

1

00:00:00,440 --> 00:00:10,436

This series presents information based in part on theory and conjecture.

2

00:00:10,436 --> 00:00:20,432

The producer's purpose is to suggest some possible explanations, but not necessarily the only ones to the mysteries we will examine.

3

00:00:20,432 --> 00:00:31,428

Oh, I am a computer. I've been programmed to tell you that your future isn't what it used to be, and there is mine.

4

00:00:31,428 --> 00:00:36,426

Mankind is entering a future of unlimited possibilities.

5

00:00:36,426 --> 00:00:42,424

Tomorrow's city is now being constructed in steel and concrete.

6

00:00:43,424 --> 00:00:49,421

Engineers work on a bold new space-age city in the middle of the Arizona desert.

7

00:00:49,421 --> 00:00:55,419

What we see may give us a glimpse of life in the 21st century.

8

00:00:55,419 --> 00:01:00,417

There are some who say future life isn't here at all.

9

00:01:00,417 --> 00:01:03,416

Then it exists somewhere in space.

10

00:01:03,416 --> 00:01:05,415

Is this tomorrow?

11

00:01:05,415 --> 00:01:10,413

Tomorrow?

12

00:01:10,413 --> 00:01:18,410

Man's curiosity has forever been the key to his survival, the drive to explore the unknown, his fate.

13

00:01:18,410 --> 00:01:24,408

His greatest discoveries have been the result of confronting his greatest fears.

14

00:01:24,408 --> 00:01:30,406

Of all the mysteries we confront, it is our future itself that remains the most elusive.

15

00:01:30,406 --> 00:01:37,403

What lies ahead is the question we pose to some of America's most prominent futurists.

16

00:01:37,403 --> 00:01:46,400

By the middle of the next century, I suspect that there may be literally millions of people every year moving out into space and back again quite routinely.

17

00:01:46,400 --> 00:01:56,396

I think that most of the existing diseases like cancer, heart disease and so forth will be either totally conquered or much diminished in frequency by the end of this century.

18

00:01:56,396 --> 00:02:03,393

The evolution of the computer is going to impact everything that we do, including even the evolution of man himself.

19

00:02:03,393 --> 00:02:16,388

I think science is becoming so powerful that the problem that will face us in the future is how to decide what we want, not how to decide what we can get.

20

00:02:16,388 --> 00:02:25,385

Today, prediction of the future is the full-time study of a specialized group called futurists, 20th century visionaries.

21

00:02:25,385 --> 00:02:32,382

The mysteries they probe may hold the key to not only the quality of our life, but to our very survival.

22

00:02:32,382 --> 00:02:37,380

If they are right, we may soon realize our wildest dreams.

23

00:02:37,380 --> 00:02:45,377

70 miles from Phoenix on a remote desert bluff, a daring step into the future has been taken.

24

00:02:45,377 --> 00:02:52,375

A prototype for space-age cities is under construction. It is called Arcosanti.

25

00:02:52,375 --> 00:02:58,372

When construction began 10 years ago, critics labeled it a utopian fantasy.

26

00:02:58,372 --> 00:03:04,370

Today, many see it as the genesis of an entirely new type of city.

27

00:03:04,370 --> 00:03:14,366

It is a city without streets, a city without cars, a nearly self-contained environment.

28

00:03:14,366 --> 00:03:20,364

Though only an experiment, the dream of Arcosanti has attracted worldwide attention,

29

00:03:20,364 --> 00:03:32,359

for few theories of the future are actually committed to concrete and steel.

30

00:03:32,359 --> 00:03:39,357

Its present population is comprised of an international community of engineers, architects and students

31

00:03:39,357 --> 00:03:45,355

who are convinced that Arcosanti holds the key to the future of city living.

32

00:03:45,355 --> 00:03:53,351

So convinced that they work under the blazing Arizona sun as unpaid volunteers.

33

00:03:53,351 --> 00:04:03,348

Though a folly to some, to these people, the city represents a chance to build the future around them.

34

00:04:03,348 --> 00:04:12,344

They are dedicated to the vision of one man, Maverick architect and philosopher Paolo Solari.

35

00:04:12,344 --> 00:04:21,341

The main relationship of Arcosanti to the environment is in terms of a very limited encroachment on environment

36

00:04:21,341 --> 00:04:27,339

because what we are doing in Arcosanti's substitute takes the place of what we might be doing in a suburban development

37

00:04:27,339 --> 00:04:33,336

that might take 20 square miles. That means the community has to have many levels.

38

00:04:33,336 --> 00:04:40,334

But through that kind of containment and miniaturization, the impact is going to be minimized on environment.

39

00:04:40,334 --> 00:04:46,331

In addition, the ability to use less resources is going to be also very important.

40

00:04:46,331 --> 00:04:53,329

So we are encouraging a notion of frugality, which is not just an individual commitment,

41

00:04:53,329 --> 00:04:59,326

but its commitment of the habitat itself to be frugal.

42

00:04:59,326 --> 00:05:10,322

The name Arcosanti comes from the word archaeology, a combination of architecture and ecology.

43

00:05:10,322 --> 00:05:18,319

One of the most daring goals will be to bring large scale agriculture to the heart of the city in the form of giant hot houses.

44

00:05:18,319 --> 00:05:22,318

A prototype of this system is operating in Massachusetts.

45

00:05:22,318 --> 00:05:28,315

This energy-regenerating hot house is the work of the new Alchemy Institute.

46

00:05:28,315 --> 00:05:31,314

Gary Hirschberg.

47

00:05:31,314 --> 00:05:37,312

This greenhouse is 100% solar heated in a climate that is really quite nasty.

48

00:05:37,312 --> 00:05:45,309

The heat that comes in here comes through the glazing and bounces off the back wall down into the ground, is absorbed by the ground,

49

00:05:45,309 --> 00:05:51,307

and some of it goes to the top of the room where it's either sent out doors if there's too much heat,

50

00:05:51,307 --> 00:05:59,304

or it's collected by a fan whose opening is up here, which takes the heat that has gone to the top of the building

51

00:05:59,304 --> 00:06:05,301

and pumps it into this big box here, which is filled with fist-sized rocks.

52

00:06:05,301 --> 00:06:11,299

And the hot air heats up the rocks, and then at night when the fan runs,

53

00:06:11,299 --> 00:06:20,296

it blows through the heated rocks and takes the heat from them and pumps it out through louvers across the plants and keeps them warm.

54

00:06:20,296 --> 00:06:25,294

The rest of the heat that comes in here is absorbed by the fish tanks.

55

00:06:25,294 --> 00:06:29,292

The fish tanks are green because they have algae in them.

56

00:06:29,292 --> 00:06:36,290

Algae is what the fish eat. Algae also absorbs solar heat, so the water gets slowly but surely hot.

57

00:06:36,290 --> 00:06:41,288

Not as hot as dishwater, but hot enough to keep the place warm at night when it's freezing.

58

00:06:41,288 --> 00:06:50,284

This combination of architecture and the agriculture and the aquaculture works together without using fossil fuel energy,

59

00:06:50,284 --> 00:06:58,281

and it makes the possibility of a greenhouse in this climate commercially viable idea again.

60

00:06:58,281 --> 00:07:04,279

These ideas have already been incorporated into the structures at Arcosanti.

61

00:07:05,279 --> 00:07:09,277

Yet despite the proven practicality of such innovative systems,

62

00:07:09,277 --> 00:07:14,275

futurists like Solari are often considered eccentric dreamers.

63

00:07:14,275 --> 00:07:19,273

Are he and his followers putting their hopes into a false future?

64

00:07:19,273 --> 00:07:28,270

The notion that I am a utopian or a dreamer, I think it's totally out of contest with my model of reality.

65

00:07:28,270 --> 00:07:38,266

I don't believe in the Garden of Eden, I don't believe in utopia, I don't believe in equity in terms of having it tomorrow.

66

00:07:38,266 --> 00:07:45,263

I don't believe that life is uneasy, gliding through few years and so on.

67

00:07:45,263 --> 00:07:49,262

So what we are doing here is something very hard to do, difficult to implement.

68

00:07:49,262 --> 00:07:56,259

We are absolutely knowledgeable of our limitations in terms of intellect, in terms of resources, in terms of skills.

69

00:07:56,259 --> 00:08:01,257

But we think that we have enough reasons for doing what we are doing to stay with it.

70

00:08:01,257 --> 00:08:04,256

But there is nothing utopian about Arcosanti.

71

00:08:04,256 --> 00:08:09,254

Utopia is nonsense. Utopia is for angels, we are not angels.

72

00:08:09,254 --> 00:08:14,252

Still, man has always had visions of a utopian society.

73

00:08:14,252 --> 00:08:20,250

How we build our future may now be the result of a remarkable machine.

74

00:08:21,250 --> 00:08:29,247

Hello, I am a computer. I am happy to give you a demonstration of the way I speak.

75

00:08:29,247 --> 00:08:36,244

Pretty good isn't it when you consider that English is not my native language?

76

00:08:36,244 --> 00:08:41,242

And I am still learning, so I will start even better.

77

00:08:41,242 --> 00:08:44,241

We have taught computers how to talk.

78

00:08:44,241 --> 00:08:48,239

Current research is developing computers that can think.

79

00:08:48,239 --> 00:08:52,238

Already, they serve as the crystal ball of our future.

80

00:08:52,238 --> 00:08:57,236

No tool will play a more important role in shaping our lives.

81

00:08:57,236 --> 00:09:04,233

With the computer, our imaginations will be able to explore at will.

82

00:09:04,233 --> 00:09:12,230

The children of today are growing up using computers as previous generations used pencils and books.

83

00:09:12,230 --> 00:09:19,228

As adults, these children will operate computers with unbelievable capacities.

84

00:09:19,228 --> 00:09:25,225

Computer expert Lou Crane speculates on where computer technology is heading.

85

00:09:25,225 --> 00:09:34,222

If we were to try to look just 50 years down the future, the impact of computers is going to be absolutely phenomenal.

86

00:09:34,222 --> 00:09:41,219

The evolution of computers is going to affect everything that we do, including even the evolution of man himself.

87

00:09:41,219 --> 00:09:45,218

Today's computers certainly cannot think.

88

00:09:45,218 --> 00:09:52,215

They can only perform pre-coded tasks in a precise one-step-at-a-time type technique.

89

00:09:52,215 --> 00:09:58,213

Basically, they are performing tasks at a tremendous rate, but they are not thinking.

90

00:09:58,213 --> 00:10:06,210

But down the road, I am sure that programs will be written that will allow computers literally to think.

91

00:10:06,210 --> 00:10:14,207

To be able to react to their environment, to change their environment, to program themselves.

92

00:10:14,207 --> 00:10:22,204

And this will be utterly necessary for a space probe, as an example.

93

00:10:22,204 --> 00:10:27,202

The extreme distances between solar systems require many years of travel.

94

00:10:27,202 --> 00:10:33,200

Though we rely on computers in space today, what if a computer could think?

95

00:10:33,200 --> 00:10:37,198

Space is by its very nature, the unknown.

96

00:10:37,198 --> 00:10:45,195

So there is no way that you can tell a computer how to respond to every situation, because you don't know every situation.

97

00:10:45,195 --> 00:10:52,192

So the computer has to be able to think for itself, has to be able to adapt to things that we can't even imagine.

98

00:10:52,192 --> 00:11:02,189

It may well be that the first contact between Earth and another planet will not be between a man and the other species.

99

00:11:02,189 --> 00:11:05,187

It will be between computer and the other species.

100

00:11:05,187 --> 00:11:11,185

Indeed, it may be between two computers, Earth's computer and their computer.

101

00:11:11,185 --> 00:11:13,184

We've never had anything like it.

102

00:11:13,184 --> 00:11:19,182

Dr. Marvin Minsky repeats itself, and when anything new happens, it's not really new.

103

00:11:19,182 --> 00:11:21,181

But I think the computer is really new.

104

00:11:21,181 --> 00:11:27,179

There's never been an intelligent artifact before.

105

00:11:27,179 --> 00:11:30,178

There's never been a box that could understand things.

106

00:11:30,178 --> 00:11:33,177

And computers can't understand anything yet, really.

107

00:11:33,177 --> 00:11:35,176

But they're getting there.

108

00:11:35,176 --> 00:11:40,174

And I think in the 21st century, we'll have something really new.

109

00:11:40,174 --> 00:11:44,173

Computer technology is our fastest growing science.

110

00:11:44,173 --> 00:11:50,170

In the imaginations of futurists, the possibilities are truly incredible.

111

00:11:50,170 --> 00:11:59,167

Maybe 45 years, possibly less, there will be a major evolutionary step, which will take place.

112

00:11:59,167 --> 00:12:03,165

Not only in computers, but in the evolution of man.

113

00:12:03,165 --> 00:12:13,162

It will be possible at that time, I believe, to have a computer, a small chip, surgically implanted in the brain of a person.

114

00:12:13,162 --> 00:12:18,160

Not unlike today's pacemaker or other touch device.

115

00:12:18,160 --> 00:12:21,159

And this chip will receive its power from the body.

116

00:12:21,159 --> 00:12:25,157

It will be a very, very capable computer.

117

00:12:25,157 --> 00:12:29,155

It will be man and machine working together.

118

00:12:29,155 --> 00:12:40,151

A person could, just by thinking about it, have at his disposal the equivalent of the entire contents of the Library of Congress or all of the works of Shakespeare.

119

00:12:40,151 --> 00:12:52,147

A scientist could, a doctor looking for a solution to a difficult problem, could have at his disposal all of the work done by all of the other scientists working on similar projects.

120

00:12:52,147 --> 00:12:59,144

The final result then is the most important step in the evolution of man in a million years or perhaps ever.

121

00:12:59,144 --> 00:13:02,143

It is really the beginning of a new species.

122

00:13:02,143 --> 00:13:06,141

The fact that you can get all...

123

00:13:06,141 --> 00:13:14,138

I now believe that we've located or identified the major genetic control area that regulates aging.

124

00:13:14,138 --> 00:13:23,135

And if in the future we can learn how to stimulate this or otherwise control it, we may be able to increase lifespan substantially.

125

00:13:23,135 --> 00:13:27,133

Dr. Roy Walford, professor of pathology at UCLA.

126

00:13:27,133 --> 00:13:39,129

Like other medical researchers, Dr. Walford is convinced that the great medical discoveries of the future will be the result of our ability to understand and manipulate our genetic code.

127

00:13:39,129 --> 00:13:47,126

These long strands called chromosomes are made up of over 50,000 units called genes.

128

00:13:47,126 --> 00:13:58,122

Acting as nature's computer, they're programmed with each of the body's characteristics, from the color of our eyes to our immunity to disease.

129

00:13:58,122 --> 00:14:09,117

If Dr. Walford is correct, then the location of the gene site that controls the aging mechanism may be within our grasp.

130

00:14:09,117 --> 00:14:11,117

We might enjoy...

131

00:14:11,117 --> 00:14:13,116

Dr. Edward Cornish.

132

00:14:13,116 --> 00:14:15,115

We could rejuvenate ourselves.

133

00:14:15,115 --> 00:14:19,114

Well, I think we also could experience stronger bodies.

134

00:14:19,114 --> 00:14:21,113

We could be more intelligent.

135

00:14:21,113 --> 00:14:24,112

We might be more beautiful than we are now.

136

00:14:24,112 --> 00:14:28,110

And I think that all these things are technologically feasible.

137

00:14:28,110 --> 00:14:42,105

Now, that does not mean we have the technology to do all that today, but you can easily see by

relatively modest projections of what's happening in medical technology that in the 21st century a lot of this would really become possible.

138

00:14:42,105 --> 00:14:50,102

Genetics research has produced amazing results. Some of the secrets have already been revealed.

139

00:14:51,102 --> 00:15:00,098

We are at the point now where we can perform minor cell surgery and even inject healthy genes into diseased tissue.

140

00:15:02,097 --> 00:15:09,095

Perhaps the most promising technique for gene manipulation lies in the area of electrical stimulation.

141

00:15:09,095 --> 00:15:16,092

As the experiments continue, scientists may learn to stimulate the genes that control our aging.

142

00:15:16,092 --> 00:15:19,091

What will it mean to live longer?

143

00:15:21,090 --> 00:15:31,086

If people begin living to be 120, 150, or 180, you'll have many unforeseen and, in my view, positive social effects.

144

00:15:31,086 --> 00:15:42,082

For example, if you increase lifespan by decelerating the rate of aging, then one, all of the diseases of aging are postponed to a much later age.

145

00:15:42,082 --> 00:15:52,078

So that cancer, heart disease, stroke, and so forth, instead of occurring as they do now at about the age 65, will be occurring at the age 130, 140.

146

00:15:52,078 --> 00:16:01,075

So by decelerating the rate of aging, you, in effect, cure all of these diseases at one stroke for the age group at which they now occur.

147

00:16:01,075 --> 00:16:07,073

They don't have many sociological effects that I don't think we can realize right now.

148

00:16:07,073 --> 00:16:10,072

People will be into having multiple careers.

149

00:16:10,072 --> 00:16:20,068

They spend 20 or 30 years in a present career and have to be reeducated through a revamped, retooled educational system to go on to other careers.

150

00:16:20,068 --> 00:16:23,067

A lot of people would choose to do that now.

151

00:16:23,067 --> 00:16:33,063

Women, for example, if you extend lifespan, you also extend the childbearing age so that it could be quite feasible then to be having children when you're 60, 70, or 80,

152

00:16:33,063 --> 00:16:38,061

which means that the women could have a whole career before they get into raising the family if they want to do that.

153

00:16:38,061 --> 00:16:44,059

They don't have to make that hard choice that a lot of career women are faced with in present society.

154

00:16:44,059 --> 00:16:51,056

How old would people be if we could stop the aging process entirely? How long would people live?

155

00:16:51,056 --> 00:16:58,053

The answer is about 600 years. If you keep the accident rate the same, if you still think about a survival curve,

156

00:16:58,053 --> 00:17:05,051

if you keep the accident rate the same as it is today but stop everybody from aging and cure all diseases,

157

00:17:05,051 --> 00:17:12,048

then the maximum lifespan would be about 600 years. Some kind of an accident would get you by that time.

158

00:17:12,048 --> 00:17:20,045

The medical and technological advances of the 21st century will greatly increase our mental and physical capabilities.

159

00:17:20,045 --> 00:17:22,044

Where will we take them?

160

00:17:22,044 --> 00:17:24,043

Run. Fire.

161

00:17:28,042 --> 00:17:30,041

Run!

162

00:17:30,041 --> 00:17:32,040

Run!

163

00:17:32,040 --> 00:17:34,040

Run!

164

00:17:34,040 --> 00:17:36,039

Run!

165

00:17:36,039 --> 00:17:38,038

Run!

166

00:17:38,038 --> 00:17:40,037

Run!

167

00:17:40,037 --> 00:17:42,037

Run!

168

00:17:42,037 --> 00:17:44,036

Run!

169

00:17:44,036 --> 00:17:46,035

Run!

170

00:17:46,035 --> 00:17:48,034

Run!

171

00:17:48,034 --> 00:17:54,032

We have already taken our first tentative steps into outer space.

172

00:17:54,032 --> 00:17:59,030

Slowly we are learning how to adapt to this entirely new environment.

173

00:17:59,030 --> 00:18:09,026

Our concept of the universe is changing. As it does, our concept of ourselves and our place in the universe is also changing.

174

00:18:09,026 --> 00:18:11,026

Run!

175

00:18:11,026 --> 00:18:13,025

Run!

176

00:18:13,025 --> 00:18:15,024

Run!

177

00:18:15,024 --> 00:18:17,023

Run!

178

00:18:17,023 --> 00:18:23,021

We must see current space explorations as more than just another new technology,

179

00:18:23,021 --> 00:18:27,019

rather a natural expression of our survival instinct.

180

00:18:27,019 --> 00:18:33,017

The colonization of outer space will ensure the survival of the human species.

181

00:18:33,017 --> 00:18:38,015

Today we are rehearsing the construction of colonies in space.

182

00:18:38,015 --> 00:18:44,013

These underwater tanks at NASA labs, the problems of construction in a weightless environment,

183

00:18:44,013 --> 00:18:52,010

are anticipated and resolved before the work actually begins.

184

00:18:52,010 --> 00:18:59,007

Some of the techniques discovered here have already been put into practical use by our astronauts.

185

00:18:59,007 --> 00:19:06,005

One of the things that I spend some time on is working on new ways of getting off the planet.

186

00:19:06,005 --> 00:19:14,002

Friends of mine and I are working on a new way to launch very heavy loads into space cheaply.

187

00:19:14,002 --> 00:19:22,998

And I believe that if we can get these things to work, then it's practical to build houses, cities in space.

188

00:19:23,998 --> 00:19:36,993

In a lab at Princeton University, a working scale model of the machine that could solve some of the problems of large scale space construction has been developed.

189

00:19:36,993 --> 00:19:39,992

It is called a mass driver.

190

00:19:39,992 --> 00:19:43,990

Futurist Dr. Gerardo Neal of the Space Studies Institute.

191

00:19:43,990 --> 00:19:46,989

This is the bucket of a mass driver electric motor.

192

00:19:46,989 --> 00:19:59,984

The bucket carries a payload of lunar material and it's accelerated by these magnetic coils with an acceleration that's more than 100 times as fast as the hottest drag racer ever made.

193

00:19:59,984 --> 00:20:10,980

When the bucket and its payload get to the full speed of 8,000 miles per hour, the payload is released and goes out into space and the bucket is recirculated for reuse.

194

00:20:11,980 --> 00:20:19,977

So if you were to look at a mass driver in operation, you'd see that stream of payloads like water coming out of a fire hose off into space.

195

00:20:19,977 --> 00:20:21,976

And this is how it works.

196

00:20:28,973 --> 00:20:35,970

We can use the mass driver as a catapult to bring thousands of tons per year of lunar material into space.

197

00:20:35,970 --> 00:20:50,965

There we can process it using solar energy into oxygen that we can breathe into silicon that we can make into solar cells and into big structures, space industries, space power stations or space colonies.

198

00:20:50,965 --> 00:20:59,961

Industries and colonies in space may sound incredible, but we who are working toward them know that most of the building blocks are already in place.

199

00:20:59,961 --> 00:21:06,959

For less than the investment in the Alaskan pipeline, we could make these things happen before the year 2000.

200

00:21:07,958 --> 00:21:17,955

The future holds many possibilities. With the technologies available to us, what that future will be is now a matter of choice.

201

00:21:18,954 --> 00:21:30,950

If our destiny lies in outer space, it may be as philosopher Eric Hoffer stated, man is a stranger on this planet.

202

00:21:30,950 --> 00:21:40,946

The seed of man originated amongst the stars. Does this explain our preoccupation with the heavens, the stars and the gods?

203

00:21:48,943 --> 00:21:57,939

Coming up next on FBI The Untold Stories, agents take on a Cleveland bank robber who's threatening to blow up his hostages.

204

00:21:57,939 --> 00:22:06,936

Then on history's crimes and trials, the movie turned them into romantic heroes, but this is the real story of cold blooded killers, body and Clyde.

205

00:22:06,936 --> 00:22:14,933

And later tonight, hex factor week gets off to a spooky start on history's mysteries with a look at the origins of our common superstitions.

206

00:22:14,933 --> 00:22:18,931

At 8, here on the History Channel, where the past comes alive.