the possibility\h

that intelligent life on Earth is a result of\h\h

412

00:53:38,040 --> 00:53:42,660

a purposeful experiment carried out\h
by an extraterrestrial civilization\h\h

413

00:53:44,280 --> 00:53:50,640

well I mean that is the real and historical\h
possibility that is being completely ignored\h\h

414

00:53:50,640 --> 00:53:58,200

in discussions of life in the universe life on the\h
earth I think if transpermia is the answer to how\h\h

415

00:53:58,200 --> 00:54:07,320

life originated in our life evolves over millions\h
and billions of years then the idea that into the\h\h

416

00:54:07,320 --> 00:54:14,100

the there is a purposeful experiment also being\h
carried out by a very Advanced super Advanced\h\h

417

00:54:14,100 --> 00:54:21,360

intelligent civilization that can actually\h
inject material to the Earth carrying messages\h\h

418

00:54:22,320 --> 00:54:29,580

coded in in for instance in viral\h
genes and and attempting to alter\h\h

419

00:54:29,580 --> 00:54:36,060

the the process of human evolution this has\h
to be taken very seriously but it's totally\h\h

420

00:54:36,780 --> 00:54:44,700

abandoned in the anas of respectable science it's\h
relegated to the to the Realms of sort of Science\h\h

421

00:54:44,700 --> 00:54:51,780

Fiction and and maybe superstitions so this is\h

another instance where we have to keep all options\h\h

422

00:54:51,780 --> 00:55:02,040

open if life did not start here on the Earth uh\h
the possibility of more advanced life than others\h\h

423

00:55:02,040 --> 00:55:10,020

than humans existing widely in the universe\h
really has to be taken seriously and and this\h\h

424

00:55:10,020 --> 00:55:16,560

is really not been even remotely considered\h
as a intelligent way of looking at things\h\h

425

00:55:17,220 --> 00:55:26,160

for example I mean if if you if you project our\h
own human civilization human technology say for\h\h

426

00:55:26,160 --> 00:55:37,140

another 50 years it will be entirely possible that\h
humans will be able to devise and engineer a life\h\h

427

00:55:37,140 --> 00:55:45,240

form that is for Superior perhaps to life that\h
exists on the earth the human life for example\h\h

428

00:55:45,840 --> 00:55:54,720

make a huge number of viruses that code for this\h
information and just throw it out into space and\h\h

429

00:55:54,720 --> 00:56:03,840

so what would happen thereafter is that if there\h
is a nearby planet with life with civilization\h\h

430

00:56:03,840 --> 00:56:12,780

for example like us uh the the the they will be\h
essentially impregnated or infected with this with\h\h

431

00:56:12,780 --> 00:56:19,980

this new information input and so there could be\h

a deliberate attempt made by an alien civilization\h\h

432

00:56:19,980 --> 00:56:28,680

more advancing ours to influence the progress of\h
Life on our planet I think it cannot be ruled out\h\h

433

00:56:28,680 --> 00:56:36,720

it's maybe it is still a way out earlier and so\h
I respect the the conservatism that prevails but\h\h

434

00:56:36,720 --> 00:56:43,920

um but all I think if Transformer is admitted a\h
little bit so we have to make these possibilities\h\h

435

00:56:44,520 --> 00:56:51,120

at least consider them for what they are worth\h
thank you for your answer now we have a braised\h\h

436

00:56:51,120 --> 00:56:57,960

hand from a Beatrice via Royal who incidentally is\h
also the chair of an upcoming symposia that we are\h\h

437

00:56:57,960 --> 00:57:03,600

hosting on astronomical anomalies so I invite\h
the interest to ask her a question directly

438

00:57:05,820 --> 00:57:13,140

um hello I have a comment and a question\h
so I just wanted first to say how actually\h\h

439

00:57:13,140 --> 00:57:17,700

important your papers were for me for my\h
personal journey to become an astronomer\h\h

440

00:57:17,700 --> 00:57:24,240

I was an undergraduate student in I was\h
studying molecular biotechnology and I\h\h

441

00:57:24,240 --> 00:57:30,660

remember one day I I was taking a course\h

in microbiology and we were asked to

442

00:57:31,980 --> 00:57:36,900

um present some essays on how we thought that the
life came to Earth and I was very inspired by your

443

00:57:36,900 --> 00:57:42,600

ideas on transpernia and I wanted to present this
for the class and I was not permitted I was the

444

00:57:42,600 --> 00:57:48,240

only one who was not permitted because you know
so different from what the biology teacher wanted

445

00:57:48,240 --> 00:57:54,840

it and after that actually that was the final
step before I switched to astronomy I later did

446

00:57:54,840 --> 00:58:03,360

a PhD in astronomy working with quasars actually
very much like our ideas also on the quasars and

447

00:58:03,360 --> 00:58:09,120

which I didn't follow later but it's helped
me very much for my journey as a scientist

448

00:58:09,840 --> 00:58:16,800

and well today I'm also involved in cities such
as for extraterrestrial technology technology and

449

00:58:16,800 --> 00:58:22,860

I wanted just to ask you sort of so that was my
just comment on that it has been very important

450

00:58:22,860 --> 00:58:30,420

for me to um these ideas of transparagement for my
professional career and I actually wanted to ask

451

00:58:30,420 --> 00:58:38,160

you if you would pick your favorite two methods

to search for life outside the Earth how would\h\h

452

00:58:38,160 --> 00:58:46,020

you do it what would you better well I think I\h
would do two things one is to look for evidence\h\h

453

00:58:46,020 --> 00:58:52,200

of exoplanets with living signatures and that\h
is a possibility that is really very close\h\h

454

00:58:52,200 --> 00:58:58,620

to being realized we have for example the James\h
Webb Telescope uh Hubble Telescope which is until\h\h

455

00:58:58,620 --> 00:59:07,980

recently and so on so spectroscopy very detailed\h
spectroscopy of did any detected exoplanet might\h\h

456

00:59:07,980 --> 00:59:15,840

reveal uh signs of of biochemistry but in\h
terms of I mean showing that life exists\h\h

457

00:59:15,840 --> 00:59:23,940

or that transpermeables the the reason for life\h
existing on the earth this has also to be resolved\h\h

458

00:59:23,940 --> 00:59:31,800

decisively because the data is there as I pointed\h
out I mean there are tons of material biological\h\h

459

00:59:31,800 --> 00:59:39,420

material falling on the Earth every single\h
minute and they're just being swamped by the by\h\h

460

00:59:39,420 --> 00:59:46,380

the native biology there's so much Hospitality so\h
much bacteria on the Earth but it is really really\h\h

461

00:59:46,380 --> 00:59:53,760

very important I think that we use our available\h

biological techniques and experimental techniques\h\h

462

00:59:53,760 --> 01:00:02,280

to try to separate the in Falling component\h
from the indigenous component and to see how\h\h

463

01:00:02,280 --> 01:00:10,020

these two components first of all this is to show\h
that an alien component does exist right and we\h\h

464

01:00:10,020 --> 01:00:18,660

can do that for example by studying the isotope\h
the signatures of the bacteria that are coming in\h\h

465

01:00:18,660 --> 01:00:27,540

for example for instance if the uh if the alien\h
bacteria came from a source where the carbon\h\h

466

01:00:27,540 --> 01:00:34,500

isotope ratio is different from the earth we would\h
we could perhaps detect the difference here on the\h\h

467

01:00:34,500 --> 01:00:41,400

earth uh just means there's a spoon coming here\h
yeah so that's one one way of discriminating\h\h

468

01:00:41,400 --> 01:00:49,740

between then falling bacteria and Indigenous\h
bacteria that should be should be done as\h\h

469

01:00:49,740 --> 01:00:56,820

urgently as possible and so that's that's the\h
second first is to look for about signatures\h\h

470

01:00:56,820 --> 01:01:05,880

in exoplanets and then to study as in as detailed\h
away as possible that component of living material\h\h

471

01:01:05,880 --> 01:01:12,420

that is definitely extraterrestrial and there\h

is evidence that such material does exist so\h\h

472

01:01:12,420 --> 01:01:19,980

the travestyo of of science is it it's an insult\h
to our collective intelligence that this is not\h\h

473

01:01:19,980 --> 01:01:26,220

being done and in in your personal case that\h
people didn't even want to hear your your\h\h

474

01:01:26,220 --> 01:01:33,180

assessment of the transform yeah still I mean\h
that's that's censorship at a very deep level\h\h

475

01:01:34,320 --> 01:01:39,540

well I am thankful for that to happen because\h
it brought me to astronomy and it brought me to\h\h

476

01:01:39,540 --> 01:01:47,040

the where I am today so in the end I'm quite\h
happy for all these events yeah I'm enjoying\h\h

477

01:01:47,040 --> 01:01:53,280

my my science where I am today really yeah\h
astronomy is a really exciting uh discipline\h\h

478

01:01:53,280 --> 01:01:59,460

and it's getting more exciting with all the new\h
developments in your astronomical telescopes to\h\h

479

01:01:59,460 --> 01:02:06,780

space telescopes the exploration of asteroids and\h
so on it's it's it's accelerating it at such a\h\h

480

01:02:06,780 --> 01:02:13,860

pace that sooner or later it will not be possible\h
to deny the fact that there is life outside there\h\h

481

01:02:15,720 --> 01:02:22,500

I think the same thank you for joining us\h

Beatrice uh we've got we're going to go just\h\h

482

01:02:22,500 --> 01:02:28,980

a little bit past the hour um and we've got\h
I'm going to say two more questions sort of\h\h

483

01:02:29,700 --> 01:02:33,900

um one is I got I had a question of my own and\h
I see other people are thinking similar things\h\h

484

01:02:33,900 --> 01:02:40,440

you were talking earlier about the um what\h
was my notes the uh initial Cosmic Legacy\h\h

485

01:02:41,160 --> 01:02:47,580

uh that that is responsible for this panspermia\h
and then we also have Gene Thomas who had a\h\h

486

01:02:47,580 --> 01:02:51,780

comment that even if life was later spread\h
throughout the Universe it nonetheless had\h\h

487

01:02:51,780 --> 01:02:57,060

to have a beginning or many Beginnings that did\h
not rely on seeding from other sources thus Cosmic\h\h

488

01:02:57,060 --> 01:03:02,580

life is a combination of the spontaneous\h
generation and uh panspermia and then also\h\h

489

01:03:03,120 --> 01:03:08,160

um Stephen Hall says even if panspermia is\h
the way life began on Earth he would still\h\h

490

01:03:08,160 --> 01:03:14,280

need to account for the origin elsewhere right\h
yeah so how how do you respond to these ideas\h\h

491

01:03:14,940 --> 01:03:22,740

but I think I think I think he's right I mean\h

we really got to find an answer to if it ever\h\h

492

01:03:22,740 --> 01:03:29,820

started if it was eternally present then we\h
don't need to to worry about uh any any start\h\h

493

01:03:29,820 --> 01:03:38,760

of life or any start or anything but if it did\h
start in uh in a location that is much bigger\h\h

494

01:03:38,760 --> 01:03:44,700

than the earth right for instance if the if the\h
space that is needed for spontaneous generation\h\h

495

01:03:44,700 --> 01:03:51,480

is essentially a whole galaxy or a cluster of\h
galaxies how did it start there how did it uh\h\h

496

01:03:51,480 --> 01:03:59,340

overcome the the the improbability odds against\h
life that I have mentioned I mean Paul and I had\h\h

497

01:03:59,340 --> 01:04:05,880

to think a metaphor that is probably has been\h
immortalized to say that we think that life the\h\h

498

01:04:05,880 --> 01:04:11,940

origin of life is like saying that uh tornado\h
blowing through a junkyard with all the bits\h\h

499

01:04:11,940 --> 01:04:18,060

and pieces the Plastics and the screws and so\h
on uh assembled fully working buoyance Boeing\h\h

500

01:04:18,060 --> 01:04:25,920

747 and we've gone a long way from Boeing 747s now\h
but anyway that's that's the kind of improvement\h\h

501

01:04:25,920 --> 01:04:30,600

that when one has to cope with so it has to\h

start somewhere if there was ever a beginning\h\h

502

01:04:31,200 --> 01:04:36,840

right and this is the question that uh is a\h
deep philosophical question that depends on your\h\h

503

01:04:36,840 --> 01:04:42,540

personal point of view right uh the Babylonians\h
would say there was no beginning the Indians\h\h

504

01:04:42,540 --> 01:04:49,620

would say there was no beginning and but the the\h
Western tradition famous the beginning I think\h\h

505

01:04:49,620 --> 01:04:56,040

four reasons that are connected with theology\h
after all I mean God created the universe God\h\h

506

01:04:56,040 --> 01:05:02,580

created the Earth God created life so there was\h
in in in in the western canon in the Canon of uh\h\h

507

01:05:02,580 --> 01:05:11,040

I remember I should stress that I'm not bashing\h
any religion I think Christianity is a great\h\h

508

01:05:11,040 --> 01:05:17,640

religion it's a very it's been a civilizing force\h
for centuries and so on but it has an underlying\h\h

509

01:05:17,640 --> 01:05:25,080

philosophy that is non uh supported not supported\h
by science which is the the story of Origins

510

01:05:30,660 --> 01:05:38,880

yeah I think it does yeah thank you so much so\h
we have a few more questions unfortunately we're\h\h

511

01:05:38,880 --> 01:05:44,280

running out of time um but I will say that we're\h

going to ask one more but um before we close with\h\h

512

01:05:44,280 --> 01:05:50,340

the last question um uh Chandra has agreed to\h
join us in the social Lounge um so some of you\h\h

513

01:05:50,340 --> 01:05:55,080

will have opportunities maybe to ask directly once\h
we are done with the session so the final question\h\h

514

01:05:55,080 --> 01:06:00,540

comes from the SSC secretary he asks at the end of\h
your talk he said that if panspermia is accepted\h\h

515

01:06:00,540 --> 01:06:05,820

it would have major changes on Humanity can you\h
elaborate on that and what makes you think that\h\h

516

01:06:05,820 --> 01:06:12,120

this knowledge would change Humanity well I think\h
I think what would what would happen immediately\h\h

517

01:06:12,120 --> 01:06:19,860

is that scientific establishments universities\h
and so on would suddenly realize that\h\h

518

01:06:19,860 --> 01:06:26,160

they've got to teach a different story right the\h
story that we are being told constantly for the\h\h

519

01:06:26,160 --> 01:06:32,880

last uh 50 years ever since universities and\h
academies got very powerful was that there was\h\h

520

01:06:32,880 --> 01:06:40,440

no other alternative but a beginning of\h
Life on the earth and that sort of gives\h\h

521

01:06:40,440 --> 01:06:46,740

human beings a very important position in this\h

whole story humans are in some ways the center\h\h

522

01:06:46,740 --> 01:06:53,220

of this whole process of of Life the culmination\h
of the whole process of Life starting at some\h\h

523

01:06:53,220 --> 01:07:03,060

point on the earth perhaps or maybe elsewhere\h
but leading up to to humanity if that is eroded\h\h

524

01:07:03,060 --> 01:07:10,860

if there is is threatened then I think uh the\h
sort of view of ourselves is going to change we\h\h

525

01:07:10,860 --> 01:07:19,380

are not uh we are not anything special we are just\h
the outcome of a process of cosmic Evolution and\h\h

526

01:07:19,380 --> 01:07:24,480

um and that's the reason that I think that\h
we would become trivialized or we would\h\h

527

01:07:24,480 --> 01:07:29,940

feel tribulized the other thing other aspect of\h
course is that if scientists and if philosophers\h\h

528

01:07:29,940 --> 01:07:37,500

have held a certain point of view for a hundred\h
years or many hundred years if they are proved\h\h

529

01:07:37,500 --> 01:07:43,260

to be wrong then their egos are shattered\h
they've got to change their point of view and\h\h

530

01:07:43,260 --> 01:07:48,780

nobody in a professional situation is\h
very happy about changing their point\h\h

531

01:07:48,780 --> 01:07:54,240

of view they become less important they\h

can learn their self-importance is eroded\h\h

532

01:07:55,260 --> 01:08:01,800

yeah that makes sense well um SSC members patrons\h
I encourage you to stick around we're going to\h\h

533

01:08:01,800 --> 01:08:07,260

open the social Lounge Sean is going to visit\h
us for a little bit uh thank you again Professor\h\h

534

01:08:07,260 --> 01:08:13,080

for joining us uh it was a wonderful afternoon\h
and I look forward to uh chatting with you some\h\h