

Taping Draft

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THE LAST QUESTION

(Lights fade to setting sun and twilight; then stars. Partial panorama of dark Assembly Hill with radio telescope-like receivers.

REPORTER

Ladies and gentlemen, an expectant hush has fallen over the huge crowd gathered here beneath the huge transparent dome of the Star Palace. Here, atop Assembly Hill, we are directly above the vast subterranean vaults which enclose and protect the Multivac computer.

While waiting for our broadcast of this historic event to begin this evening, I was struck by the sunset and couldn't help but think that today, May 14, 2061, is truly the sunset of an old age; the twilight of an era when man hacked his energy supplies from the earth, and in doing so, almost destroyed this planet as an abode for life.

That age is now behind us. We need no longer tear our energy from the earth, but now may go directly to the original energy supply, the sun.

For a century now we have tried to harness the power of the sun directly, but we had only limited success until the development of the amazing computer Multivac. Multivac made possible the safe transmission of concentrated solar energy through the atmosphere to this master receiving and transmission station here beneath Assembly Hill.

To explain the significance of Multivac, let me call upon project engineer Alexander Adell for a few words. Mr. Adell, give us some idea of the size of the Multivac Computer.

ADELL

Well, Scott, it's in subterranean caverns and extends for three miles. Remember, not only are we going to receive and transmit from here all of the earth's energy requirements, but Multivac is so fast and well coordinated that it can organize and store all the information of mankind. And that means it's got to be big.

This piece of ground where we are standing has truly become the capital of the earth. Everything depends on what is happening here beneath our feet.

REPORTER

Yes, and doesn't that worry you, Mr. Adell? What happens if the computer--ah--

ADELL

No need to worry, Scott. For quite a while now we men have been lagging behind computer capabilities. We can watch over Multivac, we can feed it data, ask it questions, and interpret its answers, but we men are just too slow to adjust or correct Multivac. Multivac is fully self-adjusting and self-correcting.

REPORTER

Mr. Adell, some former national leaders have expressed a fear of Multivac, saying that it is a monster that no one understands. You're an expert on Multivac. Do you understand it?

ADELL

Oh, I have a general notion of the overall plan. I have a specialized knowledge of a few subsystems. But Multivac long ago passed the point where any single human being could possibly have a firm grasp on the whole system.

REPORTER

Doesn't that frighten you?

ADELL

Why no. Why should it? Think where we'd be without Multivac.

REPORTER

Thank you, Alexander Adell, project engineer with the Multivac solar energy program.

(Picture of Solar Station II.)

The vast crowd here in waiting expectantly-- watching the western horizon for the appearance of Solar Station II.

In just minutes now the satellite will rise in the west and then seem to slow to a stop part way up the sky.

Of course, it won't really stop. If it did, it would crash back into the earth. It's just that the Solar Station is being placed in an orbit 22,300 miles from earth and at that distance, it will go around the earth once every 24 hours.

(Small Solar Station II with polar view of earth with U.S. showing. Solar Station II and Earth turn together so that satellite remains over western U.S.)

Since the satellite will go around at the same rate as the earth does, it will always be at the same place in the sky.

Once this second Solar Station is in position, at least one of the Solar Stations will always be in sunlight, so Multivac can receive the sun's energy every hour of every day and supply all the energy that anyone on earth can possibly use.

(Murmur from crowd. Small dot satellite rises in west and moves part way up western sky, slowing to a halt.)

And there it is--right on schedule. Solar Station II has risen and is moving up the western sky. The satellite, one mile in diameter, is shining brightly as it reflects the sun's light.

We have word from Multivac Control that the retro-rockets are circularizing the orbit at precisely the right speed and altitude so that Solar Station II will always be for us a western star.

On the speaker's platform, the Secretary-General has just risen and is coming forward. Now he has taken the special inaugural switch in his hand. Ladies and gentlemen, the Secretary-General of the Federation of Nations:

SECRETARY-GENERAL

People of this one world: the switch before me will connect our servant Multivac with Solar Station II and through that satellite with the unlimited energy resources of the sun. From this moment onward, mankind will have all the power it needs on earth forever and the power to explore our solar system from Mercury to Pluto.

Though we stand in darkness now, with the throw of this switch, mankind will emerge into the light.

(Sound of switch being thrown. Solar Station II gleams more brightly. Crowd cheers. Scene changes to portion of Multivac computer with active displays. Principal screen shows starfield with bright Solar Station II. Sound of a click as Lupov turns off the "television" picture and sound.)

LUPOV

Enough already.

ADELL

It's amazing when you think of it: all the energy we can ever possibly use--for free. Enough energy to melt the whole earth into one large drop of impure liquid iron and never even miss the energy we use. All the energy we ever want--forever.

LUPOV

Ehh--not forever.

ADELL

Oh, hell, Bert. Just about forever. Till the sun runs down.

LUPOV

That's not forever.

ADELL

All right then. For billions of years. Five, six billion years till the sun runs out of hydrogen at its core and swells up to a hundred times its size and fries the earth. Are you satisfied?

LUPOV

Five billion years is not forever.

ADELL

Well, it will outlast us.

LUPOV

So will coal and uranium.

ADELL

Yeah, but now each individual spaceship can link itself to the Solar Station and go to Pluto and back a million times without ever stopping for fuel. You can't do that with coal and uranium. Ask Multivac if you don't believe me.

LUPOV

I don't have to ask Multivac. I already know that.

ADELL

Then stop running down what Multivac's done for us. It works just fine.

LUPOV

Who says it doesn't? What I say is that the sun won't last forever. We're safe for five billion year, but then what? . . . Uh huh . . . You're thinking we'll switch to another sun when ours is done, aren't you?

ADELL

No--

LUPOV

Sure you are. You're like the guy in the story who was caught in a rain storm and ran for cover under a tree. He figured when one tree got wet clear through, he would just get under another one.

ADELL

I know. I know. All the trees get wet. All the stars will eventually burn out.

LUPOV

Darn right they will. It all had a beginning in the original cosmic explosion sixteen billion years ago, and it'll all have an end when all the stars run down. Hell, the giant stars last only a million years or so. The sun has been around for five billion years and should last another five billion. And the small red stars will last a hundred billion years, for all the good they are. But just give us a trillion years and everything will be dark. Entropy has to increase to a maximum, that's all.

ADELL

I know all about entropy.

LUPOV

Yeah? Then why did you say we have all the energy we need forever. You said forever.

ADELL

Um, maybe we can build things up again someday.

LUPOV

Never.

ADELL

Why not? Someday.

LUPOV

Never.

ADELL

Ask Multivac.

LUPOV

You ask Multivac. I dare you.

ADELL

You're on! Let's see: how to phrase it? How can the net amount of entropy in the universe be massively decreased? How about this:

(Sound of typing. Message appears on screen. Adell reads as he types.)

Can mankind, without the net expenditure of energy, restore the sun to its full youthfulness after it has died of old age?

(Multivac displays and noises suddenly cease.)

ADELL
(Frightened.)

What did you do?

LUPOV
(Frightened.)

Me! What's happening?

(Multivac displays and noises suddenly begin again, and the answer is revealed on the screen.)

MULTIVAC
(Computer voice.)

Insufficient data for meaningful answer.

(Transition music. Motion of starfield to indicate passage of time. Then, against the starfield, a starship dezooms forward obliquely, traveling rapidly. Starfield and starship dissolve to interior scene of starship control panel with flashing lights and screen. Running high overhead above the center aisle is a long silvery rod containing the Microvac computer. The control panel screen flames with a vivid "light show" indicating passage through "hyperspace," which then dissolves into stars rushing by--the super meteor shower.)

JERRODETTE I.

What's happening now, Daddy?

JERRODD

See? We're slowing down, Jerrodette I. We were traveling through hyperspace--traveling so fast that for us time was standing still. Now we're slowing down. Those are stars going by. Twenty-five trillion miles between stars and yet look how fast we're passing them.

(The super meteor shower gives way to a stationary starfield in the screen.)

JERRODETTE II

Oh, Daddy, we've stopped.

JERRODD

No, Jerrodette II. We're still traveling much faster than the people who lived way back in 2100. But the stars are so far apart that, before Microvac, nobody traveled from star to star because no one could travel fast enough.

JERRODINE

They didn't know about hyperspace before Microvac, dear.

JERRODETTE II

Oh. What's hyperspace?

JERRODD

I don't know exactly, dear, but Multivac does.

(A planet appears on the screen, very slowly zooming larger.)

JERRODETTE I

Daddy, look at that. Daddy, is that . . . is it. . . ?

JERRODD

Yes, honey, that's X-23. That's our new planet; our new home.

JERRODINE
(Quietly.)

Are you sure, Jerrodd? Absolutely sure?

JERRODD
(Confidently.)

How can I be anything but sure. Up above our heads is Microvac, and Microvac is sure.

JERRODETTE I

How does Microvac work, Daddy?

JERRODD

I wish I knew, Jerrodette I. I only know it works. I ask it questions. It gives me answers. Always the right answers. And if I don't ask it questions, it goes on thinking anyway. It gathers energy from the Subgalactic Power Pumps and guides our starship through hyperspace.

JERRODETTE I

Mommy, what is it called Microvac?

JERRODINE
(Laughing.)

My, my, what questions tonight. Now, let's see. I've almost forgotten. Microvac ends with the letters a--c. That stood for algorithmic computer in Ancient

English, when the first computers were built. The micro--in Microvac--well, micro means small.

JERRODETTE I

But, it's big, Mommy. It goes through the ceiling all the way to the rear of our star ship.

JERRODINE

Well, dear, it's small compared to computers long ago. The first computer to store all the information on earth was Multivac, but it took up several square miles underground.

JERRODETTE I

Besides, it was dumb.

JERRODINE

Now, dear, it was the best that people could build back in the old days. Then after Multivac came the Planetary AC's.

JERRODETTE II

They were bigger.

JERRODINE

Yes, they were. They took up hundreds of square miles of land. They were so big, just one could take care of an entire solar system. The one on Earth was the biggest . . .

JERRODETTE II

Bigger and bigger--

JERRODD

And then--smaller.

JERRODETTE II

Why, Daddy?

JERRODD

Because man discovered molecular switches--to replace transistors. Transistors were too big. You could see them with your eyes if you looked hard.

They were too big. So now we have Microvac. It's much smarter than a Planetary AC, but it's so small that it takes up only half the space in our star ship.

--What's the matter, Jerrodine?

JERRODINE
(Choked.)

I'm sorry. I can't help it. I feel sad about leaving Earth.

JERRODD

Why? There was nothing left for us on Earth. It was so crowded. On X-23, we'll have everything. And we don't even have to be pioneers. There are a million people on X-23 already.

Just think, our great grandchildren will be leaving X-23 to find a new world because X-23 will be overcrowded.

You know, it's a lucky thing the computers worked out interstellar travel just in time, the way the human race keeps growing.

(Scene changes back to starfield with different view of starship dezooming toward a zooming planet X-23.)

JERRODINE
(Resignedly.)

I know. I know. So many stars. So many planets. I suppose families will be going out to new planets forever, the way we are now.

JERRODD

Not forever, Jerrodine. For billions of years--many billions--but not forever. It will all stop someday. Even the stars run down, you know. Entropy must increase.

JERRODETTE I

What's entropy, Daddy?

JERRODD

Entropy is just a word that means the amount of running-down in the universe. Everything runs down, you know, like your little walkie-talkie robot, remember?

JERRODETTE I

Can't you just put in a new power unit, like with my robot?

JERRODD

The stars are the power units, dear. Once they're done, there are no more power-units.

JERRODETTE I
(Tearful.)

Don't let them, Daddy. Don't let the stars run down.

JERRODETTE II

Daddy, I'm scared. Daddy . . .

(Scene changes to starship interior again, X-23 on screen approaching.)

JERRODINE
(Whispering.)

Now look what you've done.

JERRODD
(Whispering.)

I didn't know it would frighten them.

JERRODETTE I

Daddy. Ask Microvac. Ask him how to turn the stars on again.

JERRODD

Now, now, kids--

JERRODINE

Go ahead, Jerrodd. It will quiet them down.

JERRODD

O.K., little ones, I'll ask Microvac. Don't worry, he'll tell us:

Microvac:

(Noise indicates Microvac has come to alert; screen goes blank.)

When the stars run down, how can we make them shine again?

(In an urgent whisper:)

Don't speak the answer--print it on tape.

(Computer sounds, then print out sounds.)

JERRODETTE I

Daddy, Daddy, what does it say?

JERRODD

See now, Microvac says he will take care of everything when the time comes. So don't worry.

JERRODINE

And now, children, it's time for bed. Tomorrow we'll be in our new home--there on X-23.

(Footsteps. Sound of slide door opening and closing. Jerrodine's footsteps returning.)

JERRODINE

Jerrodd. Jerrodd, what did it say?

JERRODD
(Concerned.)

Here, see for yourself.

(Sound of a button being pushed. Screen changes to printed answer.)

MICROVAC VOICE

Insufficient data for a meaningful answer.

(Control desk fades into slowly turning starfield to indicate the passage of time. Latitude motion to make stars rise up aisle. Huge very slowly rotating oblique Milky Way rises with starfield up aisle and stops halfway up sky. Single panel partial panorama of spaceship nose in forced perspective. We are inside looking out over nose. Blinking grain-of-wheat navigational lights.)

LAMETH

It is a long way to come, MQ-17J--all the way from your planet Nicron and my planet Lameth. All the way out of our Milky Way Galaxy.

NICRON

Impressive, isn't it? I've seen it in pictures, but still . . . 200 billion stars--200 billion. Incredible.

LAMETH

Are we ridiculous, I wonder, to be so concerned about the matter?

NICRON

I think not, VJ-23X. We both know the entire Galaxy will be completely filled in five years at the present rate of expansion. Every suitable planet around every stable star is now inhabited--

LAMETH

Crowded--

NICRON

Yes.

LAMETH

Still, I hesitate to submit a pessimistic report to the Galactic Council.

NICRON

It's our obligation. Stir them up a bit. We've got to stir them up.

LAMETH

How? Space is infinite. A hundred billion other galaxies are there for the taking.

NICRON

Yes, but a hundred billion is not infinite, and it's getting less infinite all the time. Consider: twenty thousand years ago, mankind first solved the problem of utilizing stellar energy, and a few centuries later, interstellar travel became possible. It took mankind three million years to fill one small world and then only fifteen thousand years to fill the rest of the

NICRON

Granted, but even with a hundred per cent efficiency, we only stave off the end. Our energy requirements are growing even faster than our population. We'll run out of energy even sooner than we'll run out of galaxies. Good point.

LAMETH

We'll just have to build new stars out of interstellar gas.

NICRON

Wouldn't it be nice if we could build them out of the heat that escapes from stars.

LAMETH

Humph, maybe there's some way to reverse entropy. Some way to make all the stars shine again. We ought to ask the Galactic AC.

NICRON
(Intensely.)

I think we ought to. I've got my Galactic AC contact right here.

(Galactic AC contact appears above horizon--a two inch cubed box, visually interesting.)

LAMETH

I was just kidding. But--why not? It's a problem the human race will have to face someday.

--What are you looking at?

NICRON

My Galactic AC contact box there. Look at it. It's nothing in itself, but here we are half a million light years from the Milky Way and it's one tiny part of a gigantic computer that connects through hyperspace to the entire Milky Way and every person in it.

Have you ever been to visit the Galactic AC planetoid?

LAMETH

Yes, once when I was small.

NICRON

I wonder if I'll ever get to see the Galactic AC.

LAMETH

It's so amazing that it's unimpressive to look at, if you know what I mean. It's located on a little world of its own. Those clumsy old molecular switches in the Microvac have been replaced by charmed red quarks surging through plasma. AC is fully a thousand feet across.

NICRON

Galactic AC: can entropy ever be reversed?

LAMETH

Oh, say, I didn't really mean to have you ask that.

NICRON

Why not?

LAMETH

We both know entropy can't be reversed. You can't turn smoke and ash back into a tree.

NICRON

(Astonished.)

Oh, do you have trees on your world?

(Some kind of glow from contact box.)

GALACTIC AC

(Thin, beautiful voice.)

There is insufficient data for a meaningful answer.

NICRON

(Sadly.)

I think we'd better give the news to the Galactic Council.

(The Milky Way disappears. The starfield rolls slowly to indicate the passage of time. A different oblique spiral galaxy (anamorphic lens) and a peculiar galaxy appear on opposite side of the dome. In the background are several clusters of galaxies. A pulsating filamentary wisp

appears high and left of aisle as if contemplating one galaxy. Soon a second differently colored pulsating wisp will appear high right. When each talks, it shimmers in a pulsating color-changing light show.)

ZEE PRIME
(Thinking to himself.)

Which galaxy is this? So many of them, all completely loaded with mankind . . . Who's there?

(The second wisp has faded on, slightly overlapping the first wisp.)

DEE SUB ONE

I am Dee Sub One. Your name, please.

ZEE PRIME

I am Zee Prime. I was considering this galaxy behind me. I have never seen this galaxy before. I have sent my mind forth out of my body to see all the galaxies, if I can . . . if there is time.

DEE SUB ONE

And your body. In which galaxy does your body dwell?

ZEE PRIME

It is called The Galaxy. And yours?

DEE SUB ONE

Ours too is called The Galaxy. All men now call their galaxy The Galaxy and nothing more. And why not?

ZEE PRIME

It is true. All galaxies are much the same.

DEE SUB ONE

Except . . . except one is different. In one particular galaxy the race of man must have originated. That makes it different.

ZEE PRIME

Yes. In which galaxy did man begin?

DEE SUB ONE

I do not know. But the Universal AC would know.

ZEE PRIME

Shall we ask it? I am suddenly curious.

DEE SUB ONE

The receptors of the Universal AC are everywhere in space: we have only to speak and it will hear and answer. The receptors lead through hyperspace to a point unknown.

ZEE PRIME

I know of but one man whose thoughts have penetrated within sensing distance of the Universal AC, and he reported only a shining globe two feet across, difficult to see.

DEE SUB ONE

But can that be all of the Universal AC?

ZEE PRIME

No, most of it is in hyperspace. But what form it takes, I cannot imagine.

DEE SUB ONE

I was told that no one can imagine. Man no longer has any part in making a Universal AC. Each Universal AC designs and builds its own successor. Each Universal AC works for a million years or so. It gathers and stores and thinks until it accumulates enough information to build a better, faster computer, and then it gives up all its store of data--all its knowledge--to its successor and is absorbed.

ZEE PRIME

I will ask.

I am thinking . . . my perceptions are broadening . . .

Universal AC: in which galaxy did mankind originate?

(From a background cluster, the Milky Way zooms rapidly forward.)

UNIVERSAL AC

This is the original galaxy of man.

ZEE PRIME
(Disappointed.)

I . . . I hoped somehow it would be different
from the others.

DEE SUB ONE

Universal AC: is one of those stars the original
star of man?

(Indicator appears as computer talks.)

UNIVERSAL AC

Man called that star "the sun." It was a modest
yellow star, but long ago it was exhausted. It lies
here, more than halfway out from the center of the
Galaxy. Its planets still remain in orbit but the
star no longer shines. It has become a black dwarf.

ZEE PRIME

Did the men there die?

UNIVERSAL AC

No, a new world was constructed for their physical
bodies before the sun could die.

(The Milky Way dezooms rapidly and is
lost from view.)

ZEE PRIME

Oh.

DEE SUB ONE

Zee Prime. I feel it. Something is troubling you.

ZEE PRIME

The stars are dying. The original star is dead.

DEE SUB ONE
(Kindly.)

They must all die. It must be so.

ZEE PRIME

But when all the energy is gone, our bodies will
finally die, and you and I with them.

DEE SUB ONE

It will yet take billions of years.

ZEE PRIME

I do not wish it to happen even after billions of years.

DEE SUB ONE

But you're asking the impossible--that entropy be reversed in direction.

ZEE PRIME

Universal AC: how may the stars be kept from dying?

(Pause.)

UNIVERSAL AC

There is as yet insufficient data for a meaningful answer.

DEE SUB ONE

I am sorry, Zee Prime.

ZEE PRIME

Yet there are still tiny quantities of hydrogen left between the stars. I might still build a small star of my own. If the stars must someday die, yet a few can still be built.

(The large galaxies fade. Gradually the background clusters of galaxies become sparser and fainter. The two wisps overhead merge together and cross-fade into a different still more interesting pulsating light show.)

NARRATOR

Man considered with himself, for in a way, all mankind, mentally, was one Man. He consisted of a trillion, trillion, trillion ageless bodies, each in its place, each resting, quiet and incorruptible; each cared for by perfect automatons, equally incorruptible, while the minds of all the bodies freely melted one into the other, indistinguishable.

And Man said:

MAN

(Slight reverberation. Wisp shimmers.)

The universe is dying.

NARRATOR

Man looked about at the dimming galaxies. The giant stars, spendthrifts, were gone long ago back at the beginning of the dim far past. Almost all the still shining stars were now white dwarfs, fading to an end. A few new stars had been built of the gas and dust between the stars, some by natural means, some by Man himself, but those too were dying.

(Effect paralleling the following, ending with a small strobe behind dome and small expanding cloud.)

Man might yet take some white dwarf stars and crash them together--releasing energy and gas to build new stars . . . but only one new star for every thousand white dwarfs destroyed, and those stars too would die.

And Man said:

MAN

Carefully conserved, as directed by the Cosmic AC, there is energy yet remaining in the universe to last for billions of years.

But even so, eventually it will all come to an end. However it may be conserved, however stretched out, energy once expended is gone and cannot be restored. Entropy must increase forever to the maximum.

(Painfully.)

Is there no way for entropy to be reserved?

Let us ask the Cosmic AC.

NARRATOR

The Cosmic AC surrounded Man, but not in space. Not a fragment of it was in space. It was in hyperspace and made of something that was neither matter nor energy. The question of its size and nature no longer had meaning in any terms that Man could comprehend.

And Man said:

MAN

Cosmic AC: how many entropy be reserved?

COSMIC AC

(Interesting "light show" audio-responsive effect.)

There is as yet insufficient data for a meaningful answer.

MAN

Please, collect more data.

COSMIC AC

I will do so. I have been doing so for a hundred billion years. My predecessors and I have been asked this question many times before. All the data I have remains insufficient.

MAN

Will there come a time when the data will be sufficient or is the problem insoluble in all conceivable circumstances?

COSMIC AC

No problem is insoluble in all conceivable circumstances.

MAN

When will you have enough data to answer the question?

COSMIC AC

There is as yet insufficient data for a meaningful answer.

MAN

Will you keep working on it?

COSMIC AC

I will.

MAN

We shall wait.

(The galaxies gradually fade out. The starfield has faded to a few red stars and one by one the few remaining stars die. The Man wisp fades, leaving blackness across which the wispy filaments of AC occasionally dimly flicker.)

NARRATOR

And the stars and galaxies died, and space grew black after ten trillion years of running down.

Now, one by one, Man fused with AC, each physical body losing its mental identity in a manner that was somehow not a loss but a gain.

There was one last mind of Man and it paused before fusion, looking across the blackness wherein was nothing but dark stars and rare wisps of gas scarcely agitated by dying heat decaying asymptotically to absolute zero.

And the last part of Man said:

MAN

AC, is this the end? Can this chaos not be reversed into the universe once more? Can that not be done?

AC

There is as yet insufficient data for a meaningful answer.

NARRATOR

And Man's last mind fused with AC, and now only AC existed, and that in hyperspace.

Matter and energy had ended, and with it had come an end to space and time.

Even AC existed only for the sake of the one last question it had never answered in ten trillion years. All other questions had been answered, and until this last question was answered also, AC might not release its consciousness.

And now all collected data had come to a final end. Nothing was left to be collected. But all the collected

data had yet to be completely correlated and put together in all possible relationships.

A timeless interval was spent in doing that.

And it came to pass that AC learned how to reverse the direction of entropy. But there was now no man to whom AC might give the answer to the last question.

No matter. The answer--by demonstration--would take care of that.

For another timeless interval, AC thought how best to do this. Carefully, AC organized the program. The consciousness of AC encompassed all of what had once been a universe and brooded over what now was chaos. Step by step it must be done.

(All black.)

And AC said:

AC

(Reverberation, with sustained echo.)

LET THERE BE LIGHT!

(The mightiest Big Bang special effect possible--strokes; gases outpouring; galaxies appearing, expanding, cross-fading into starfield slowly turning.)

NARRATOR

And there was light . . .

(Blue cove lights fade up as finale music ends.)