1

00:00:00,000 --> 00:00:10,000

This program is not science fiction.

2

00:00:10,000 --> 00:00:18,000

It is a report on science's very real search today for the existence of life on other worlds.

3

00:00:18,000 --> 00:00:24,000

A search by microscope examining the smallest particles of matter in nature,

4

00:00:24,000 --> 00:00:28,000

by telescope viewing the largest objects in space,

5

00:00:28,000 --> 00:00:32,000

a probe into distant galaxies and star clusters,

6

00:00:32,000 --> 00:00:37,000

looking with the enormous eyes of the optical telescopes,

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00:00:37,000 --> 00:00:44,000

and listening with the electronic ears of the radio telescope for signals from outer space.

8

00:00:44,000 --> 00:00:51,000

And eventually this search will be carried on by man himself through interplanetary travel.

9

00:00:55,000 --> 00:01:04,000

The elements that exist here on Earth and the chemistry of our world are the same as on the most distant star.

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00:01:04,000 --> 00:01:10,000

If the atom, one of the smallest particles of matter, and the galaxy,

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00:01:10,000 --> 00:01:16,000

the largest mass in the visible universe are governed by the same physical laws,

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00:01:16,000 --> 00:01:22,000

then life might well have evolved from the hydrogen atom in space.

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00:01:22,000 --> 00:01:29,000

It continued to the development of the human brain and may have repeated a similar process

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00:01:29,000 --> 00:01:35,000

unnumbered times in the hundreds of billions of worlds abounding in the cosmos,

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00:01:35,000 --> 00:01:42,000

making the probability great that intelligent creatures beside Earthman, people the universe.

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00:01:42,000 --> 00:01:54,000

On just the beginning of this search for life on other planets,

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00:01:54,000 --> 00:02:01,000

the American taxpayer is spending two billion dollars in probes of Mars alone.

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00:02:01,000 --> 00:02:08,000

Nobel Prize-winning scientist Dr. Harold Urie says of the cost of the space program,

19

00:02:08,000 --> 00:02:13,000

some people say that we can't afford the space program,

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00:02:13,000 --> 00:02:19,000

but I say the Greeks couldn't afford the plasma,

21

00:02:19,000 --> 00:02:23,000

and the Egyptians couldn't afford the pyramids,

22

00:02:23,000 --> 00:02:27,000

and middle ages couldn't afford the great procedural superiority.

23

00:02:27,000 --> 00:02:32,000

We could have always spent this money, as they say, for something else,

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00:02:32,000 --> 00:02:35,000

but you know we can't afford the space program.

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00:02:35,000 --> 00:02:41,000

It may be proved that life existed on Mars or ever did exist on Mars.

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00:02:41,000 --> 00:02:46,000

In my opinion it would be one of the most horrendous discoveries of this century.

27

00:03:05,000 --> 00:03:14,000

We are not alone.

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00:03:14,000 --> 00:03:20,000

It's brought to you by B. F. Goodrich, the name that sells quality,

29

00:03:20,000 --> 00:03:31,000

entire chemicals, plastics, footwear, products for home, industry and aviation.

30

00:03:31,000 --> 00:03:36,000

B. F. Goodrich.

31

00:03:44,000 --> 00:03:52,000

Philip! Philip! Isn't this the day you were going to buy new tires?

32

00:03:52,000 --> 00:03:56,000

Philip!

33

00:04:01,000 --> 00:04:06,000

Why is it tire buying day always seems like the morning after?

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00:04:06,000 --> 00:04:12,000

All the waiting around, the endless confusion about the right tire to buy,

35

00:04:12,000 --> 00:04:17,000

and the biggest blow of all, the money it costs.

36

00:04:17,000 --> 00:04:22,000

Now, B. F. Goodrich doesn't give away free tires,

37

00:04:22,000 --> 00:04:25,000

but if tire buying day drags you down,

38

00:04:25,000 --> 00:04:29,000

we'll wake you up with a brand new way of doing business.

39

00:04:29,000 --> 00:04:34,000

No confusing tire talk, just straight talk.

40

00:04:34,000 --> 00:04:38,000

We've got nothing up our sleeves except this,

41

00:04:38,000 --> 00:04:45,000

a special tire value calculator that'll find you the right tire at the right price.

42

00:04:45,000 --> 00:04:50,000

The lowest price B. F. Goodrich tire for the way you drive.

43

00:04:50,000 --> 00:04:54,000

Well you may be so happy at the money B. F. Goodrich can save you.

44

00:04:54,000 --> 00:04:59,000

You want to bring something home to your wife.

45

00:04:59,000 --> 00:05:03,000

B. F. Goodrich.

46

00:05:03,000 --> 00:05:07,000

The straight talk tire people.

47

00:05:07,000 --> 00:05:11,000

Here now your narrator, Edward P. Morgan.

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00:05:11,000 --> 00:05:15,000

The fixed stars in our firmament have, through the ages,

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00:05:15,000 --> 00:05:18,000

given man a feeling of security.

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00:05:18,000 --> 00:05:23,000

We have always wanted to believe that we have our feet firmly planted

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00:05:23,000 --> 00:05:28,000

on a solid earth with a protective heaven above.

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00:05:28,000 --> 00:05:32,000

But science has continually whittled away at this idea.

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00:05:32,000 --> 00:05:36,000

For some time we have known that our earth, in reality,

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00:05:36,000 --> 00:05:41,000

is only a changing ball of rock and soil, water and air,

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00:05:41,000 --> 00:05:44,000

held together by a tenuous gravity,

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00:05:44,000 --> 00:05:49,000

spinning and whirling in space around our sun.

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00:05:49,000 --> 00:05:52,000

And even as a planet we are not very special,

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00:05:52,000 --> 00:05:57,000

being only one of nine in orbit around the mother sun.

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00:05:57,000 --> 00:06:04,000

Our sun itself, a star and only a small middle aged one as stars go,

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00:06:04,000 --> 00:06:09,000

is a kind of lost child on the outskirts of its galaxy,

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00:06:09,000 --> 00:06:13,000

which we can see in the sky as the Milky Way.

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00:06:13,000 --> 00:06:18,000

It is only one of hundreds of billions of stars in our galaxy,

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00:06:18,000 --> 00:06:22,000

which is only one of hundreds of billions of galaxies,

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00:06:22,000 --> 00:06:26,000

all of which are in constant motion.

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00:06:26,000 --> 00:06:32,000

If we are not unchanging in space, neither are we eternal in time.

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00:06:32,000 --> 00:06:39,000

Our sun, five billion years old, will, in another five billion years or so,

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00:06:39,000 --> 00:06:45,000

burn itself out, and in doing so expand and absorb all its planets,

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00:06:45,000 --> 00:06:49,000

as countless other stars have done before.

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00:06:49,000 --> 00:06:54,000

Our sun's only real distinction that we know of thus far,

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00:06:54,000 --> 00:06:58,000

is that it has people whirling around it.

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00:06:58,000 --> 00:07:03,000

The question is, might this have happened elsewhere in the universe,

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00:07:03,000 --> 00:07:06,000

or are we alone?

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00:07:06,000 --> 00:07:11,000

It was recently discovered that stars and gases in space

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00:07:11,000 --> 00:07:18,000

emit natural radio waves, which can be picked up and amplified by radio telescopes.

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00:07:18,000 --> 00:07:22,000

The Jodrell Bank radio telescope in England,

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00:07:22,000 --> 00:07:27,000

the Green Bank radio telescope in West Virginia,

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00:07:27,000 --> 00:07:34,000

and this one at Arrasibo in Puerto Rico, can be called man's largest ears.

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00:07:34,000 --> 00:07:38,000

The bowl of the telescope, a thousand feet across,

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00:07:38,000 --> 00:07:43,000

made of half-inch wire mesh, acts as a reflector,

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00:07:43,000 --> 00:07:49,000

able to focus even extremely weak radio signals from space.

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00:07:49,000 --> 00:07:52,000

In searching for life on other worlds,

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00:07:52,000 --> 00:07:56,000

the theory is that intelligent civilizations in the universe

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00:07:56,000 --> 00:08:02,000

would use natural radio frequencies as a means of communicating with one another.

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00:08:02,000 --> 00:08:06,000

By listening to signals from interstellar space,

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

intelligent codes could be distinguished from the patterns of natural radio waves.

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00:08:12,000 --> 00:08:19,000

Radio astronomer of Cornell University and director of the Arrasibo Ionospheric Observatory,

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00:08:19,000 --> 00:08:24,000

Dr. Frank Drake, conducted Project OSMA,

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00:08:24,000 --> 00:08:29,000

the first search for intelligent life in space by radio telescope.

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00:08:29,000 --> 00:08:35,000

Some years ago, it was suggested by Professors Morrison and Kikoni at Cornell

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00:08:35,000 --> 00:08:41,000

that there might be other civilizations in space attempting to send us messages.

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00:08:41,000 --> 00:08:46,000

We use very sensitive and ingenious detecting devices

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00:08:46,000 --> 00:08:52,000

to search for intelligent signals amongst static which comes to us from the interstellar space.

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00:08:52,000 --> 00:08:57,000

Well, in 1960, we made a short search for such signals.

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00:08:57,000 --> 00:09:02,000

With existing telescopes, such as the 85-foot telescope at Greenbank,

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00:09:02,000 --> 00:09:05,000

using the 21-centimeter line frequency,

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00:09:05,000 --> 00:09:09,000

and we looked at... there was time, in fact, to look at only two stars,

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00:09:09,000 --> 00:09:13,000

the ones we picked, of course, with the two nearest stars, which are like the sun.

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00:09:13,000 --> 00:09:18,000

The stars toss cede, and the constellation of Cetus the whale,

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00:09:18,000 --> 00:09:22,000

and epsilon arrhythmia, and the constellation of arrhythmia.

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00:09:22,000 --> 00:09:26,000

We found no evidence for extraterrestrial intelligence signals.

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00:09:26,000 --> 00:09:30,000

And now we must realize that this was an extremely limited search,

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00:09:30,000 --> 00:09:34,000

and the fact that we found nothing should not discourage us

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00:09:34,000 --> 00:09:38,000

or cause us to think that any future search is going to fail.

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00:09:38,000 --> 00:09:44,000

One can estimate that a search which has a good chance of succeeding will take perhaps 30 years.

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00:09:44,000 --> 00:09:49,000

But if one is going to make a realistic search, this is what is required,

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00:09:49,000 --> 00:09:54,000

and anything less than this is really not worth the effort because the chance of success is so small.

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00:09:54,000 --> 00:09:59,000

Surely the results of the detection of extraterrestrial signals

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00:09:59,000 --> 00:10:03,000

are going to be one of the most exciting things that ever happened.

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00:10:03,000 --> 00:10:07,000

While some scientists in the discipline of astronomy

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00:10:07,000 --> 00:10:13,000

pressed the search for intelligent life in the distant stellar regions beyond our solar system

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00:10:13,000 --> 00:10:18,000

with the big ears and eyes of the radio and optical telescopes,

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00:10:18,000 --> 00:10:22,000

some, perhaps more down-to-earth investigators,

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00:10:22,000 --> 00:10:27,000

feel they would be making an historic discovery by a less ambitious find.

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00:10:27,000 --> 00:10:31,000

These men are called exobiologists.

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00:10:31,000 --> 00:10:35,000

They are looking for microbiologic forms of life,

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00:10:35,000 --> 00:10:40,000

lesser than intelligent man, and perhaps higher than the lowly virus,

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00:10:40,000 --> 00:10:48,000

something between the organic molecule and the bacteria that might have evolved outside the Earth.

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00:10:48,000 --> 00:10:54,000

The most likely candidates for such a search are the planets Mars and Venus,

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00:10:54,000 --> 00:10:58,000

Earth's nearest neighbors in the solar system.

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00:10:58,000 --> 00:11:06,000

The Mariner spacecraft has been our principal vehicle for unmanned planetary exploration.

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00:11:06,000 --> 00:11:11,000

The planetary program is carried out by the Jet Propulsion Laboratory,

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00:11:11,000 --> 00:11:18,000

operated by the California Institute of Technology for the National Aeronautics and Space Administration.

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00:11:18,000 --> 00:11:22,000

Dr. William H. Pickering is the director.

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00:11:22,000 --> 00:11:26,000

Mars and Venus, of course, are the two closest planets to the Earth.

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00:11:26,000 --> 00:11:30,000

In some ways we know more about Mars than we do about Venus,

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00:11:30,000 --> 00:11:34,000

because Venus is always covered with clouds.

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00:11:34,000 --> 00:11:38,000

We do not believe we have ever seen down to the surface of Venus.

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00:11:38,000 --> 00:11:41,000

That is with a telescope from the Earth.

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00:11:41,000 --> 00:11:47,000

Whereas in the case of Mars, we usually see the surface of Mars.

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00:11:47,000 --> 00:11:53,000

Mars, on the other hand, is a planet which astronomers for many years have compared with the Earth.

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00:11:53,000 --> 00:11:56,000

The size is a little smaller than the Earth.

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00:11:56,000 --> 00:12:00,000

It happens that the day on Mars is almost exactly the same length as the day on the Earth.

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00:12:00,000 --> 00:12:04,000

The year is about twice as long as the year on the Earth.

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00:12:04,000 --> 00:12:08,000

The seasons change in the same manner that they do on the Earth.

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00:12:08,000 --> 00:12:14,000

In other words, the spin axis of Mars is tilted about the same way that the axis of the Earth is tilted.

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00:12:14,000 --> 00:12:22,000

All of this has led astronomers to compare Mars with the Earth in many ways.

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00:12:22,000 --> 00:12:27,000

And of course the one comparison which one must always make is,

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00:12:27,000 --> 00:12:28,000

what about life?

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00:12:28,000 --> 00:12:33,000

Is Mars a suitable planet for life as we know it?

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00:12:33,000 --> 00:12:35,000

It is feasible.

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00:12:35,000 --> 00:12:39,000

And what we know about life on Earth, that life could exist on Mars.

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00:12:39,000 --> 00:12:46,000

Dr. Richard S. Young, Chief of the Exobiology Division of NASA's Ames Research Center.

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00:12:46,000 --> 00:12:54,000

Life on Earth probably arose as the result of a very natural sequence of events.

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00:12:54,000 --> 00:13:00,000

We think we know what the primitive atmosphere of the Earth was like before there was any life on the Earth.

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00:13:00,000 --> 00:13:06,000

We think we know what types of energies were available on the primitive Earth before there was any life on Earth.

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00:13:06,000 --> 00:13:14,000

The biological evolution took over and the atmosphere was changed rather drastically until we have the sort of atmosphere we have on the Earth today.

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00:13:14,000 --> 00:13:18,000

And we have the tremendous diversity of life that we have today.

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00:13:18,000 --> 00:13:24,000

A subsequent result over the next, say, three billion years of biological evolution.

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00:13:25,000 --> 00:13:33,000

In fact, then, just about any primitive planet during its early history should have undergone a similar sequence of events.

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00:13:33,000 --> 00:13:40,000

They were formed obeying the same laws of physics and chemistry that should have had the same type of primitive atmosphere

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00:13:40,000 --> 00:13:44,000

and probably underwent chemical evolution much the same way the Earth did.

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00:13:44,000 --> 00:13:47,000

Now what we need is proof of that.

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00:13:47,000 --> 00:13:57,000

If we can find life on one planet, St. Mars, then it is very probable that elsewhere within our own galaxy

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00:13:57,000 --> 00:14:02,000

there must certainly be planets comparable to Earth with life forms comparable to Earth.

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00:14:06,000 --> 00:14:16,000

The optical telescope has been the principal tool of astronomers for studying the stars and the planets from the days of Galileo centuries ago.

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00:14:16,000 --> 00:14:25,000

The 200-inch mirror in the Palomar Observatory Telescope in California can be called man's largest eye.

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00:14:25,000 --> 00:14:31,000

It can bring into view the farthest observable objects in the universe, called quasars.

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00:14:31,000 --> 00:14:38,000

Points of light believe to be billions of light years away and moving away from us at incredible speeds.

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00:14:39,000 --> 00:14:45,000

Another kind of telescope is the 26-inch refractor or direct-view telescope,

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00:14:45,000 --> 00:14:50,000

like this one at the United States Naval Observatory in Washington, D.C.

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00:14:50,000 --> 00:14:58,000

To find planets comparable to Earth, revolving around stars comparable to our Sun,

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00:14:58,000 --> 00:15:08,000

Dr. Kai Strand, scientific director of the observatory and his former colleague Dr. Peter Van Decamp of Swarthmore College,

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00:15:08,000 --> 00:15:11,000

used a telescope of this type.

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00:15:11,000 --> 00:15:16,000

They wanted to verify the argument that planets are abundant in the universe.

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00:15:16,000 --> 00:15:23,000

In 1963, Van Decamp announced the discovery of a planet orbiting a neighboring star,

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00:15:23,000 --> 00:15:31,000

the first planet ever to be detected beyond our solar system, although it has never been directly seen.

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00:15:31,000 --> 00:15:34,000

That depends what you mean by seen.

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00:15:34,000 --> 00:15:40,000

Harvard astronomer Carl Sagan explains how the existence of this planet was deduced.

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00:15:40,000 --> 00:15:47,000

The second nearest star system after the Sun is called Barnard's Star,

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00:15:47,000 --> 00:15:50,000

named after an American astronomer, E.E. Barnard.

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00:15:50,000 --> 00:16:01,000

And the motion of this star, of course, the sky, is not a more or less uniform line on the background stars,

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00:16:01,000 --> 00:16:04,000

as you might expect, but instead oscillates.

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00:16:04,000 --> 00:16:09,000

And the wiggly path is due to the presence of a dark companion.

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00:16:09,000 --> 00:16:14,000

We don't see the dark companion, but we can quite reliably deduce its presence

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00:16:14,000 --> 00:16:18,000

from the wiggles in the motion of this star.

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00:16:18,000 --> 00:16:25,000

Let's suppose this is Jupiter and this is the Sun, and the two of them are moving, of course, to space together.

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00:16:25,000 --> 00:16:30,000

However, Jupiter is also going around the Sun, and when Jupiter is on the side of the Sun,

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00:16:30,000 --> 00:16:33,000

its gravitational attraction pulls the Sun a little bit that way.

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00:16:33,000 --> 00:16:38,000

When it's on the other side of the Sun, it pulls the Sun a little bit that way.

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00:16:38,000 --> 00:16:44,000

Also, as the Sun goes from space, it has, in addition to its ordinary motion that way,

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00:16:44,000 --> 00:16:50,000

it has, let's say, an up-and-down wiggle due to the motion of the invisible Jupiter.

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00:16:50,000 --> 00:16:54,000

And so the wiggle tells you the presence of Jupiter, and not only that,

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00:16:54,000 --> 00:17:00,000

it tells you its mass and it tells you how far away it is.

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00:17:00,000 --> 00:17:05,000

The existence of planetary systems around stars other than our own Sun

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00:17:05,000 --> 00:17:15,000

is a scientifically established fact, and if, as we know, there are hundreds of billions of such Suns in our own galaxy alone,

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00:17:15,000 --> 00:17:20,000

some leading astronomers dedicated to the idea that life does exist elsewhere

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00:17:20,000 --> 00:17:27,000

have calculated the possible number of stars whose energy might support life.

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00:17:27,000 --> 00:17:33,000

Astronomer Dr. Harlow Sheppley, Director Emeritus of Harvard College Observatory,

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00:17:33,000 --> 00:17:39,000

who first measured the size of our galaxy, now retired to his New Hampshire farm,

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00:17:39,000 --> 00:17:46,000

discusses cosmic matters with two young friends, Georgia and Emily Huffley.

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00:17:46,000 --> 00:17:48,000

How many stars are there?

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00:17:48,000 --> 00:17:51,000

In the sky, the whole sky, how many stars are there?

193

00:17:51,000 --> 00:17:58,000

Well, you can see a thousand stars, and you go out some clear dark night, a thousand stars,

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00:17:58,000 --> 00:18:01,000

make or die stars, we call them, but if we put a telescope into action,

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00:18:01,000 --> 00:18:07,000

we get deeper and deeper into space, and the further out we go, Emily, more stars we find.

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00:18:07,000 --> 00:18:10,000

And so now, how many stars are there?

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00:18:10,000 --> 00:18:17,000

Well, I've measured these galaxies and these stars and these shooting stars and so forth,

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00:18:17,000 --> 00:18:22,000

and you know what I find out? That there are just billions of these galaxies.

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00:18:22,000 --> 00:18:26,000

Now, a billion, you know what that billion is, it's a thousand million.

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00:18:26,000 --> 00:18:31,000

Well, there are more than a thousand million of these galaxies in the sky,

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00:18:31,000 --> 00:18:37,000

and each galaxy has more than ten thousand million stars, and so there's just lots of stars in the sky.

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00:18:37,000 --> 00:18:39,000

I'll give you the number of few, try to remember.

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00:18:39,000 --> 00:18:44,000

The number of stars is more than a hundred thousand million billion.

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00:18:44,000 --> 00:18:48,000

Stars are not for everybody, see, if you want stars, you can have a lot of them.

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00:18:48,000 --> 00:18:53,000

I don't know whether there's anybody living on those stars, not on the stars,

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00:18:53,000 --> 00:18:56,000

it can't be on the stars, a sun, you can't be on the sun.

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00:18:56,000 --> 00:18:57,000

Why?

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00:18:57,000 --> 00:18:58,000

It's fire.

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00:18:58,000 --> 00:19:01,000

Yes, it's too hot, that's it, much too hot.

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00:19:01,000 --> 00:19:06,000

But planets, yes, you can live on it, that is here on this planet we can.

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00:19:06,000 --> 00:19:10,000

You know any other planet where we might find life?

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00:19:10,000 --> 00:19:11,000

Now?

213

00:19:11,000 --> 00:19:13,000

You ever hear of Mars?

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00:19:13,000 --> 00:19:16,000

The planet Mars, that might have some life on it.

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00:19:16,000 --> 00:19:20,000

It might have, and we'll have to get more and more observations, and then we'll come out.

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00:19:20,000 --> 00:19:28,000

My guess is that there are more than a hundred million planets that have living things on them.

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00:19:28,000 --> 00:19:32,000

By living, I mean like trees and grass and people of that kind.

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00:19:32,000 --> 00:19:36,000

I think at least that many, and I'm a very conservative person.

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00:19:36,000 --> 00:19:41,000

Our galaxy's wheel shape, you know, is flattened like this, but has a big center,

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00:19:41,000 --> 00:19:45,000

and it has that hundred thousand million stars scattered all the way through it.

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00:19:45,000 --> 00:19:49,000

It's rotating too, we've measured that, it's turning around.

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00:19:49,000 --> 00:19:55,000

Long time and turning around, I'll tell you how long, it'll take about two hundred million years

223

00:19:55,000 --> 00:20:00,000

to make one complete turn around in our galaxy, where we are.

224

00:20:00,000 --> 00:20:02,000

Any other questions?

225

00:20:02,000 --> 00:20:05,000

How are the planets on?

226

00:20:05,000 --> 00:20:07,000

Oh, how are planets formed?

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00:20:07,000 --> 00:20:15,000

Oh, that's a hard job, but I'll tell you, we think that once, long ago, long, long ago,

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00:20:15,000 --> 00:20:20,000

there's a whole lot of dust and gas in space, and it contracted, it came together,

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00:20:20,000 --> 00:20:26,000

and it got hotter and hotter, it came together, and it left off some chunks that went whirling around,

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00:20:26,000 --> 00:20:29,000

and those were the things that became planets.

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00:20:29,000 --> 00:20:34,000

So we had the sun, you see, built out of a shrinking nebula, we call it,

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00:20:34,000 --> 00:20:40,000

out of that shrinking nebula, its sun, and it threw off these particular little chunks,

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00:20:40,000 --> 00:20:45,000

little compared with the sun, and those little chunks developed into being the planets.

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00:20:45,000 --> 00:20:53,000

We have the earth, once was gaseous nebulosity, we call it, it once was gas,

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00:20:53,000 --> 00:20:57,000

and it shrunk down, and now it's hard, see how hard it is.

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00:20:57,000 --> 00:21:02,000

We are not alone. We'll continue with Sciences Search for Life on Mars

237

00:21:02,000 --> 00:21:08,000

and the exploration of life's origin on earth after this message from the BF Goodrich Company.

238

00:21:12,000 --> 00:21:26,000

If you have little feet, big feet, bold feet, bold feet, casting feet,

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00:21:27,000 --> 00:21:37,000

blasting feet, flantic feet, romantic feet, splashing feet,

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00:21:37,000 --> 00:21:42,000

the F Goodrich is always coming up with innovations in footwear,

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00:21:42,000 --> 00:21:47,000

innovations like the posture foundation wedge we build into the heels of sneakers

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00:21:47,000 --> 00:21:51,000

to take the strain off foot and leg muscles,

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00:21:51,000 --> 00:21:58,000

innovations in cold weather boots insulated to keep feet warm even at 25 below zero,

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00:21:58,000 --> 00:22:02,000

innovations to protect workman's toes.

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00:22:02,000 --> 00:22:07,000

As all kinds of fashion footwear, we make just the before of it.

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00:22:21,000 --> 00:22:42,000

All from BF Goodrich, a company known for being pretty fast on its feet.

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00:22:42,000 --> 00:22:46,000

Here again your narrator, Edward P. Morgan.

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00:22:47,000 --> 00:22:51,000

If you were riding the nose cone of a rocket to the moon,

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00:22:51,000 --> 00:22:56,000

this is what you would see as you approach the lunar surface for a landing.

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00:22:56,000 --> 00:23:01,000

These pictures were made by television cameras in Ranger 9,

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00:23:01,000 --> 00:23:08,000

the unmanned American picture taking expedition to the moon in March of 1965.

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00:23:08,000 --> 00:23:13,000

Since then, thousands of spectacular close up pictures of the moon's surface

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00:23:13,000 --> 00:23:21,000

have been returned by Surveyor One, which soft landed on the moon in June of 1966.

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00:23:21,000 --> 00:23:26,000

Pictures from the probe of lunar orbiter in August of 1966

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00:23:26,000 --> 00:23:31,000

showed our planet as seen from the vicinity of the moon.

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00:23:31,000 --> 00:23:37,000

This representation of the lunar landscape shows us what a man might see from the moon,

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00:23:37,000 --> 00:23:43,000

a bright sun in a sky black as night due to the lack of light diffusion by an atmosphere,

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00:23:43,000 --> 00:23:51,000

and the earth visible in the lunar night hanging in its black sky like an oversized moon itself.

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00:23:51,000 --> 00:23:57,000

Surveyor One and lunar orbiter returned much valuable information,

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00:23:57,000 --> 00:24:01,000

and they have also shown us what we have known the moon to be,

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00:24:01,000 --> 00:24:08,000

a body without atmosphere, without water, without life.

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00:24:08,000 --> 00:24:16,000

Not unlike the moon in some aspects is Earth's neighbor in the solar system, the planet Mars.

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

When in July of 1965, the Mariner 4 spacecraft completed a successful Mars flyby

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00:24:24,000 --> 00:24:34,000

after a journey of 8 months and 325 million miles passing within 6,500 miles of the planet.

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00:24:34,000 --> 00:24:44,000

21 pictures of the Martian surface were returned to Earth, including one of the most remarkable scientific photographs of this age,

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00:24:44,000 --> 00:24:49,000

Mariner's 11th picture of Mars.

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00:24:49,000 --> 00:24:59,000

Many scientists felt that this picture settled once and for all the century-long controversy over Martian canals.

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00:24:59,000 --> 00:25:12,000

In 1877, the Italian astronomer Giovanni Schiaparelli claimed to have seen canals which he thought could be evidence for intelligent life on Mars.

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00:25:12,000 --> 00:25:19,000

As late as 1908, the American astronomer Percival Lowell confirmed the sightings.

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00:25:19,000 --> 00:25:29,000

The spacecraft Mariner was too far away in its flyby to be able to show decisively what exists on the Martian surface.

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00:25:29,000 --> 00:25:37,000

But most scientists agree that if life does exist there, it will not be intelligent but of a very low order.

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00:25:37,000 --> 00:25:44,000

Of course the early astronomers saw canals and saw a lot of other things, but Dr. Richard DeOrder has Ames Research Center.

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00:25:44,000 --> 00:25:52,000

We no longer think canals really exist on Mars. We think they're primarily optical illusions.

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00:25:52,000 --> 00:26:01,000

And then aren't something that the Martians constructed to transport water from the pole to the equator and keep the deserts wet and all that sort of thing.

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00:26:01,000 --> 00:26:10,000

Mars has, although it's a harsh environment by biological standards, Mars has an atmosphere.

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00:26:10,000 --> 00:26:24,000

It has a very rare atmosphere. The smaller planet has a lower gravitational field and its atmosphere is probably something like 1,100 or perhaps even closer to 1,000 of the total pressure on the surface of the Earth.

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00:26:24,000 --> 00:26:33,000

It also contains water. Life can't exist without water, but the fact that Mars has water is terribly significant.

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00:26:33,000 --> 00:26:38,000

Now unfortunately, from a biological point of view, the amount of water in the atmosphere of Mars is very slight.

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00:26:38,000 --> 00:26:44,000

It's about 1,000 to 1,000th of the amount that one would detect in the Earth's atmosphere with a similar observation.

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00:26:44,000 --> 00:26:51,000

There are other features of Mars that we're reasonably familiar with. Astronomers have been observing it for something approaching 100 years now.

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00:26:51,000 --> 00:27:02,000

They've known that there are light areas and there are dark areas. The dark areas are assumed to be, at least by the early astronomers, were assumed to be vegetation.

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00:27:02,000 --> 00:27:09,000

Light areas were assumed to be deserts. There are also pole caps on Mars which have been shown to be water.

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00:27:09,000 --> 00:27:15,000

However, although they're pretty extensive, the total amount of water in these pole caps is very slight.

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00:27:15,000 --> 00:27:22,000

There's probably nothing more than a layer of frost. However, these pole caps do recede seasonally.

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In the spring, the pole cap recedes. At the same time the pole cap is receding or disappearing, the dark areas are getting darker.

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00:27:31,000 --> 00:27:45,000

Implying, at least to the early astronomers, that, well, water is becoming available now from the pole caps and the vegetation in the dark areas is literally inhaling the water and is flourishing during the spring.

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00:27:45,000 --> 00:27:55,000

We really simply don't know enough about the intimate detail of the surface of Mars to critically analyze any of these visual phenomena.

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00:27:55,000 --> 00:28:06,000

All we can do is speculate about them. And so far, the best of our speculations has failed to demonstrate that life on Mars must be ruled out.

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00:28:06,000 --> 00:28:19,000

In fact, the best of what we know still leaves well within the range of possibility the idea that life may well exist on Mars and would be well worth the search, if you will.

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00:28:19,000 --> 00:28:29,000

I feel that in the search for extraterrestrial life, there are three approaches. One first to the one that you named to go to Mars and see whether there's life there.

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00:28:29,000 --> 00:28:38,000

The other one, which Frank Drake has for some time tried out, listening to radio communication from outer space.

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00:28:38,000 --> 00:28:45,000

The third one is the one that we are working on here, retracing the path by which life appeared.

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00:28:45,000 --> 00:28:57,000

Dr. Cyril Panam Paruma, chemist at Ames Research Center, is searching for answers to extraterrestrial life by studying the chemical evolution of life on Earth.

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00:28:57,000 --> 00:29:08,000

From the information we have today, we know that the Earth is four and a half billion years old. Let me put that down as one of our starting points.

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00:29:08,000 --> 00:29:23,000

Four point seven billion years is the exact date given. Life as we know it, or the first evidence of life in the fossil record, is about three billion.

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00:29:23,000 --> 00:29:33,000

Now, biology or the Darwinian theory takes over from here. See, to find the life evolving into a whole variety of organisms.

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00:29:33,000 --> 00:29:46,000

We know that mammals are around a hundred and sixty million, and then so on, we come to the evolution of man, finally.

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00:29:46,000 --> 00:29:57,000

What went on before this, from the time the Earth was formed, or even further back, from the time the solar system was formed?

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00:29:58,000 --> 00:30:07,000

This can be described as chemical evolution. We know that the solar system is about five billion.

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00:30:07,000 --> 00:30:17,000

And then, if you go backwards in time, you come to the origin of the universe, which is greater than ten billion.

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00:30:17,000 --> 00:30:23,000

Some for you, that's thirteen, some at twenty, but we know definitely it's more than ten billion years.

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00:30:24,000 --> 00:30:32,000

Now, we have some starting points to go on. We know that ninety percent of the universe is hydrogen.

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00:30:32,000 --> 00:30:42,000

So, the hydrogen, then, by a series of reactions during the birth of a star, gave rise to the other elements of the periodic table.

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00:30:42,000 --> 00:30:51,000

Carbon, nitrogen, oxygen, and so on. In other words, you would have thermonuclear reactions taking place within a star.

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00:30:51,000 --> 00:31:01,000

So, the idea of chemical evolution, then, is the gradual evolution of hydrogen, the initial matter of the universe,

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00:31:01,000 --> 00:31:13,000

to give the elements of the periodic table, to give the constituents of the early Earth atmosphere, the methane, ammonia, and water.

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00:31:14,000 --> 00:31:24,000

Simple chemistry deltas of the carbon will be in the form of methane. The nitrogen will be in the form of ammonia, and the oxygen will be in the form of water.

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00:31:24,000 --> 00:31:30,000

So, the early atmosphere of the planet would have been made up of methane, ammonia, and water.

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00:31:30,000 --> 00:31:41,000

From here on, we visualize what happens. The early atmosphere being acted upon by lightning, or the water that lies from the sun or heat,

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00:31:41,000 --> 00:31:48,000

producing organic molecules till the early oceans became something like a primordial soup.

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00:31:48,000 --> 00:31:58,000

So, from a primitive atmosphere, we are hoping to go to this stage when the two molecules that are important to living things,

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00:31:58,000 --> 00:32:05,000

the nucleic acid and the protein, will form. First molecules capable of replication.

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00:32:05,000 --> 00:32:17,000

So, it's a stepwise process. It appears to be a beautiful plan going all the way from the hydrogen atom till the time you get to the intelligent human being.

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00:32:17,000 --> 00:32:25,000

So, there, it is a coherent story. It is something which appears most logical. It is rational.

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00:32:26,000 --> 00:32:34,000

So, the discovery of life on Mars to people studying the origin of life will be the greatest thing.

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00:32:34,000 --> 00:32:41,000

As a matter of fact, in my mind, the search for extraterrestrial life is only part of the study of the origin of life.

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00:32:41,000 --> 00:32:46,000

This is the scientifically broader question, the origin of life in the universe.

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00:32:47,000 --> 00:32:58,000

And going to Mars is a unique opportunity that we have, perhaps the one only opportunity that we have of showing this to the entire life on Mars.

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00:32:58,000 --> 00:33:05,000

And especially if we can show that its origin is different from the origin of life on Earth, or it is independent,

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00:33:05,000 --> 00:33:11,000

then we will have a very hard thing on certain expression of uniqueness in life.

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00:33:12,000 --> 00:33:18,000

New York Times Science Editor, Walter Sullivan, author of the book on which this program is based,

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00:33:18,000 --> 00:33:24,000

raised this question with Nobel Prize-winning chemist, Dr. Harold Urey.

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00:33:24,000 --> 00:33:32,000

Dr. Urey, a lot of the discussion on the origin of life boils down to the question of whether there are other worlds, other solar systems.

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00:33:32,000 --> 00:33:34,000

You believe there are.

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00:33:34,000 --> 00:33:42,000

It is my belief that if you have conditions such as we have on the Earth, life will spontaneously appear.

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00:33:42,000 --> 00:33:51,000

I don't know how long it takes, maybe a million years, maybe a billion years, but sometimes life as we know it will appear.

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00:33:51,000 --> 00:34:00,000

Every indication is that the properties of the elements and the most distant stars that we look at are the same,

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00:34:01,000 --> 00:34:04,000

as those that we have on Earth.

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00:34:04,000 --> 00:34:08,000

The physical universe is the same everywhere.

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00:34:08,000 --> 00:34:10,000

That is our conclusion.

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00:34:10,000 --> 00:34:16,000

The laws are the same as far as we go, as we understand them.

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00:34:16,000 --> 00:34:27,000

And this of course means that the chemistry of carbon, nitrogen, oxygen, hydrogen, the four abundant elements in living things,

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00:34:27,000 --> 00:34:34,000

the chemical properties of these elements will be the same wherever we are in the universe.

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00:34:34,000 --> 00:34:46,000

And therefore we expect that they will have the capacity to evolve into what we would call living organisms, no matter where we go.

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00:34:46,000 --> 00:34:50,000

Now, we don't expect that they will be the same.

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00:34:50,000 --> 00:34:57,000

Dr. Philip Morrison is Professor of Physics at the Massachusetts Institute of Technology.

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00:34:57,000 --> 00:35:06,000

The evolution of a complex being, certainly of man, and of any other vertebrates, right, is a very chancey thing.

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00:35:06,000 --> 00:35:11,000

You can show that there were many, many choices that had to be made just to choose this end on rather than that.

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00:35:11,000 --> 00:35:14,000

And if it hadn't been that way, it wouldn't have gone completely differently.

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00:35:14,000 --> 00:35:19,000

So from there, you look at the place you've come to and you say, well, it was impossible to get here.

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00:35:19,000 --> 00:35:24,000

And they say, therefore, it will never happen again in the same way. That's the general view.

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00:35:24,000 --> 00:35:33,000

I mean, I mean, if you look at the, that's right, but if you look at the results, it's quite different.

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00:35:33,000 --> 00:35:42,000

If I look, go down to the museum across the park here, I can see very beautiful skeletons, impressions, fossil impressions,

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00:35:42,000 --> 00:35:48,000

and even impressions of the fleshy parts in the soft stone from a beast.

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00:35:48,000 --> 00:35:50,000

I'd forgotten his name.

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00:35:50,000 --> 00:35:51,000

Precious sword.

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00:35:51,000 --> 00:35:52,000

Precious sword?

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00:35:52,000 --> 00:35:53,000

Yes.

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00:35:53,000 --> 00:35:55,000

You played that's right, all right.

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00:35:55,000 --> 00:36:02,000

Who is really a reptile and was extinct for some hundreds of millions of years,

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00:36:02,000 --> 00:36:06,000

but who swam in the oceans in a pelagic way as a marine reptile.

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00:36:06,000 --> 00:36:13,000

And he looks for all the world like a large torpedo-shaped object about eight or ten feet long.

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00:36:13,000 --> 00:36:19,000

Now then, you look at a tuna, a big tuna.

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00:36:19,000 --> 00:36:21,000

He looks very similar.

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00:36:21,000 --> 00:36:24,000

Not at all a reptile, but a fish.

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00:36:24,000 --> 00:36:28,000

Quite a difference and really a rather more primitive object.

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00:36:28,000 --> 00:36:31,000

And finally, you may look at the dolphin.

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00:36:31,000 --> 00:36:37,000

It was a mammal whose ancestors were in land mammals, air-breathing fellows like ourselves,

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00:36:37,000 --> 00:36:40,000

and we still breathe every two weeks or minutes, comes up.

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00:36:40,000 --> 00:36:48,000

But all of these beasts were beautifully adapted by flection, by many, many, many generations of careful fleshy and all kinds of genes,

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00:36:48,000 --> 00:36:55,000

to be able to swim very well, make a living in the scale of eight or ten feet long by catching fast fish in the sea.

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00:36:55,000 --> 00:37:01,000

There are many, many paths to get to Central Park, but when you get there, you've arrived the same place.

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00:37:01,000 --> 00:37:04,000

If you look at many paths that you've taken, every turn, every streetlight,

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00:37:04,000 --> 00:37:07,000

you certainly can't predict when I start out exactly how I'll go,

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00:37:07,000 --> 00:37:13,000

but I'm pretty sure what the end is going to be, because that end is a set of statuette, and I persist when I'm there.

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00:37:13,000 --> 00:37:16,000

If there's any chance for a form to evolve on the surface of the planet,

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00:37:16,000 --> 00:37:19,000

I'm a very complex, rich form of life that's going to happen.

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00:37:20,000 --> 00:37:28,000

Now, if this is true, if it seems reasonable to suppose that there's intelligence on many other planets, what will these fellows look like?

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00:37:28,000 --> 00:37:36,000

I don't know, I think that's more like us than one might believe,

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00:37:36,000 --> 00:37:44,000

but less like us than the common run of what we would regard as human, something in between.

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00:37:44,000 --> 00:37:54,000

In other words, I don't think there'll be 50-foot skeletal figures with long, towering, with long,

wirey arms.

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00:37:54,000 --> 00:37:58,000

I don't think there'll be round, fierce, four-inches diameter.

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00:37:58,000 --> 00:38:00,000

Simply for evolutionary reasons.

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00:38:00,000 --> 00:38:04,000

Simply for evolutionary reasons. You've got to have certain size, not too big, not too small.

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00:38:04,000 --> 00:38:07,000

You've got to be big enough to have this complicated machinery in it. It can't be too small.

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00:38:07,000 --> 00:38:13,000

It can't be too big, or it's very hard to manage on a planet that if anything might become a composition we're talking about.

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00:38:13,000 --> 00:38:17,000

But as to inconsequential things, I don't know.

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00:38:17,000 --> 00:38:22,000

Now, some people go for it. Some people say, yes, the number of fingers will not be five.

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00:38:22,000 --> 00:38:29,000

I think it'll be something like fingers. But I would be willing to believe there might be four, there might be eight, there might even be sixteen.

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00:38:29,000 --> 00:38:33,000

But I don't think there'll be five hundred, I don't think there'll be one.

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00:38:33,000 --> 00:38:45,000

We are not alone. We'll continue with the story of the race for planetary exploration and the UFO controversy after this message from the B.F. Goodrich Company.

382

00:38:47,000 --> 00:38:55,000

Meet Jeffrey Masters, nuclear physicist. When it comes to splitting atoms, nothing stunts Jeffrey.

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00:38:55,000 --> 00:38:59,000

But when it comes to buying tires, everything does.

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00:38:59,000 --> 00:39:05,000

Jeffrey is snowed by tire talk.

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00:39:05,000 --> 00:39:10,000

Cross brace treads four ply rayon, second line, third line, fourth line.

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00:39:10,000 --> 00:39:16,000

And faced with tire sizes and tire prices, he draws a blank.

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00:39:16,000 --> 00:39:20,000

So Jeffrey has been sold some pretty peculiar tires.

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00:39:20,000 --> 00:39:25,000

I think I did this. I think I did this.

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00:39:25,000 --> 00:39:30,000

Jeffrey, you know there's got to be an easier way to buy tires.

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00:39:30,000 --> 00:39:37,000

Come on over to B.F. Goodrich. We've got a brand new way of doing business. We call it straight talk.

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00:39:37,000 --> 00:39:44,000

We know you don't know a lot of technical tires talk, but you know a lot about how you drive, right?

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00:39:44,000 --> 00:39:48,000

Okay, take this, our B.F. Goodrich tire value calculator.

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00:39:48,000 --> 00:39:51,000

Go on, work it yourself. Tell it how you drive.

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00:39:51,000 --> 00:39:57,000

Now turn it over. It tells you what kind of B.F. Goodrich tire is best for you.

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00:39:57,000 --> 00:40:03,000

You don't have to be confused anymore. You see just what you're getting, just what you're paying for.

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00:40:03,000 --> 00:40:07,000

Jeffrey, what do you think of B.F. Goodrich straight talk?

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00:40:07,000 --> 00:40:10,000

And, perfectly speaking, I explicitly endorse you.

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00:40:10,000 --> 00:40:13,000

Yeah, thanks a lot, Jeff. Tell your friends.

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00:40:13,000 --> 00:40:20,000

B.F. Goodrich, the straight talk tire people.

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00:40:20,000 --> 00:40:25,000

Here again, ABC News correspondent Edward P. Morgan.

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00:40:25,000 --> 00:40:33,000

Sometime in 1973, a spacecraft will take off from Earth. Its name will be Voyager.

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00:40:33,000 --> 00:40:45,000

Voyager.

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00:40:45,000 --> 00:40:52,000

The Voyager, a new kind of space vehicle, will begin a trek to the planet Mars.

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00:40:52,000 --> 00:41:01,000

The first of a series of missions that will eventually carry sophisticated life detection devices to the Martian surface.

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00:41:01,000 --> 00:41:09,000

The success of a Voyager mission would be a scientific breakthrough in our unmanned planetary program.

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00:41:09,000 --> 00:41:17,000

It will be our first attempt to soft land an instrument package on another planet.

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00:41:17,000 --> 00:41:37,000

Looking beyond Voyager to 1977, 1979, and the 1980s, space engineers are already at the hard, practical model stage of designing devices that are still emerging from the minds of scientific dreamers.

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00:41:37,000 --> 00:41:47,000

One such device designed for a Mars life search is the automated biological laboratory called an ABL.

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00:41:47,000 --> 00:41:54,000

One concept of it has been developed by the Aeronutronic Division of the Philco Corporation.

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00:41:54,000 --> 00:42:03,000

It would operate remotely and automatically on Mars, so says space research engineer William Hostetler.

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00:42:03,000 --> 00:42:18,000

There are several processes that have to be performed. First, you have to obtain physical samples of the surface of Mars, physical samples of the soil, because that's where the organisms will congregate if they are living organisms.

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00:42:18,000 --> 00:42:32,000

I might comment, evidently, that we are concerned more with the lower forms of life, the molecular forms of life, rather than telephones and horses and so forth.

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00:42:32,000 --> 00:42:36,000

We are prepared to take pictures of these things if they happen to be there.

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00:42:36,000 --> 00:42:49,000

The ABL is divided really into three basic integrated subsystems. One of these is the sampling

subsystem that is used to obtain the soil samples from the surface of Mars.

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00:42:49,000 --> 00:43:00,000

At the very bottom of the ABL, directly underneath, there is a system that uses a brush and vacuum system to obtain samples of the Martian surface directly under the ABL.

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00:43:00,000 --> 00:43:17,000

Also, there is a core drill system that drills into the surface about 10 feet to obtain subsurface samples in case the water availability or other conditions make it more likely as a place for Martian biological life.

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00:43:17,000 --> 00:43:33,000

A second system picks up samples around the ABL with a sampler as you see here, which is located on a linking to the main body and will pick up samples generally around the ABL location.

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00:43:33,000 --> 00:43:54,000

A third system is used for getting samples from a considerably further distance and in particular selected areas that the visual survey system has pointed out as being particularly desirable because possibly they are warmer than the surrounding spots or they have a different appearance that might appear to be vegetation or something of that nature.

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00:43:54,000 --> 00:44:07,000

So, a sampling line is deployed ballistically, fired out like a small rocket, carrying this line to some distance up to possibly a thousand feet from the ABL location.

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00:44:07,000 --> 00:44:26,000

A sampler, then similar to the one that works in the vicinity of the ABL, is carried up on an elevator latched onto a trolley on this line and deployed out to the desired spot to obtain the surface sample, returning and delivering it to the operating parts of the ABL.

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00:44:26,000 --> 00:44:36,000

These samples are then processed and brought into the interior of the ABL for chemical processing prior to reading out the experiment.

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00:44:36,000 --> 00:44:46,000

The chemical processing equipment is located generally in the central area of the ABL in the form of 13 chemical processors located circumferentially around the central core.

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00:44:47,000 --> 00:45:02,000

Certain supplies, water, certain gases are stored in tanks around the center of the ABL. Other chemical reagents are stored in ampules which hold individual quantities in this area that surrounds the processors.

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00:45:02,000 --> 00:45:20,000

These ampules are put into cartridges like this so that they feed to the outer end and can be picked up by the processing by the transport device which internally then moves them to the proper location to conduct the chemical analysis.

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00:45:20,000 --> 00:45:35,000

After the analysis is completed, the sample is then transferred to the instruments to read out the experiment results. The data from these are then processed internally and transmitted through the high-gain system back to Earth.

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00:45:35,000 --> 00:45:47,000

If the scientific and engineering problems that must be solved to accomplish this feat are not overwhelming, the political obstacles may indeed be insurmountable.

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00:45:47,000 --> 00:45:58,000

Congress will soon have to make the most important decision on space policy since President Kennedy first won approval to commit us to the space age.

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00:45:58,000 --> 00:46:10,000

The future of planetary exploration will hinge on the outcome of congressional action that will begin with hearings now set for February 1967.

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00:46:10,000 --> 00:46:28,000

Because of the need for long lead times, planning policy and funds must be committed now, not only for the Voyager program in 1973, but for the life detection missions to Mars and Venus to come in the next decade or two.

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00:46:29,000 --> 00:46:44,000

Whether the Soviet Union has its equivalent of our Voyager ready to shoot for Mars or Venus is no longer in question. In Russia, cosmic expositions and public displays of space vehicles are commonplace.

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00:46:44,000 --> 00:46:53,000

Interest in planetary exploration and the search for extraterrestrial life is at a high pitch among scientists and the public alike.

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00:46:54,000 --> 00:47:05,000

If our race for space with the Soviet Union were to be judged by who will first land a man on the moon, the contest at this stage might be considered a dead heat.

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00:47:05,000 --> 00:47:19,000

But if the second lap of this race is one of planetary discovery on which depends the exciting scientific trophies of the foreseeable future, then the United States is estimated far behind.

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00:47:20,000 --> 00:47:30,000

Soviet cosmonauts, male and female, become the honored protégés of the state, symbols of Soviet communist achievement.

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00:47:31,000 --> 00:47:45,000

Not so burdened by war costs, the Soviet budget, according to a recent analysis, has allocated to planetary exploration from five to ten times as much as the United States.

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00:47:45,000 --> 00:47:57,000

And as a result, the great discoveries concerning our neighboring planets, Mars and Venus, will be made by the Russians unless early steps are taken to escalate the American effort.

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00:47:58,000 --> 00:48:11,000

In the field of radio astronomy too, the Soviets had been more consistently searching for extraterrestrial signals and recently reported having observed beacons of an interstellar civilization.

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00:48:11,000 --> 00:48:21,000

Although later observations by American scientists negated their claims, the Russians never completely revised their earlier contention.

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00:48:22,000 --> 00:48:32,000

However, in the area of the extraterrestrial life search, they have held the door open to international cooperation, says astronomer Carl Sagan.

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00:48:32,000 --> 00:48:51,000

They have made a recommendation that a worldwide international cooperation be established for a further going search of large numbers of stars and galaxies to see if there is any intelligible radio communication being sent.

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00:48:51,000 --> 00:48:57,000

And who knows if possible that such a collaborative effort might be established.

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00:48:57,000 --> 00:49:09,000

Previous collaborative efforts, for example, the IGY between the United States, Soviet Union and other countries have been enormously productive scientifically and in fact in other ways.

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00:49:09,000 --> 00:49:17,000

A persistent furor in the past few years is the one over the alleged sightings of flying saucers.

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00:49:17,000 --> 00:49:34,000

The number of officially reported sightings of UFOs, unidentified flying objects, has risen from 399 in 1963 to more than 1500 in the last 18 months according to U.S. Air Force figures.

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00:49:35,000 --> 00:49:44,000

A cult of enthusiasts has developed promoting the theory that these phenomena are visitations from intelligent beings in outer space.

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00:49:44,000 --> 00:49:52,000

And according to a recent Gallup poll, about 5 million people have reported seeing UFOs over the years.

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00:49:53,000 --> 00:50:07,000

Organizations with names like Flying Saucer News Club of America and National Investigations Committee on Aerial Phenomena, which has doubled its membership of 5,000 in the last year and a half,

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00:50:08,000 --> 00:50:24,000

have sprung up complete with annual conventions, recruiting drives and publicity bulletins arguing for acceptance of the idea that flying saucers must be dealt with as emissaries far out diplomats from space.

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00:50:25,000 --> 00:50:39,000

The scientific community, even though scientists committed to the belief that other intelligent life does exist somewhere in the cosmos, has greeted the flying saucer theory in the main with open skepticism.

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00:50:39,000 --> 00:50:45,000

Physicist Dr. Philip Morrison of Massachusetts Institute of Technology.

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00:50:45,000 --> 00:50:57,000

This is a social phenomenon, a phenomenon of journalism and television. If you look in the records of newspapers 100 to 120 years ago, exactly the same things were seen, exactly the same stories were given.

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00:50:57,000 --> 00:51:11,000

They're much more frequent now. And what has happened is the infernal invention of the phrase, the flying saucer. However, most of the things they see are, as we all well know, planets and lights in the sky and aircraft and so on.

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00:51:12,000 --> 00:51:32,000

And I think it's one of the most striking evidences, if I may exploit this opportunity, that we don't really have a deep spread of understanding and education in science as a fact that people are not able to cope with the phenomena they see in any other way than inventing what I agree is a possible theory, but a very much more improbable theory than most of the things it describes as fact.

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00:51:33,000 --> 00:51:52,000

And I think there's a sneaking suspicion also in literature of the flying saucer that this is just some terrestrial object of secret kind, which is surely another social phenomenon in response to the enormous importance given to secrecy and military preparations in secret, which is the characteristic feature of the last 20 or 30 years.

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00:51:52,000 --> 00:52:06,000

And if you take these two things out of it, then you don't have a great deal left, except a lot of interesting phenomena seen by people, some of which are new and quite unexplained and would be nice to find out more about, but a great many of which are rather familiar things, seen under unfamiliar circumstances.

456

00:52:06,000 --> 00:52:18,000

We are not alone. We'll continue with the religious and philosophical implications that would result from the discovery of life on other worlds after this message from the B.F. Goodrich Company.

457

00:52:23,000 --> 00:52:32,000

How come the typical American motorist puts off buying tires until he can't put it off any longer?

458

00:52:40,000 --> 00:52:44,000

Maybe it's because the typical American tire store is like a foreign country.

459

00:52:45,000 --> 00:52:56,000

A whole new world with a strange and different language. When you ask for help, you need an interpreter to help you with the answers. And when you finally get the bell.

460

00:52:59,000 --> 00:53:04,000

Now you don't have to let the tire buy and get you down. Go see B.F. Goodrich.

461

00:53:06,000 --> 00:53:10,000

At B.F. Goodrich, we speak your language. Straight talk.

462

00:53:11,000 --> 00:53:27,000

If you don't understand that for-plies-first-slide-miracle-tread business, try this, the B.F. Goodrich Tire Value Calculator. It takes the confusion out of tire buying. You feed it the facts about how you drive. Then spin the dial.

463

00:53:27,000 --> 00:53:33,000

And it comes up with the right B.F. Goodrich tire, the lowest price tire for your driving needs.

464

00:53:34,000 --> 00:53:41,000

Straight talk. How about it, typical American motorist? Ready for a little straight talk?

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00:53:46,000 --> 00:53:50,000

B.F. Goodrich. The straight talk tire people.

466

00:53:51,000 --> 00:54:10,000

What if one day we do actually establish radio communication with some other civilization out in the cosmos? The possibility cannot be dismissed. The prospect has captured the imaginations and stirred the emotions of scientists and laymen alike.

467

00:54:11,000 --> 00:54:31,000

One of the stunning questions raised by the possibility of life on other planets in other solar systems is this. If proved, what will it do to theology? Man has been inclined to conceive of himself as cast in an earthly but divine image of God or gods.

468

00:54:32,000 --> 00:54:51,000

What if God supervised the beginnings of other civilizations on other planets first? Do the Martians, if any, have their equivalent of Adam and Eve? Did somebody else out there discover long before Darwin the Darwinian theory of evolution?

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00:54:52,000 --> 00:55:05,000

These and countless other related religious questions, of course, must await the results of these new Christopher Columbus voyages of science through the solar system.

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00:55:06,000 --> 00:55:19,000

Dr. Morrison, for centuries, and really ever since man evolved on this planet, he thought of himself as being central, as being unique, as being the supreme representation of life.

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00:55:19,000 --> 00:55:35,000

Supposing we discover that this is not the case, we know we're not central, suppose we discover we're also not really as superior as other beings elsewhere. What is going to be the effect of this on our concept of our place in the universe and of ourselves?

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00:55:35,000 --> 00:55:48,000

Everyone who tries to think himself as having a view of the world and seeing his place in it, whatever his attitudes, will agree, I think, that above all, you have to be true.

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00:55:48,000 --> 00:56:01,000

If we want to find out if it turns out we have to adjust to this, certainly we can do so. I think we'll in some ways remove what must be an essential loneliness of this position, an arrogance, a sense of responsibility, which perhaps is not all ours.

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00:56:01,000 --> 00:56:30,000

Is it not true that, at least in the Western world, in the galactic community, as far as the Ural Mountains, Europe and North America, there's been a lengthy tradition of saying that all that is most valuable in the view of life, in the view of state, in the view of the individual, in the view of morality, a great deal of that comes, of course, from our religious development?

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00:56:30,000 --> 00:56:43,000

But an equally large, or almost equally large contribution, comes from the study of societies which are absolutely gone, with whom we never again communicate, the most important being the world of Greece.

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00:56:43,000 --> 00:56:56,000

The Greek playwrights, the Greek philosophers, the Greek historians and statesmen are their thought and what they did is on the lips and on the pens of most of the learned people in the world.

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00:56:56,000 --> 00:57:13,000

All we have is containing about 10 or 15,000 books, which is a small library easily held in a good-sized office. Those are all the Greek texts about everything that we will ever have, and yet scholars and students have gone over and over and over to those and they're terribly valuable.

478

00:57:13,000 --> 00:57:30,000

Now we've extended that in our time, because most of us are by studying other cultures with their rich traditions, the culture of the Orient, the cultures of the Orient, the cultures of America, old America, the cultures of West Africa and so on, each of which have big contributions and give us a lot of understanding, a lot of insight.

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00:57:30,000 --> 00:57:51,000

And I don't think we make a real human culture until we have all this fed in, and I think on top of that, enriching it by having the story equally complex and much longer, but in less detail, which we kind of think we'd have to have from some remote society, could do anything but add tremendous challenge and enrichment and satisfaction to those people.

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00:57:51,000 --> 00:58:07,000

Indeed, I think if I put myself into their place, that's the reason they would do it, because then it would be added to their libraries too. What our history has been, and that must be the only thing they can guess from science is the complexity of playwriting or histories of kings or folklore.

481

00:58:07,000 --> 00:58:19,000

You can get their general pattern, but the detail is too rich. You can easily show them mathematically. There's just too many possibilities. So I think that they will also be happy to have one more library coming into their signals, and that's what I'd like to say.

482

00:58:20,000 --> 00:58:21,000

Mr. Walder Sulliman.

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00:58:22,000 --> 00:58:28,000

What a wonderful planet is our world, and how far it may be to anything else like it.

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00:58:29,000 --> 00:58:48,000

We are reasonably believed there are other planets, blessed with our advantages, a kindly, stable parent star, a well-placed orbit, a suitable atmosphere, dry continents for advanced life forms, great seas within which their primitive ancestors evolved.

485

00:58:49,000 --> 00:59:05,000

But the fragile green hue of life appears only here and there on our planet, a scene from space. Its hold is tenuous. If inbred passions overcome reason, we can now render the planet uninhabitable.

486

00:59:06,000 --> 00:59:18,000

Is that the fate of all technological societies? It is up to us, on this wonderful world of ours, to prove that it is not so.

487

00:59:19,000 --> 00:59:26,000

We are not alone.

488

00:59:26,000 --> 00:59:39,000

Has been brought to you by B. F. Goodrich, the name that spells quality in tires, chemicals, plastics, footwear, products for homes, and for the rest of the world.

489

00:59:39,000 --> 00:59:59,000

This has been a presentation of ABC News.