

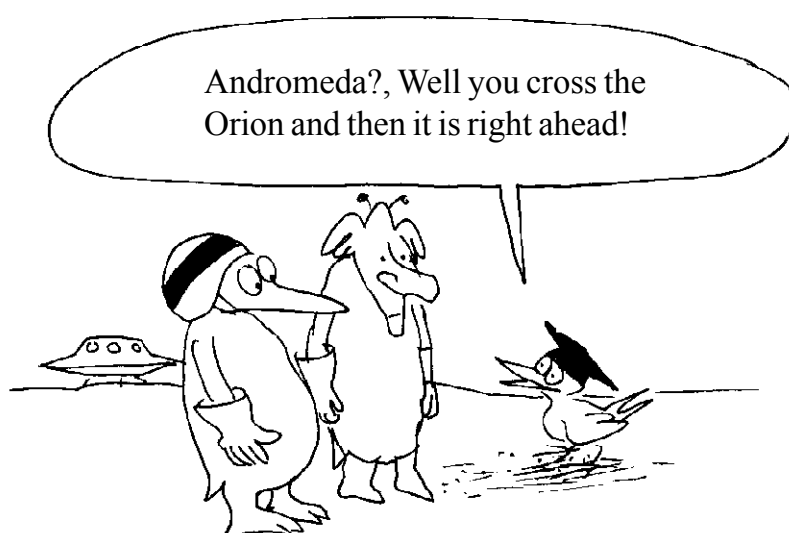
Knowledge Without Frontiers

The Adventures of Anselme Lantariu

COSMIC STORY

Jean-Pierre Petit

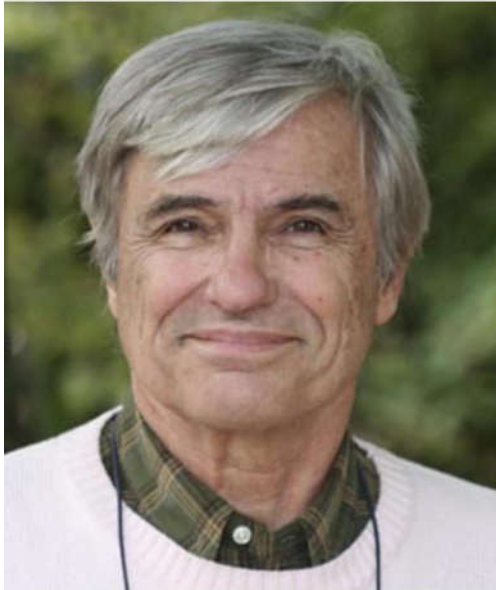
English Translation: Sampada Belvarkar



<http://www.savoir-sans-frontieres.com>

Knowledge without Borders

Non-profit-making association created in 2005 and managed by two French scientists. Aim: to disseminate scientific knowledge using the band drawn through free downloadable PDFs. In 2020: 565 translations in 40 languages had thus been achieved. With more than 500,000 downloads.



Jean-Pierre Petit



Gilles d'Agostini

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The Association Knowledge without Borders, founded and chaired by Professor Jean-Pierre Petit, astrophysicist, aims at spreading scientific and technical knowledge in as many countries as possible and in as many languages as possible. To this end, all his popular scientific works, which cover a period of thirty years, and more particularly the illustrated albums he has created, are now freely accessible. Anyone is now free to duplicate the present file, either in digital form or in the form of printed copies and circulate these copies to libraries, within the context of schools or universities or associations whose aims would be the same as the association, provided that they do not derive any profit from this circulation and that they do not have any political, sectarian or confessional connotations. These pdf files may also be put on line in the computer networks of school and university libraries.



Jean-Pierre Petit intends to create numerous other works which will be accessible to a larger audience. Even illiterate people will be able to read them because the written parts will “speak” when the readers click on them. Thus it will be possible to use these works to support literacy schemes. Other albums will be “bilingual” in so far as it will be possible to switch from one language to another selected language with a mere click. Hence another tool made available to develop language skills.

Jean-Pierre Petit was born in 1937. He made his career in French research. He worked as a plasma physicist, he directed a computer science centre, he has created softwares, he has published hundreds of articles in scientific magazines, dealing with subjects ranging from fluid mechanics to theoretical cosmology. He has published about thirty books which have been translated in numerous languages.

The association can be contacted on the following internet site:

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It is not necessary that the following hypothesis be true or even resemble the truth. One thing is for sure that they provide calculations in accordance with the actual observations.

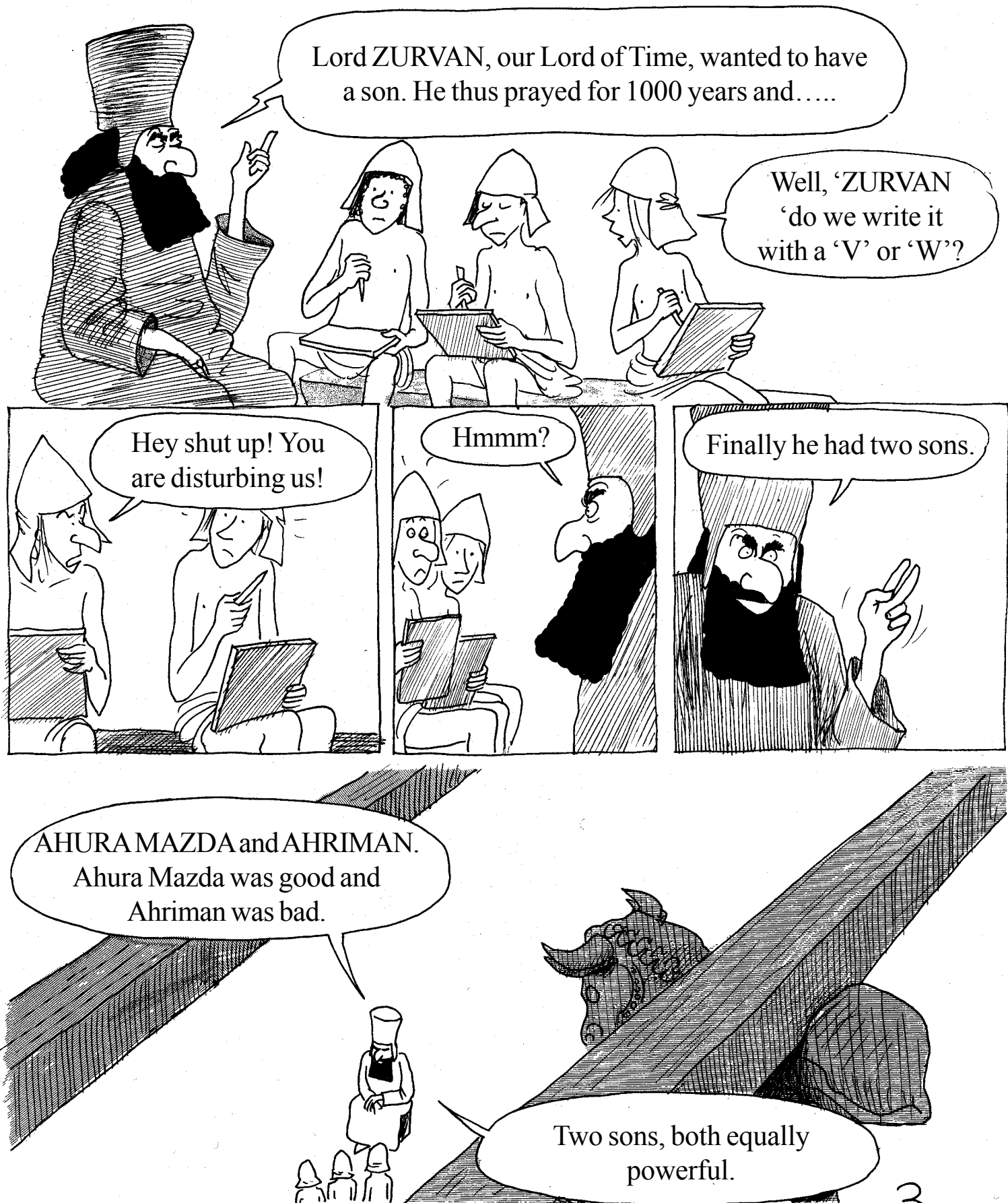
- OSIANDER (*)



(*) Osiander's preface - editor of *Copernicus*

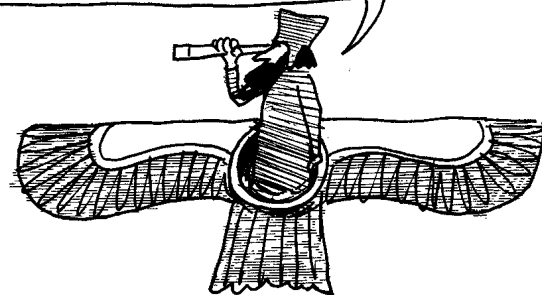
Prologue

2000 years before the present era, at Babylonia, in Persia.



Ever since their birth,
they started fighting within
themselves and were hell bent
upon destroying each other.

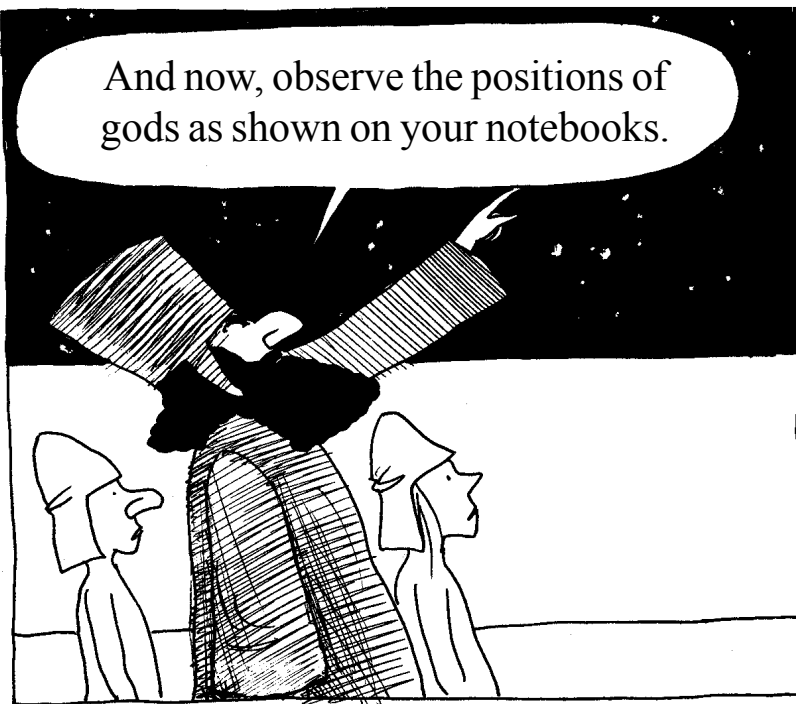
The future of our universe was in a peril.
Thanks to God MITHRA who intervened
between the two in order to protect one
against the other.



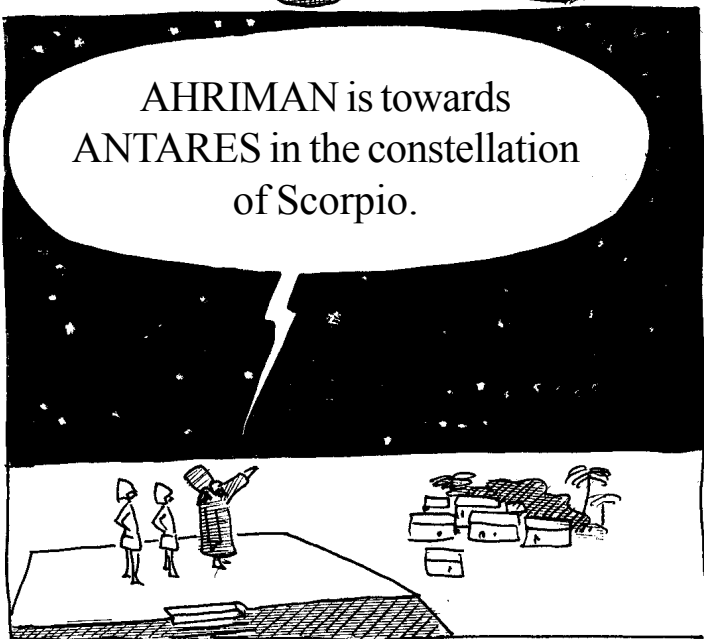
Basically he was able to stop these
two enemy brothers, the two twins,
the two halves which formed the
universe, from destroying
themselves.



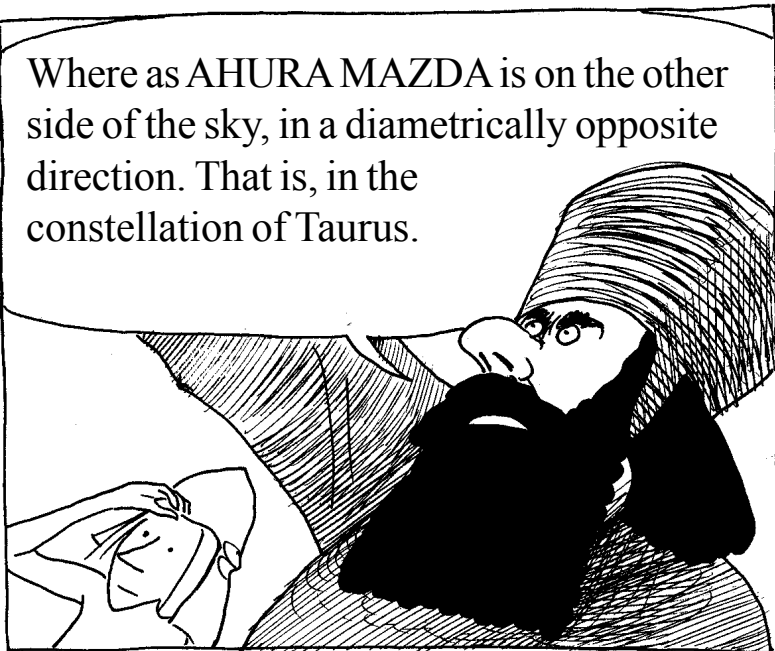
And now, observe the positions of
gods as shown on your notebooks.



AHRIMAN is towards
ANTARES in the constellation
of Scorpio.



Where as AHURA MAZDA is on the other
side of the sky, in a diametrically opposite
direction. That is, in the
constellation of Taurus.

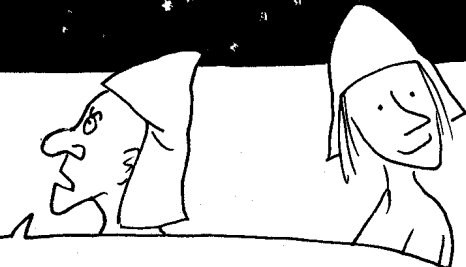


Even if what you say is right, if AHURA MAZDA and AHRIMAN were to meet someday, it would be terrible.....



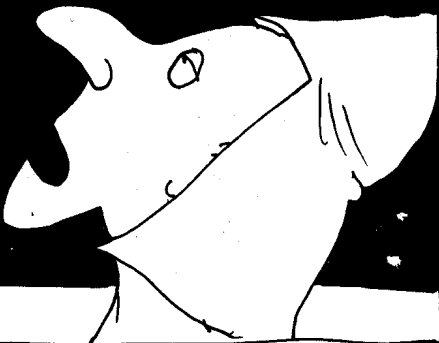
True, but luckily for us, they are separated from each other as far as possible.

That way, everything remained undisturbed. The celestial bodies are still in their proper places.



Everything in its proper place, and a proper place for everything.

The teacher says that only observation and study of the skies would lead us to wisdom.



And since then MITHRA keeps a vigil over the border between the two twin universes.



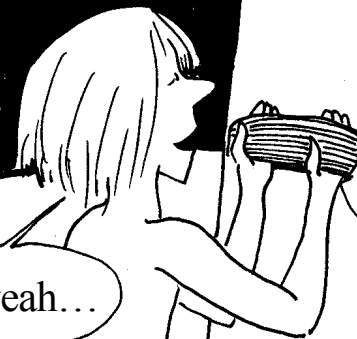
Yes, but even then....



Do you hear me?

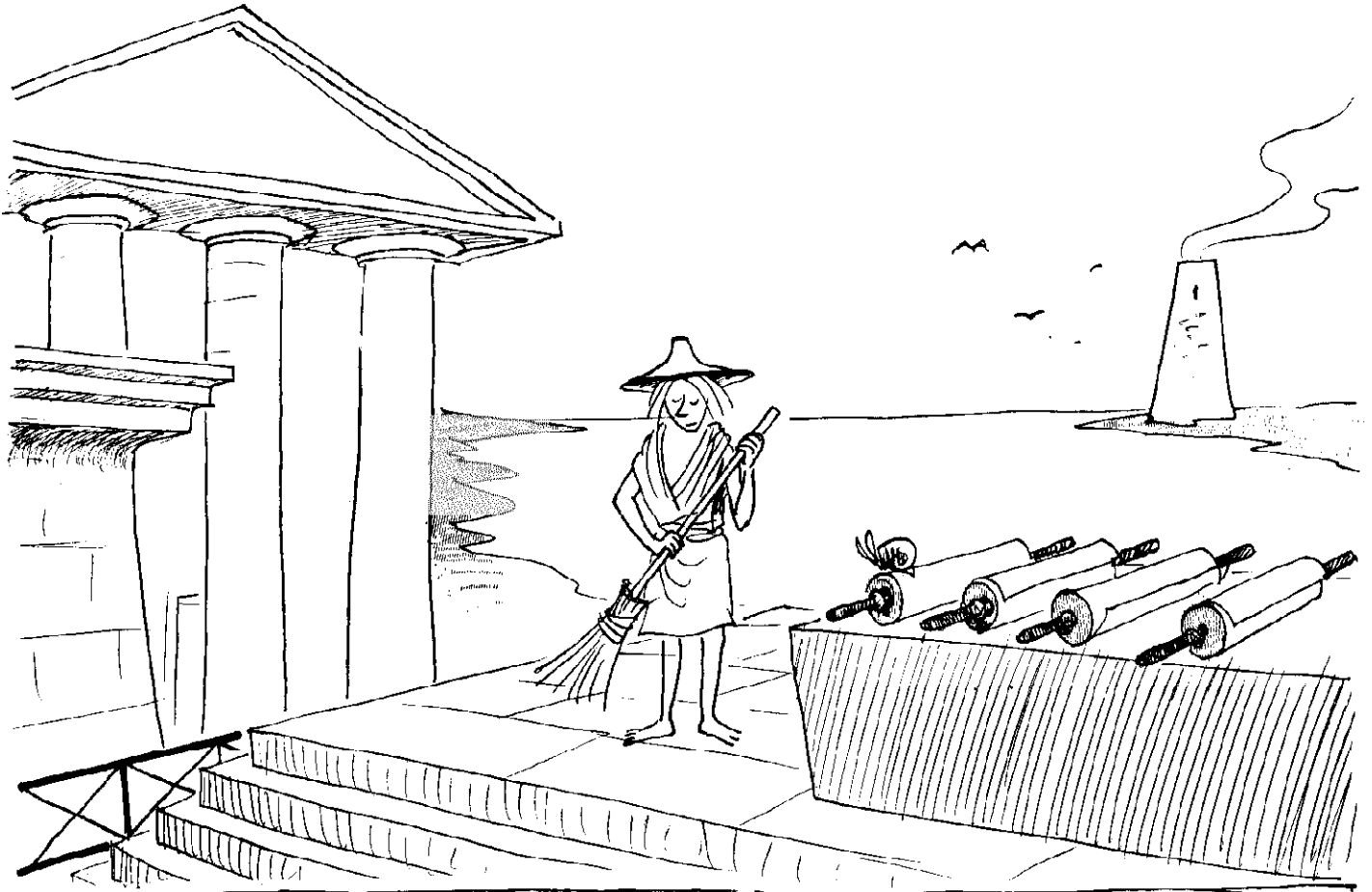


Yeah, yeah...



PTOLEMY

Alexandria, the ancient capital of knowledge.




You know, Tiresias, I am awfully happy to have found this place at the library of Alexandria.


Yeah?
Does it really please you?

It's the most beautiful in the whole universe. It has 700,000 volumes which are full of wonders of the world.

Oh! only if I knew how to read.



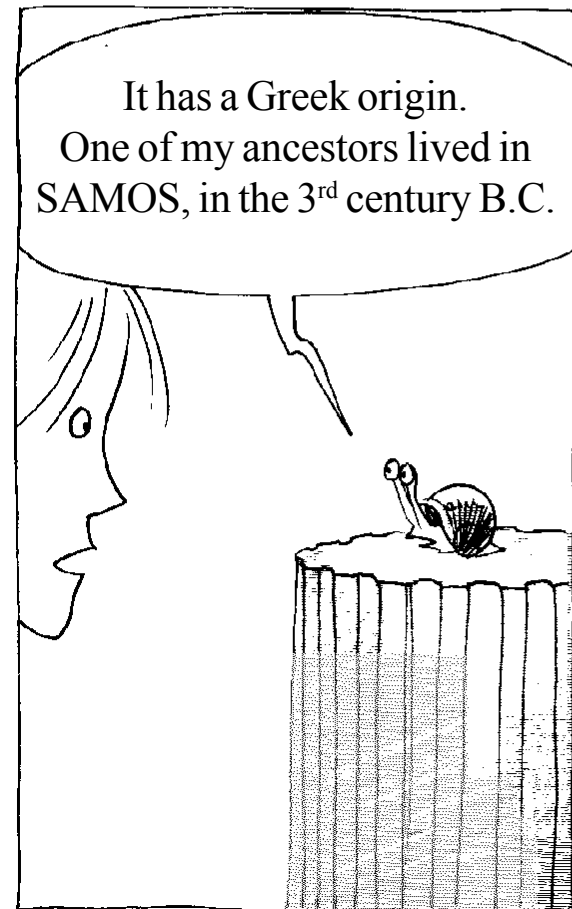
I could have read the works of Euclid.
They say that he was the one who
revolutionized the world of mathematics.



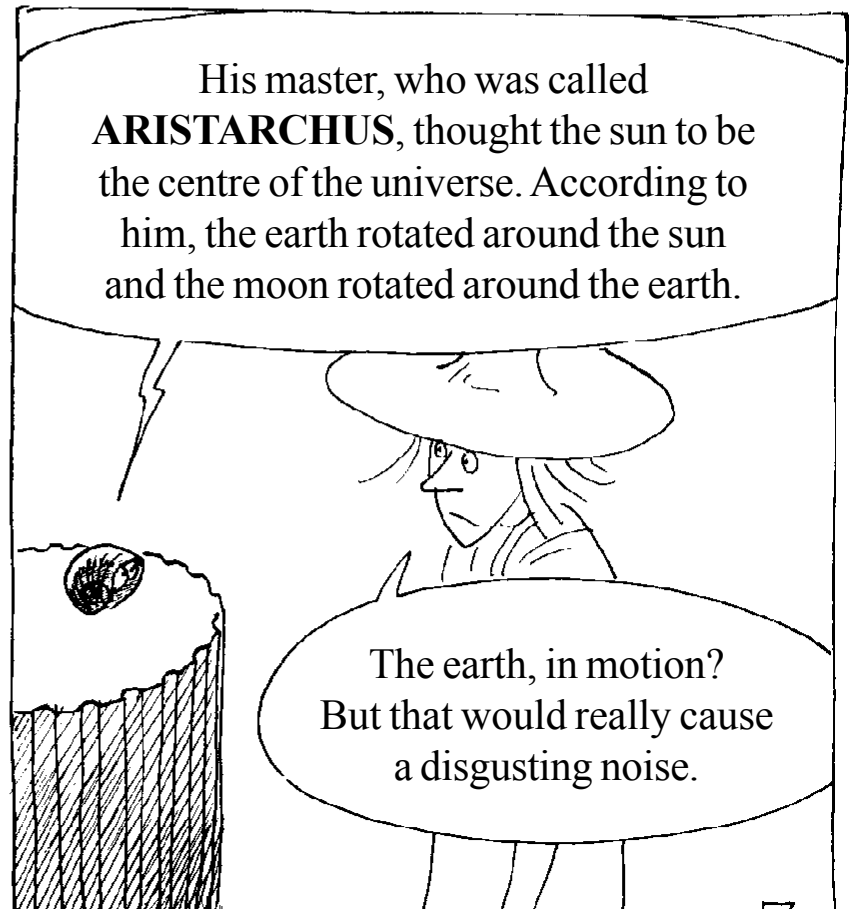
It is said that at Alexandria the
wise can explain everything,
understand everything.

Do you realize, this is not the first
time that I am hearing this from you?

Tell me Tiresias, from
where does your name
originate?



It has a Greek origin.
One of my ancestors lived in
SAMOS, in the 3rd century B.C.



His master, who was called
ARISTARCHUS, thought the sun to be
the centre of the universe. According to
him, the earth rotated around the sun
and the moon rotated around the earth.

The earth, in motion?
But that would really cause
a disgusting noise.

You must be joking! This cannot be true! When you are on a ship cutting through the waves of a calm sea and when you close your eyes, do you feel the movement of the ship?



Uh! Well.....no!

Eratosthenes had even calculated the radius of the earth, just by measuring the shadow cast by a rod.



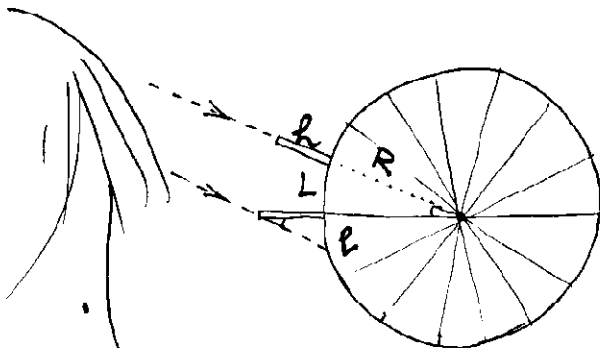
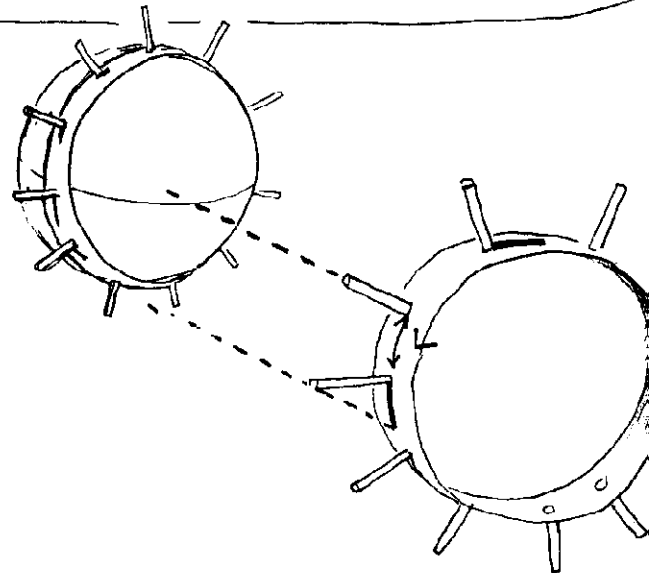
But how was that?

It's simple. Stick a band of papyrus in the vicinity of the earth's meridian. And on this band, perpendicular to its surface, stick the rods.

Like this:

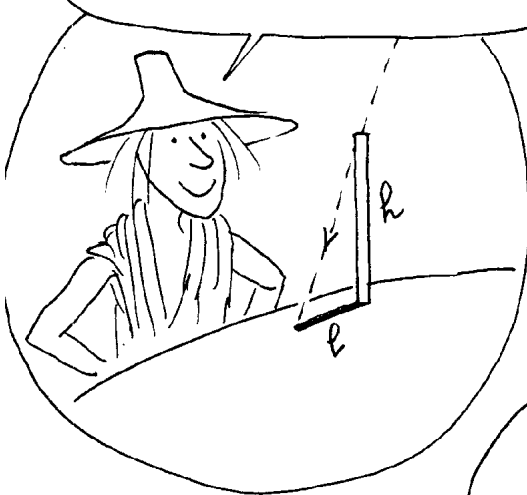


If one of the rods points towards the sun, it would not cast a shadow.



The rod's shadow can be called 'l'. Now, if you know the distance 'L' between these two rods and their height 'h' you can calculate the radius 'R' of this spherical object.

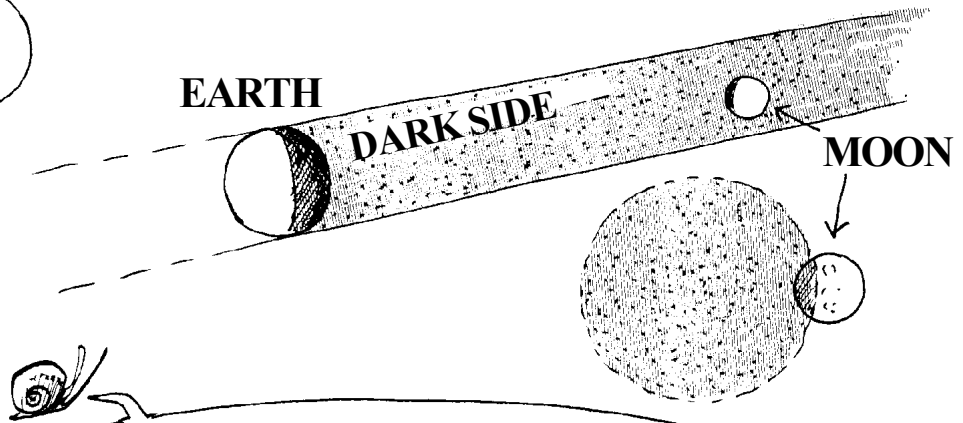
Oh yes! With these tricks of modern geometry.....



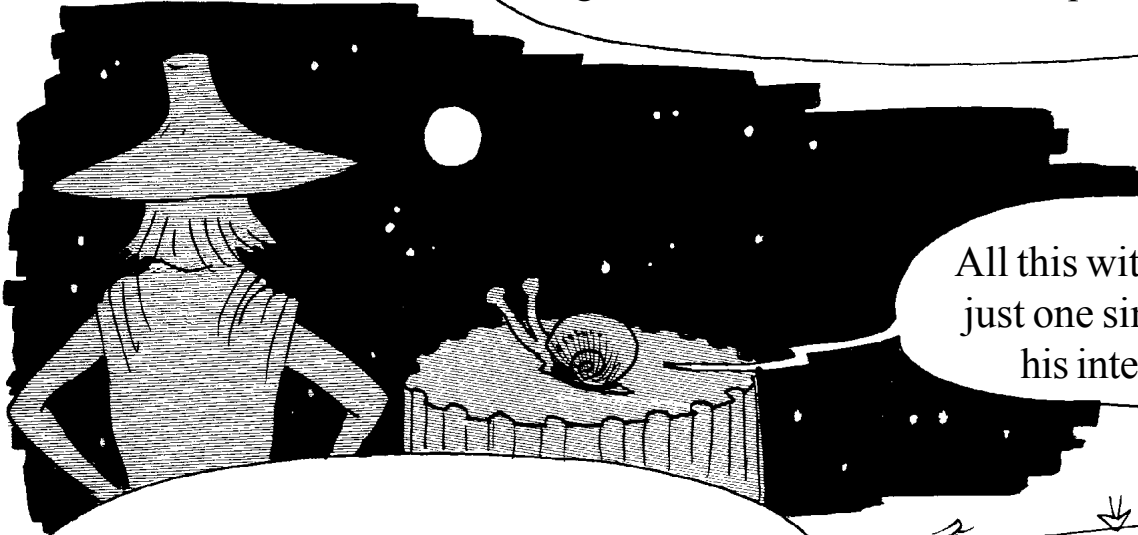
EARTH

DARK SIDE

MOON

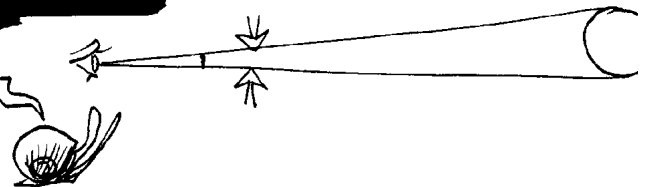


Wait, there's more to that. Observing the **lunar eclipse**, when the curvature of the earth outlines against that of the moon, Eratosthenes had guessed the size of the moon quite accurately.



All this with the help of just one single rod and his intelligence.

And based on its **apparent diameter**, he could then evaluate the distance of the moon from the earth's surface.



But, this movement of the earth which we were discussing was still to be felt. Right?



Hold on! Here's where Professor **Ptolemy** comes into the picture.

* (*) The viewing angle of an object.



Well dear, I have now actually completed my book "**THE ALMAGEST**".

Ok, then does the earth really move?

I would swear that the idea had most certainly crossed my mind.....

Well then?

But that's an absurdity. Now watch this demonstration.

As Master **Aristotle** had very well remarked that some bodies ascend whereas others descend.

I wouldn't deny that.

The light weight bodies ascend and those with heavy weights tend to descend.

That's true!

The acting forces have a strong reaction on the heavy, massive bodies.

These are the facts.....

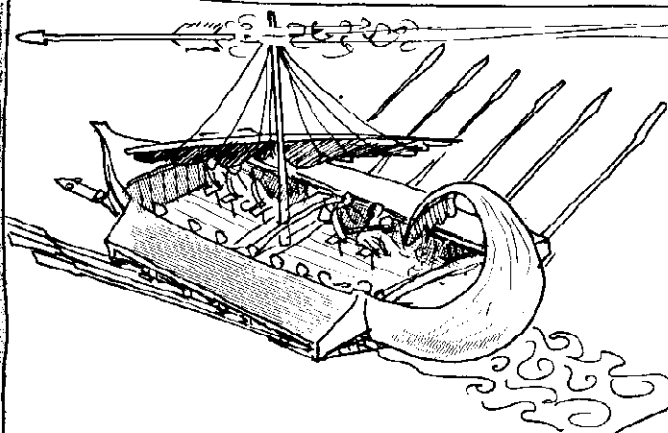
Under the influence of this **force** which attracts them towards the earth, both, a stone as well as a feather fall downwards.

But the stone reaches the ground before the feather does.

This experiment proves it right.

Tiresias, listen to that!

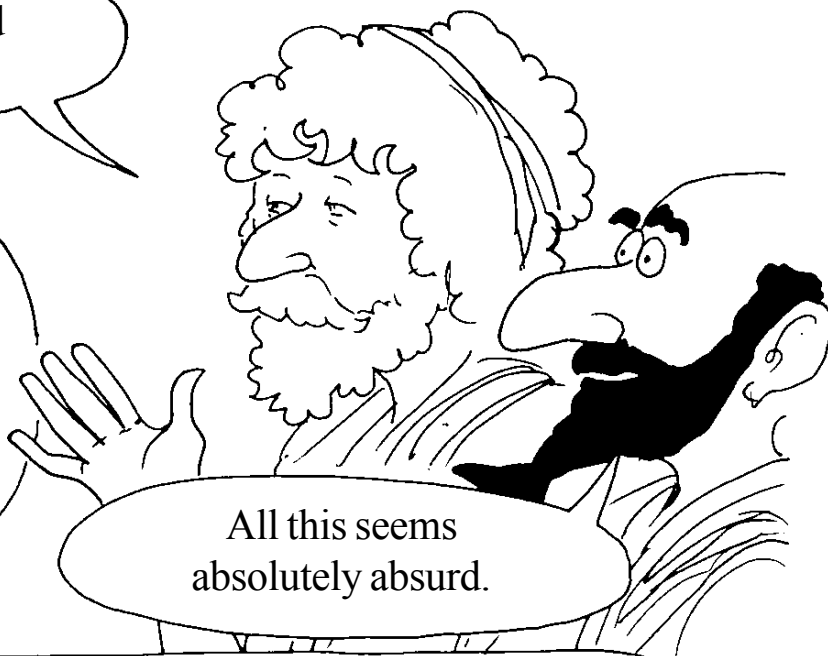
On the other hand, the objects do not move unless an external force acts on them, and the matter transmits the forces. Thus when a ship drifts along with all its oars lifted out of water, it's the eddies which push the ship. And it's the same force that pushes an arrow shot from a bow.(*)



And as a consequence were laid down the principles of **Aristotle**:
If the earth has motion, it has to be definitely
under the influence of a certain force.

We mortals also experience this force but to a very low degree as we happen to have comparatively low masses.

As a result the earth moves ahead
and we remain behind.



All this seems
absolutely absurd.

The earth's motion? An amusing idea to begin with, I would say.
But it is not supported by analysis. That's a real pity.
The astral bodies would be thus light bodies of vapour.

Then the moon must be floating in the air.

As observed by the great **Plato**,
whatever floats in the ether is unchanging and eternal.
Its only on the earth, below the moon, that lies this
world of **disorder, change and chaos**.

But as we rise above, everything
is nothing but orderly, beautiful,
calm and voluptuous.

Is that what
PLATO said?

That doesn't quite
sound like Plato.

In the lowly world, everything is imperfect, whereas up there, the celestial bodies are marvelously perfect, smooth and spherical.

How and why do you link the circle and sphere to the divine?

You would agree with me if I say that only geometric beings are capable of describing the divine. So to say, a **line**, a **plane**, a **circle** and the **sphere**.

I have been following you all along.

He is quite right. The circle and a sphere, as they do not have a beginning, nor an end are the only ones really capable of describing the divine. It is **PYTHAGORAS** who says that.

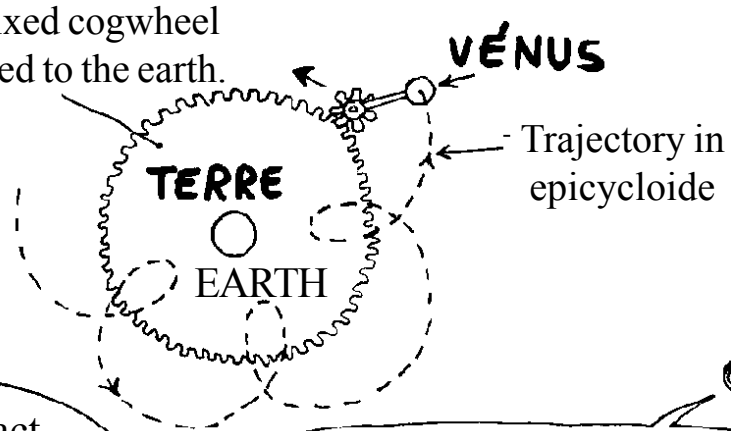
A line, a plane necessarily has to have a limit, a boundary.

That is why astral bodies are round, perfectly round and they even travel in circular paths.

But look, if we mark the path of Venus on the celestial dome, we find quite a strange ballet (moving back and forth). This astral body slows down, comes back a little and then continues ahead on its path. It hardly looks like a circular path to me.

I would like to elucidate this mystery.

A fixed cogwheel linked to the earth.



The trajectory of Venus, is in fact a **COMBINATION OF CIRCULAR MOVEMENTS**.

Epi, in Greek means 'on' or 'on the exterior of'

Besides, all the movements of the celestial bodies, those of sun as well as of planets, can transform into superposition of circular movements.

Fabulous! The paradox thus fails.

What do you think of that, Tiresias?

Nothing. I find all this frighteningly complicated.

If only the gods had consulted me before creating the universe, I would have recommended something much simpler.

Confirming to the **Aristotelian dogmas**, **Ptolemy's model** was recognized as a law somewhere during the 16th century and during this time blocked the entire serious progress in the field of astronomy. In the 15th century, it wasn't less than 48 circles, overlapping one another to actually describe the astral movement with this absurd theory.

But, in 1530, somewhere along the Baltic sea.

☄ COPERNICUS



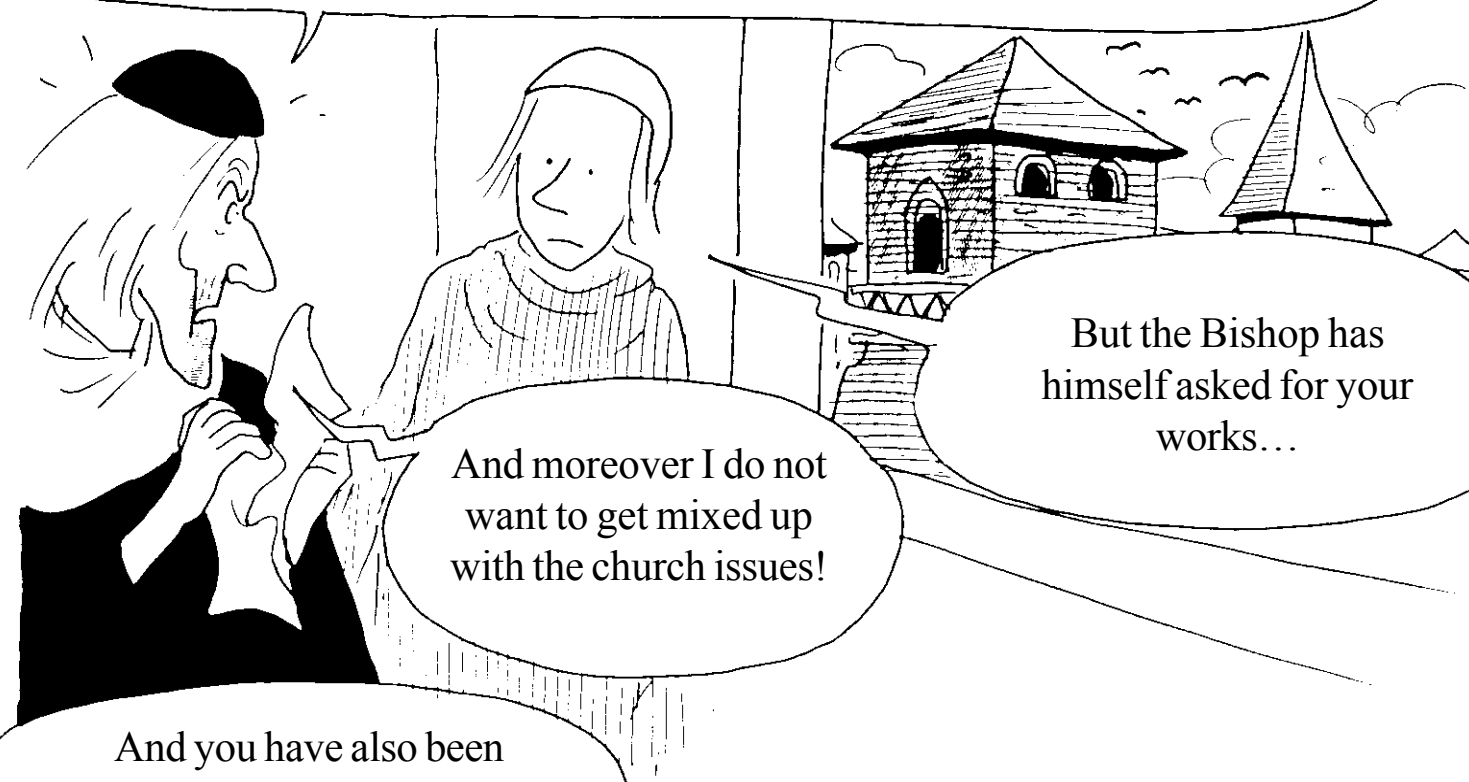
Uh, nothing master, I was just consulting your notes, your book...

The manner in which you have interpreted the works of ARISTARCHUS seem very illuminating to me. It all looks so logical and coherent. When are you thinking of getting these published?

AXIOMES

1. All celestial bodies do not revolve around a single common centre.
2. The centre of the earth is not the centre of the universe it's only the centre of gravity and the centre of the moon's orbit.
3. All these spherical bodies revolve round the sun thus it is the sun which is at the centre of the universe.
4. The distance of the steady stars from the earth is so immense that the distance between earth and the sun is quite negligible, compared to that.
5. The movements seen in the skies are not due to the movement of the sky itself but due to the movement of the earth's rotation around itself.
6. That which seems to be the sun's movement is not actually the sun moving but the earth's motion, which just like the other planets revolves around the sun.
7. The backward looking movement of the planets is only due to the earth's movement which is enough to explain their irregular movement in the sky.

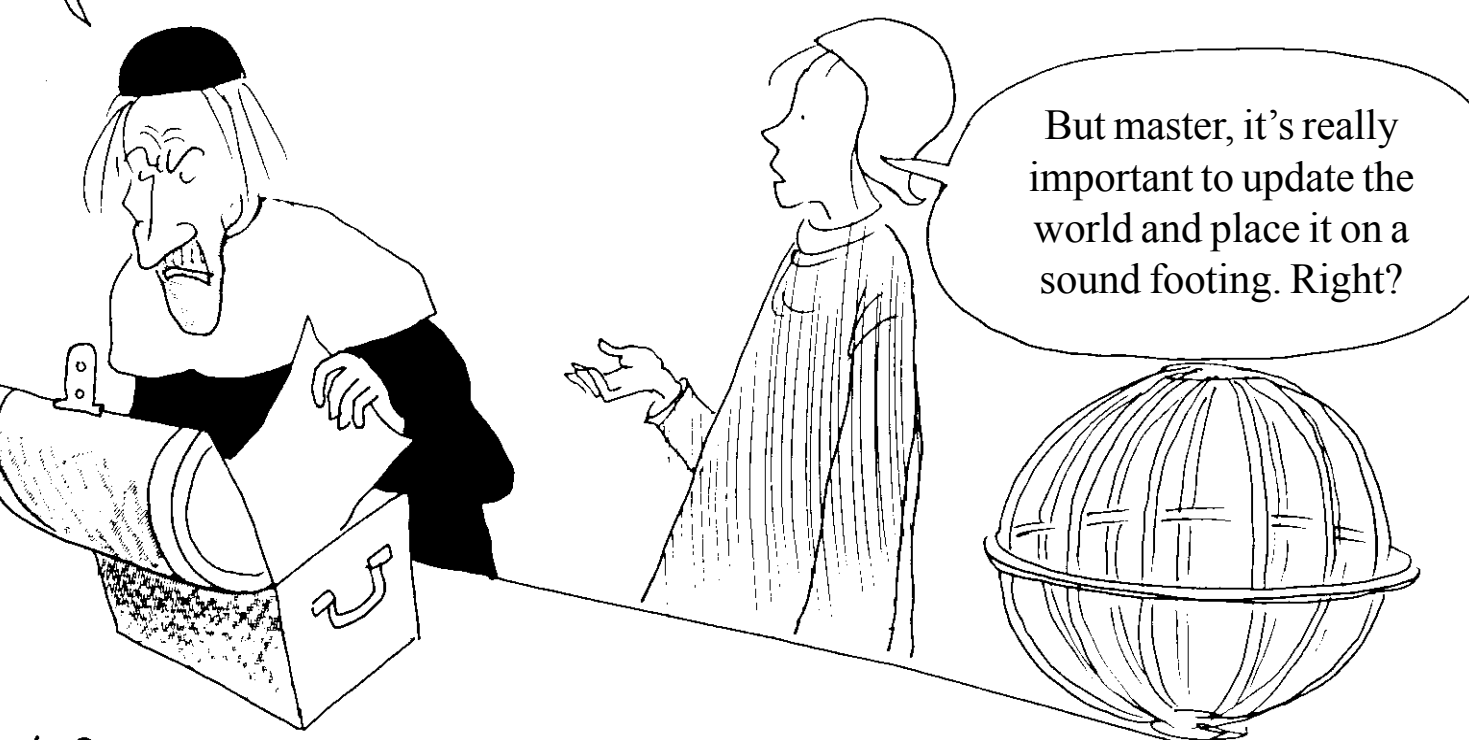
Why am I getting into this mess?
And first of all give back my papers!
Knowledge should not be shared in the first place.
And you would not understand what problems I would have to
face if I were to publish these papers here!



And moreover I do not
want to get mixed up
with the church issues!

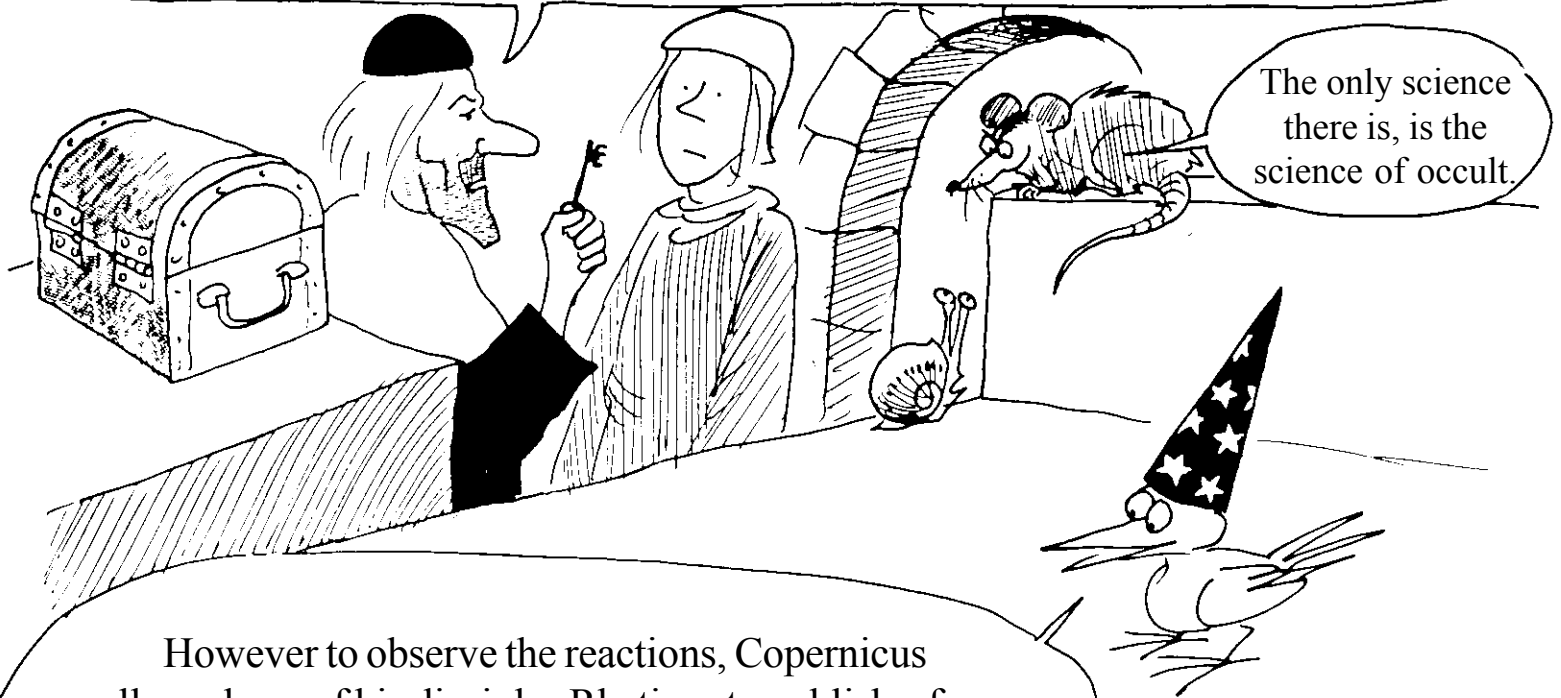
But the Bishop has
himself asked for your
works...

And you have also been
reading my mail. Charming....



But master, it's really
important to update the
world and place it on a
sound footing. Right?

My dear son, I can see the openness of your heart, but believe me,
here at Cracoie, we have a peaceful life. Don't spoil that.
The world is not yet ready and matured for this knowledge.



However to observe the reactions, Copernicus
allowed one of his disciples Rheticus to publish a few
of his own ideas under a false name.



It was only at the end of his life
that Copernicus actually allowed
Rheticus to publish his works and
the first copy was received
by him on his death bed.



The anxious editor wrote in his preface the following:

Let us leave these new hypotheses aside for a while just like the ancient theories - which are no more plausible. But all these theories are easy to understand and carry with them a huge treasure of scholarly observations.

And to whomsoever it may concern these hypotheses are not expecting something definitively certain from astronomy.

Any person whomsoever these hypothesis are exposed should not expect anything certain from Astronomy as these do not give us anything but made up stories. If anybody takes these stupid works for real facts he does it on his/her own risk.

In other words: read it, but do not take it too seriously.

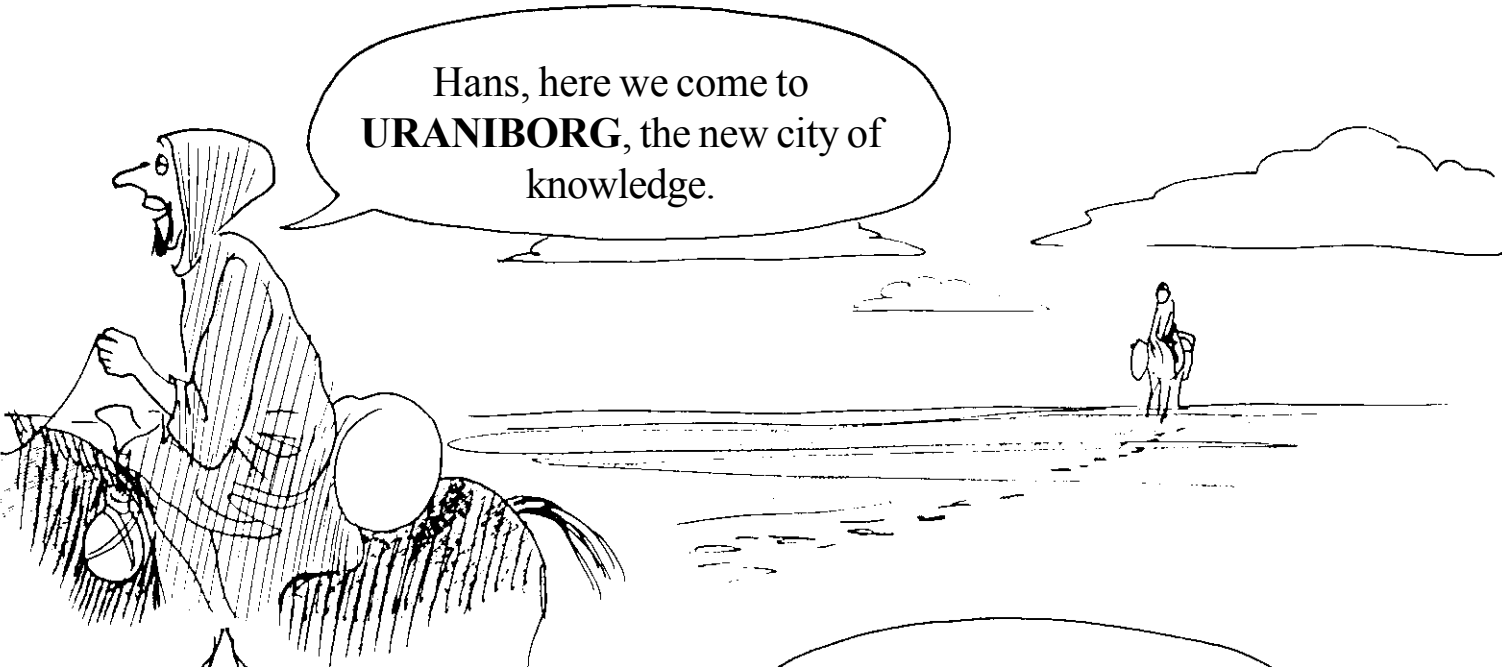
Copernicus cannot be faulted for the mistaken. In 1600, that is 57 years after the death of Copernicus, GIARDONO BRUNO was imprisoned and then burnt to death for having taken this message seriously.

A bunch of idiots. There exist for sure millions of other suns just as ours and also many more inhabited planets.

Let him continue with his jibberish. Can you please pass me the flame light.

Tycho Brahe and Kepler

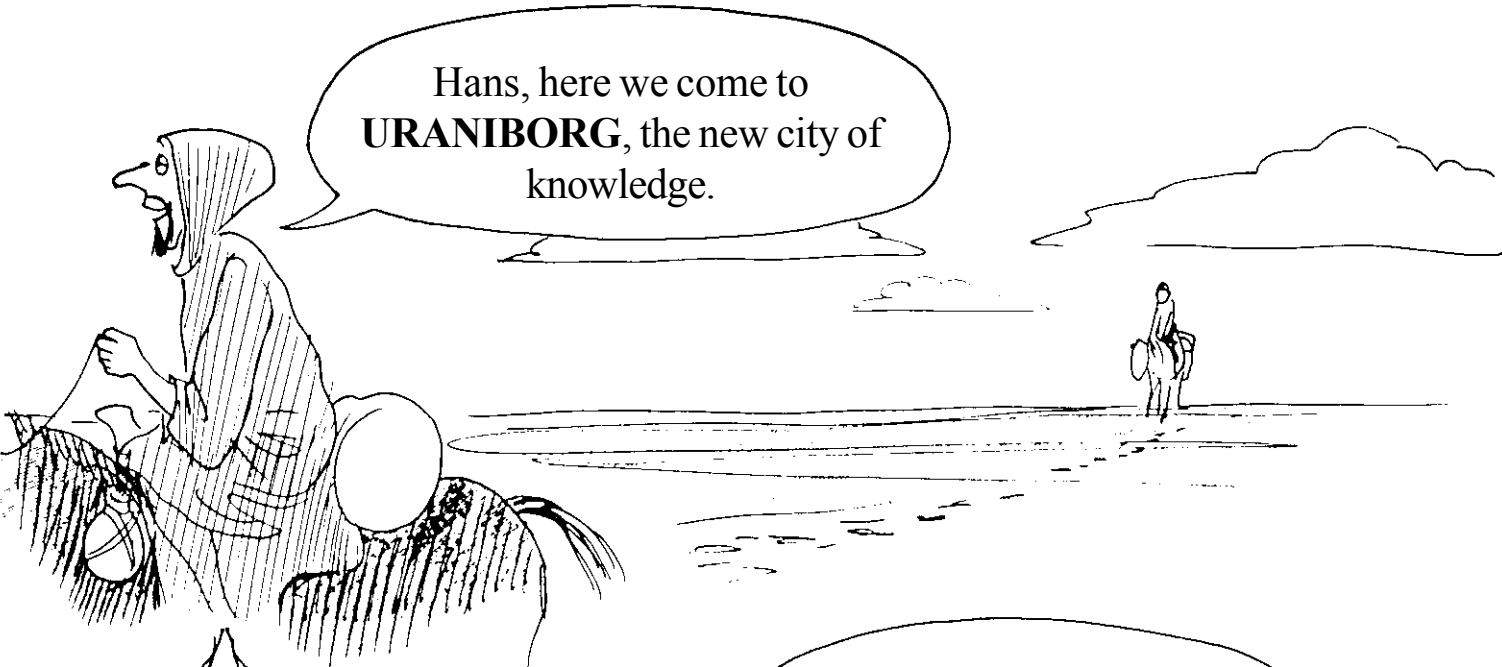
Denmark 4th February 1600.



Hans, here we come to
URANIBORG, the new city of
knowledge.



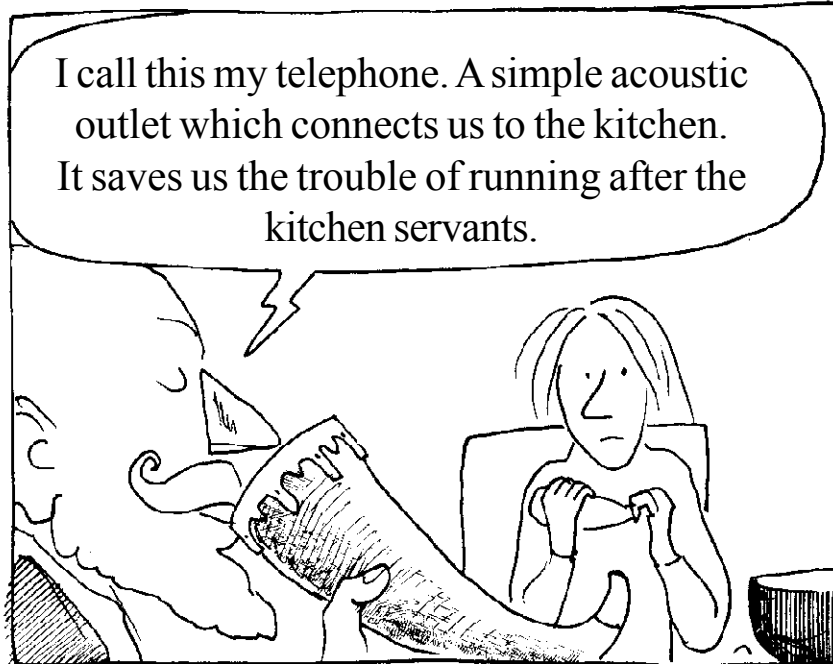
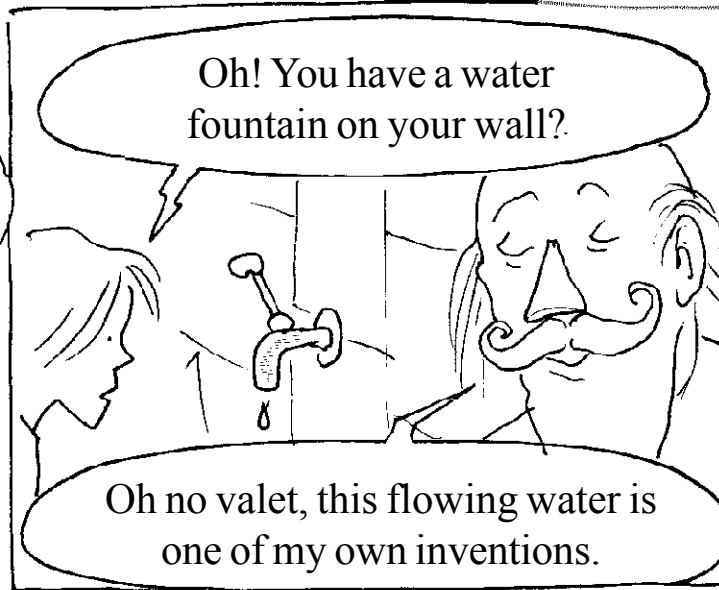
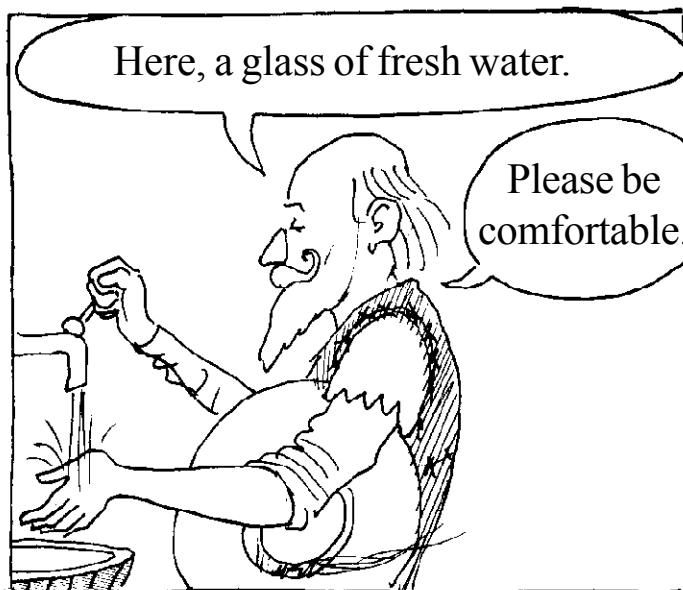
Oh master Kepler! You are
most welcome to my land.



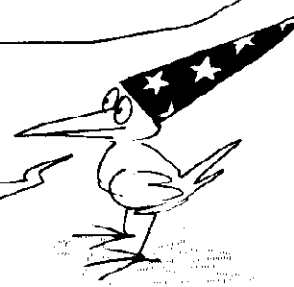
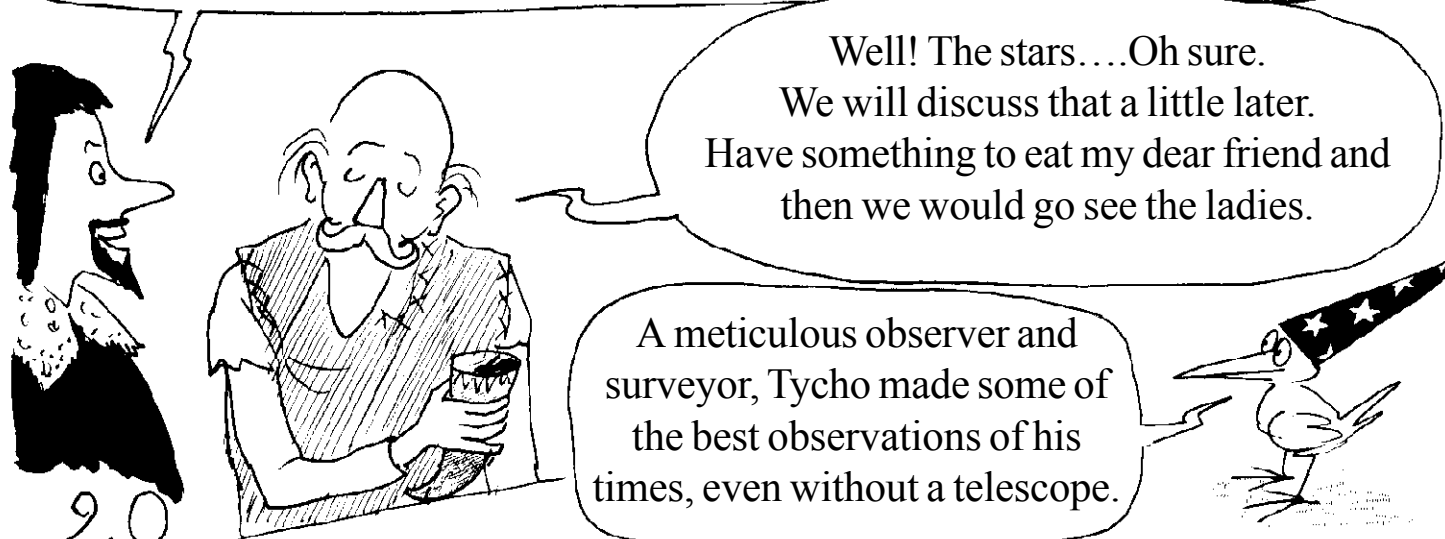
Would it be alright if
I call you Johannes?

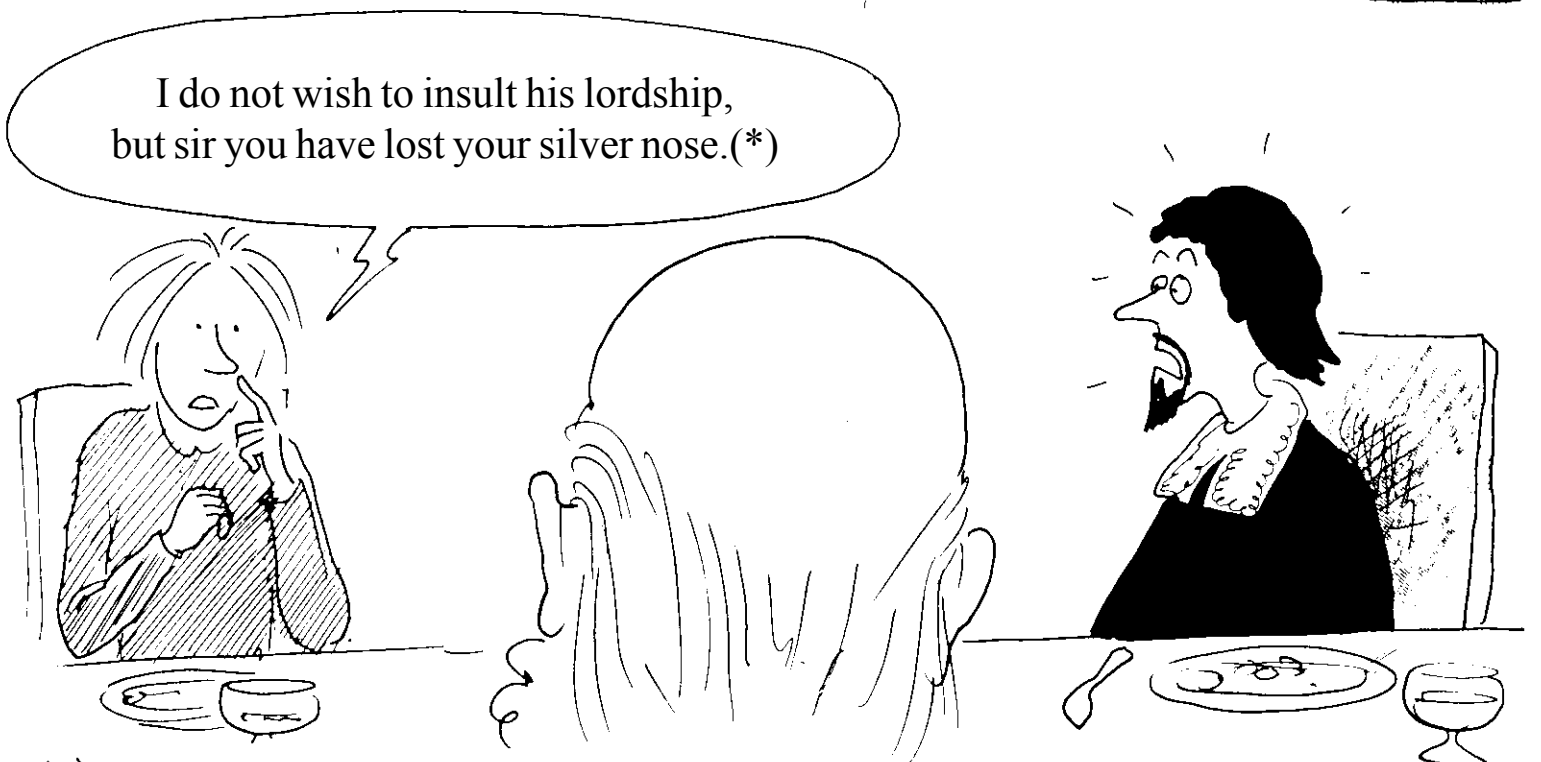
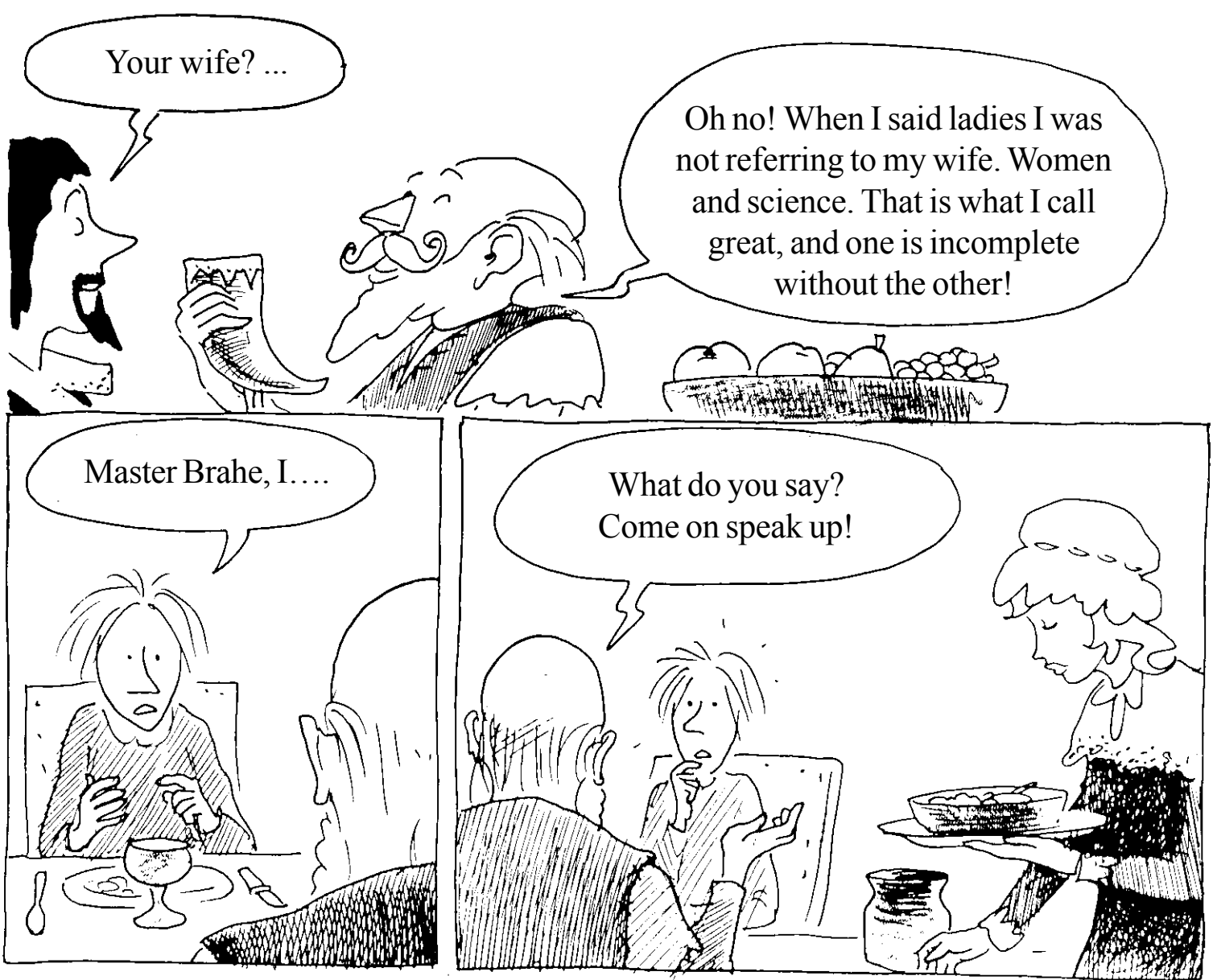


Hello,
Mr. Tycho Brahe.

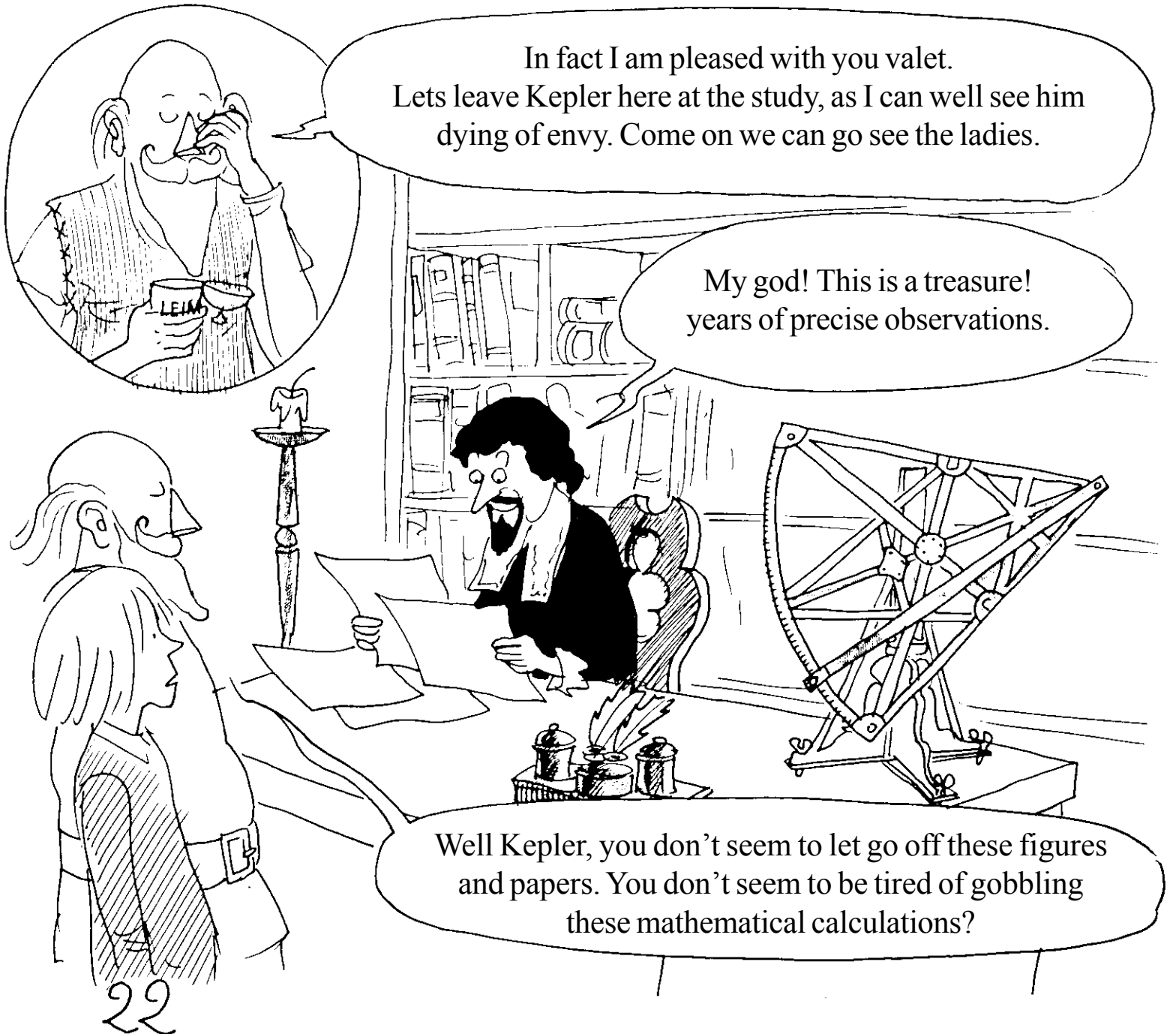
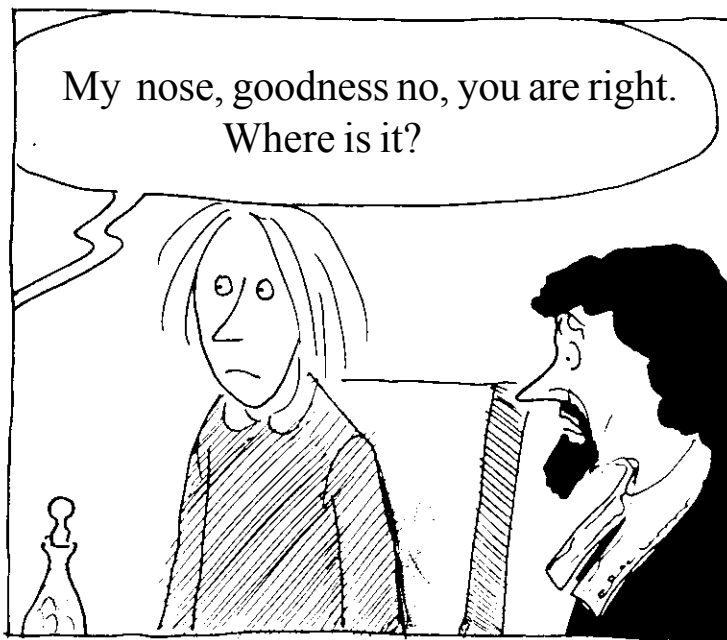


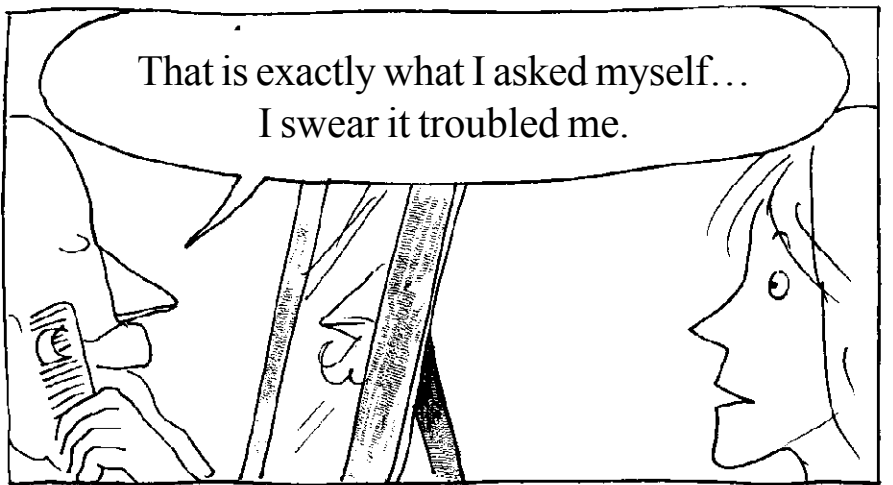
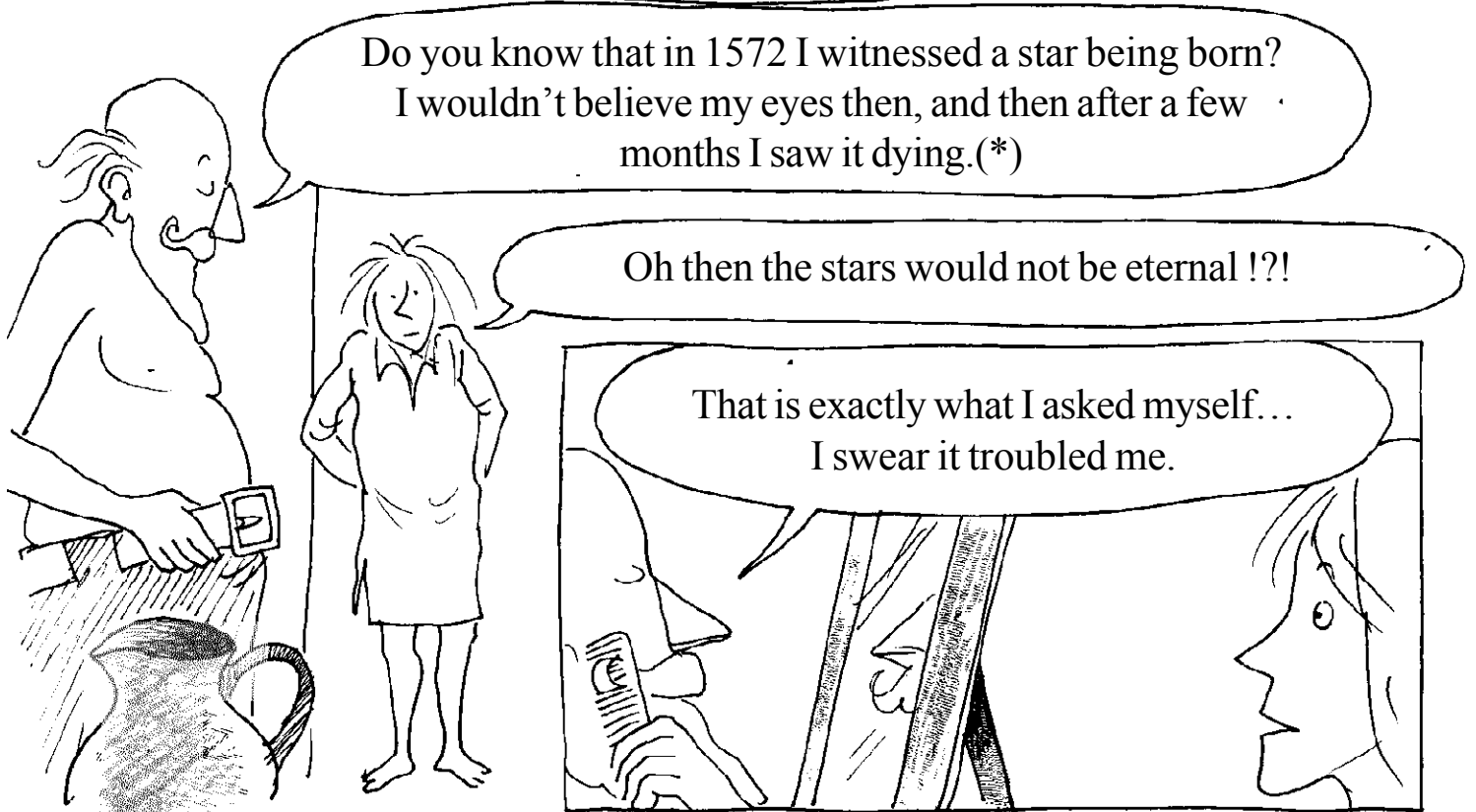
Mr. Brahe, as you are very well aware,
I am most interested in your findings about the stars.



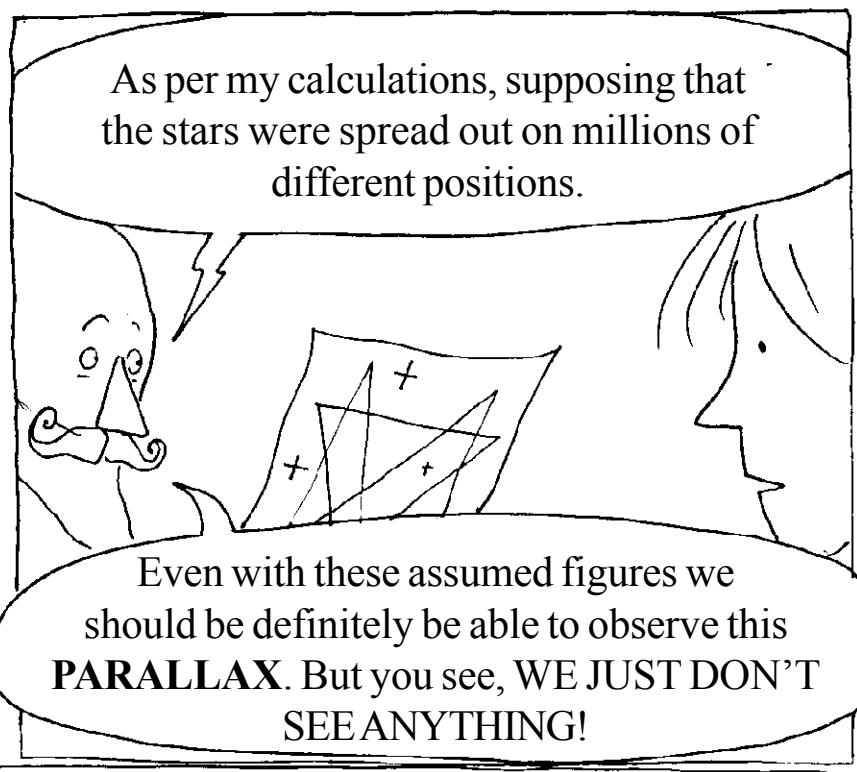
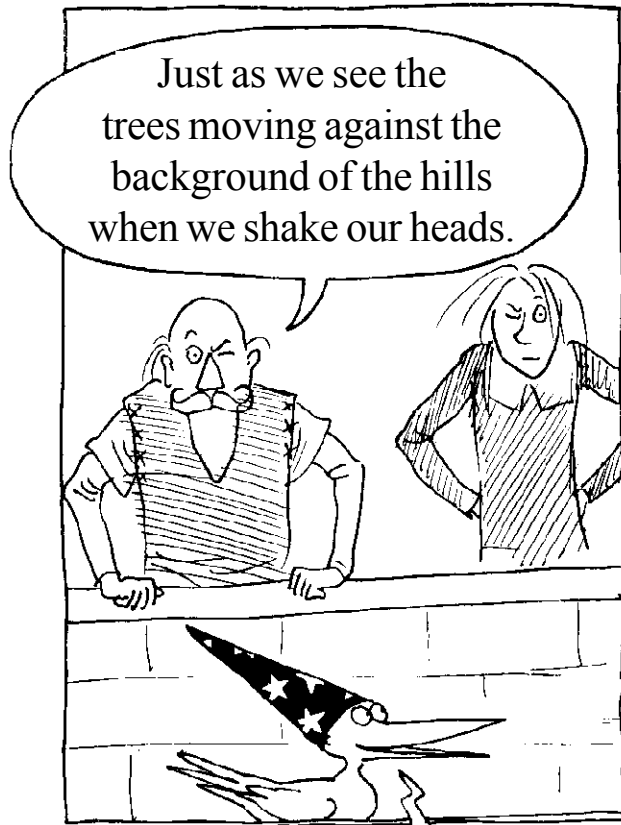
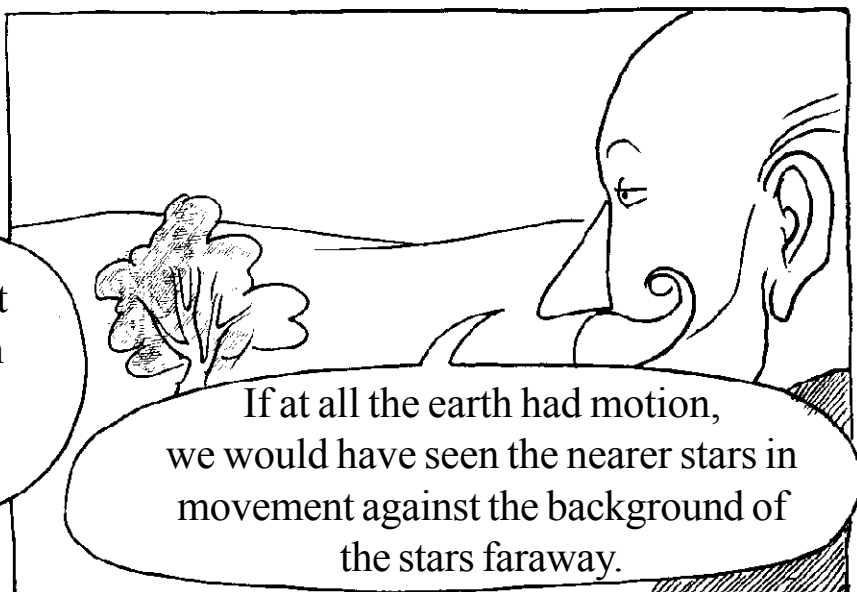
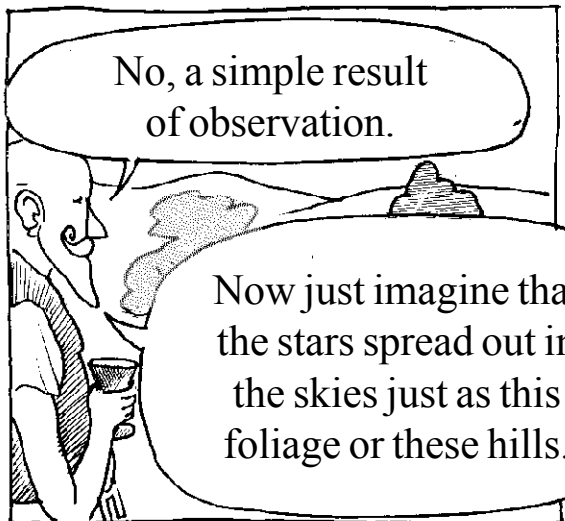
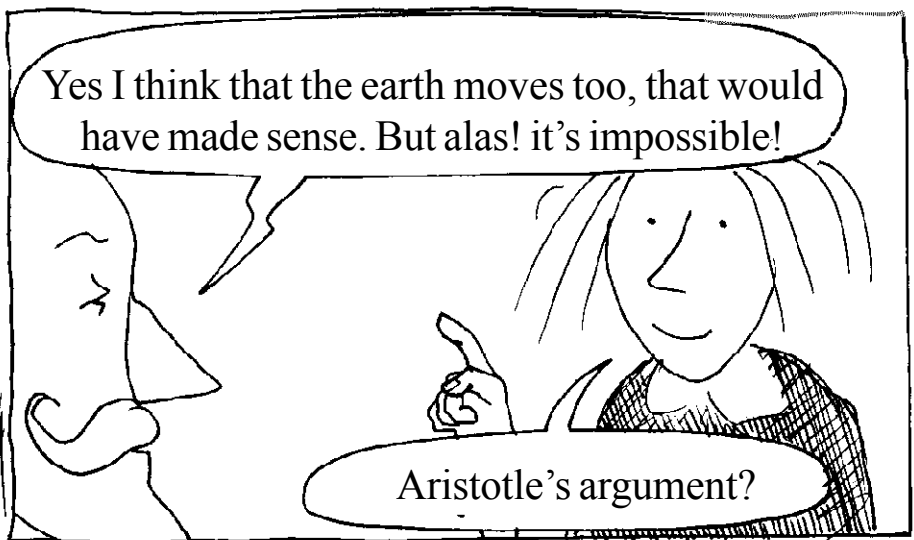
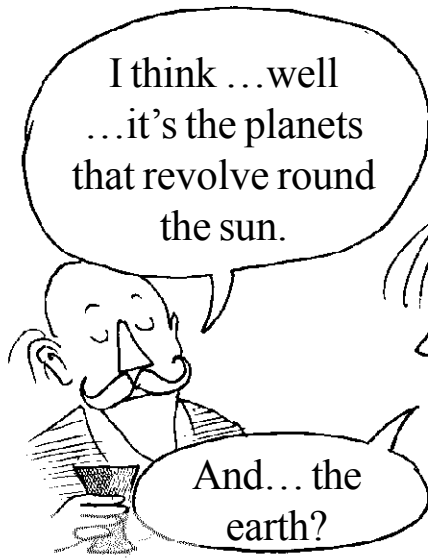


(*) (*) In a duel Tycho had got his nose sliced off.





(*) (*) this refers to the supernova as observed by Brahe.



We should be most open even to the weirdest ideas. But alas in this case, even this doesn't hold true. The earth doesn't move a bit.

Kepler stayed with Tycho, in Denmark. But one day.....

MASTER!

We have to prove that it is the sky that moves!

Lord BRAHE just died due to a *calculi* (kidney stone)

For a long time, Kepler continued studying Brahe's astronomical findings, which were the most authentic of those times.

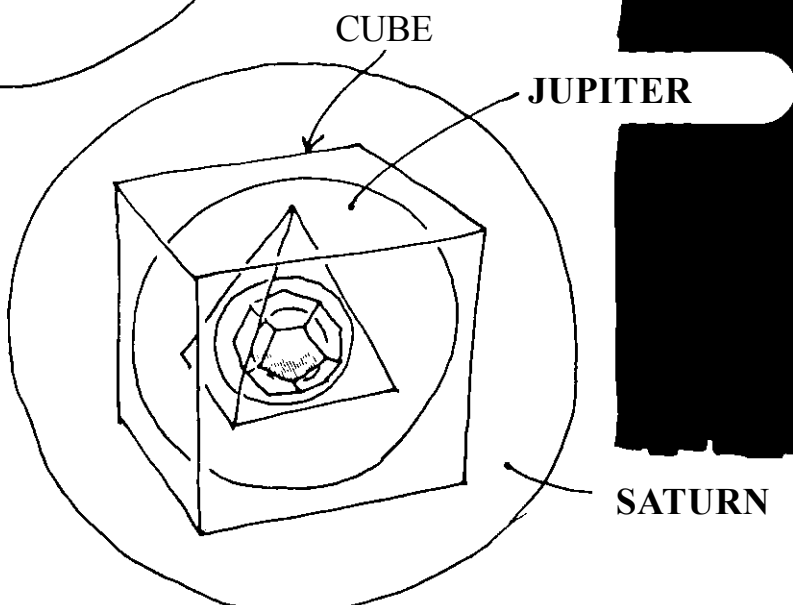
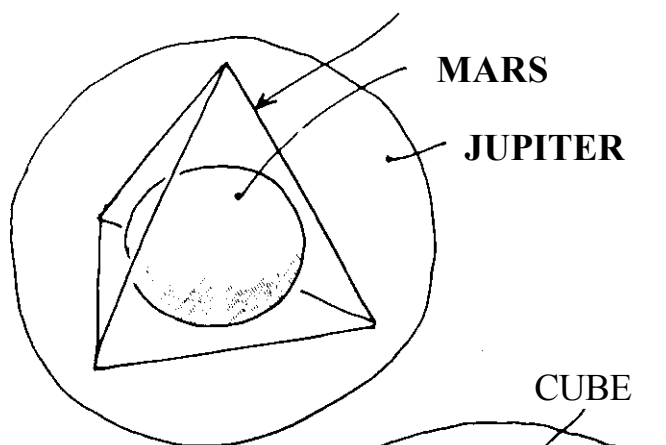
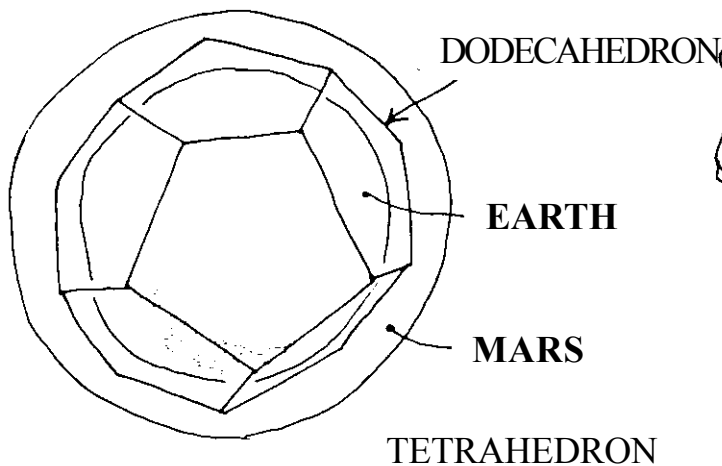
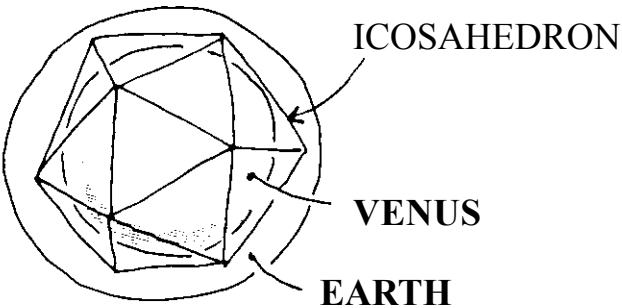
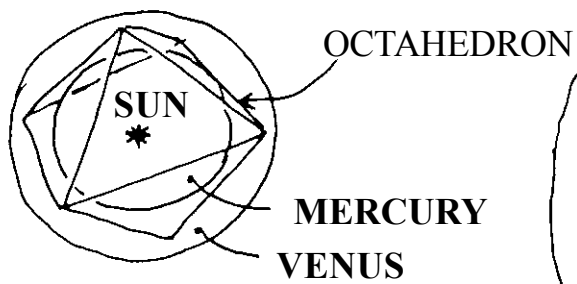
Calculi....

Well that's for good.

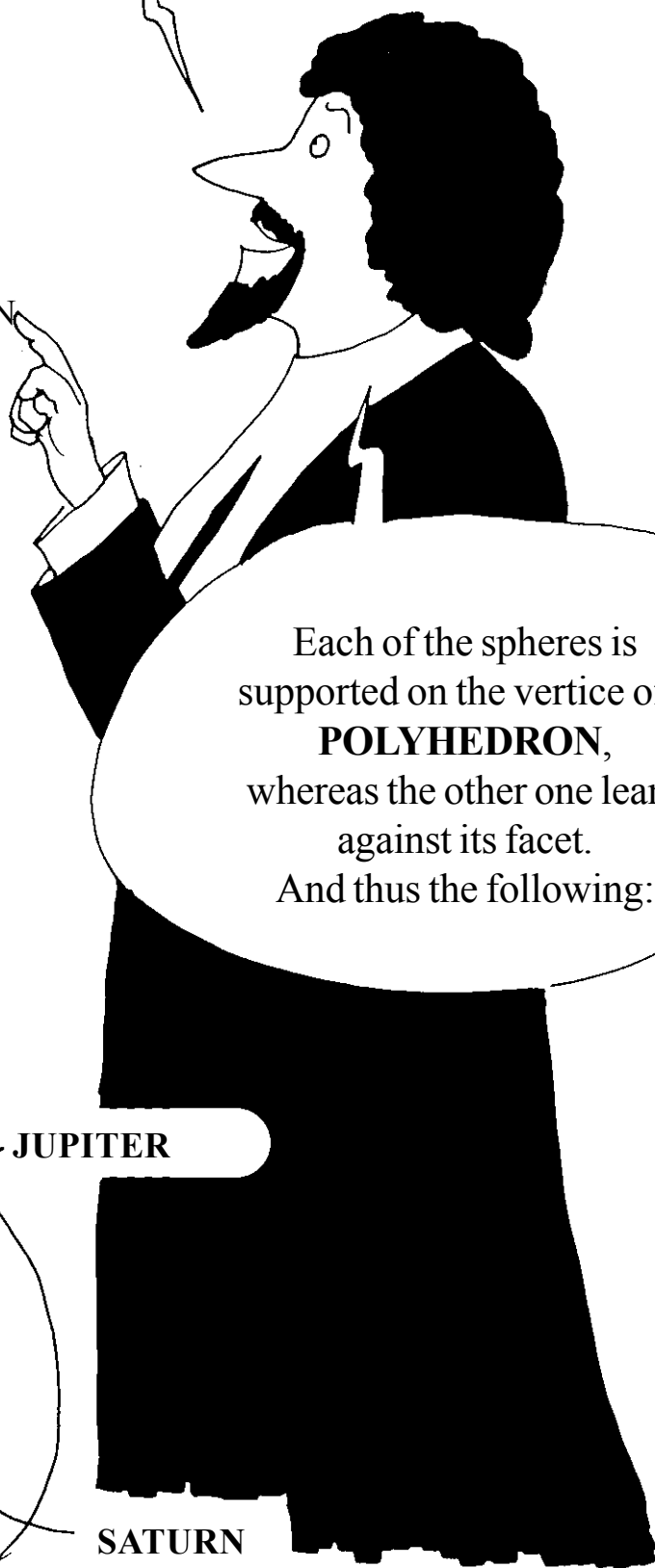
But even though he followed Copernicus, he held on to some of his own fixed notions.

Hans, Copernicus was indeed right: the sun is the centre of the universe, I am sure of that.

Hans look here: if I draw a square inside a circle on a plane, and then I insert a second circle in this square. I put in an equilateral triangle in this circle, and then I continue by drawing a pentagon.



The planets being all perfect,
they move in concentric circles.
Obviously, the sun is
placed at the centre.

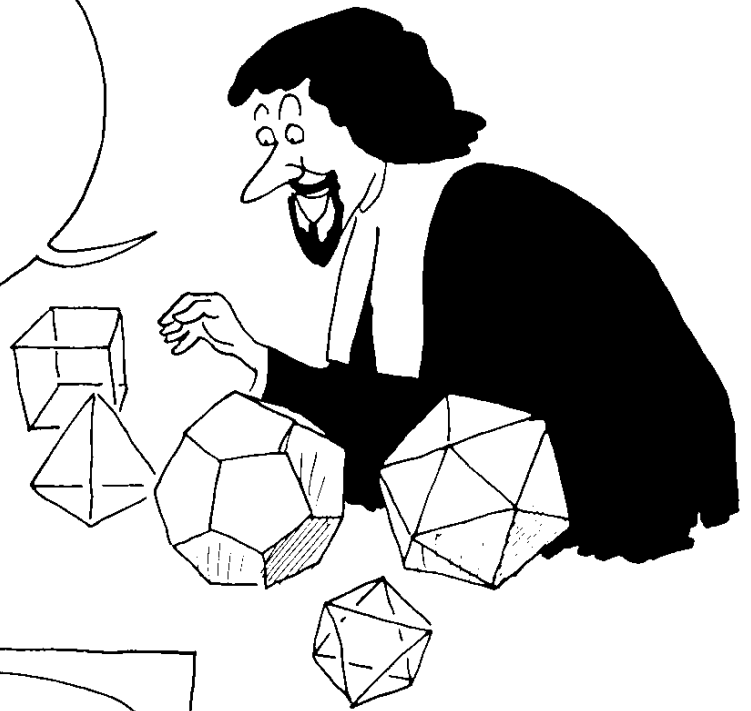


Each of the spheres is
supported on the vertex of a
POLYHEDRON,
whereas the other one leans
against its facet.
And thus the following:

Well Hans, that's the secret of the universe: the orbits of these six planets are formed with the help of Plato's regular polyhedrons.

I KNEW that. This whole loop. It all fits in. I am great! Simply great!

A case of a crank who mistakes a candle for a lantern.



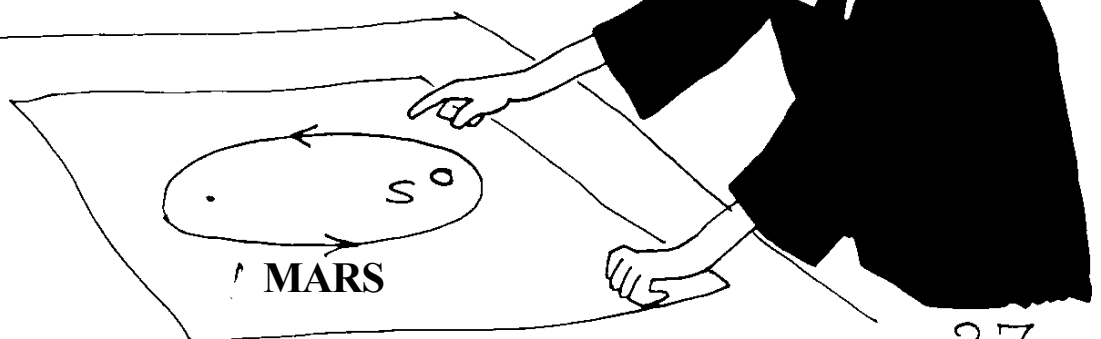
Master, does all of this coincide with Mr. Tycho Brahe's findings?

No. But there's something that is much more surprising than this.

Tycho's findings regarding the motion of mars are undisputable.

I went over the calculations again and again, there is one thing that does not turn in circles.

According to my findings MARS cannot be moving in a circle but would be going around in an elliptical orbit. The sun would also occupies a place in this ellipse.



But then Master, what about **PYTHAGORAS's** theorem, the marvelous harmony between the circles, **ARISTOTLE's** idea of linking the circle with the divine. All this would just collapse!!!

Oh, yes Hans.
It would be the end of all these assumptions, even **PTOLEMY's** circles and the rest of....

Even I am finding it difficult to believe.

Do you see that the speed of these planets is not constant on these ellipses. Mars accelerates while nearing the sun, and slows down when going away from it. This should have surprised Pythagoras!

The police, but what do they have to do with Pythagoras?

Johannes,
it's the police!

We have never heard of Mr. Pythagoras. We are here to arrest your mother, accused of witchcraft. She has given a potion to Jacob, the glazier, which has made him terribly sick.

Women seemed to create a constant nuisance for poor Kepler.

Hans, when there is a violent storm, the only thing we can do is to throw the anchor of peaceful studies in the ocean of eternity.

Dear lord!
That's bad.

Bring a pen and write:

Dear Galileo,
you are a splendid person. Could you please send a shipment of one of your marvelous telescopes.....

GALILEO

In 1623, in the office of Urbain VIII, who was Galileo's patron.

Oh my,
how I hate this North?.....

Well what's new Galileo?

One more letter from Kepler with news from Rome.
There they say that my telescopes deform the visibility of things.
Their proof: some stars look doubled.

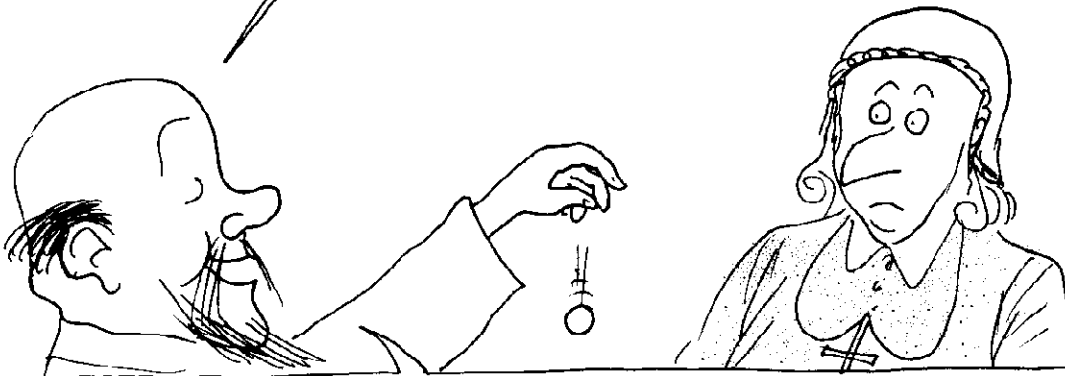


And doesn't that shock you
that the stars appear doubled
whereas through the naked eye we
can see single ones?.

Galileo, sh....

Why don't you try to see the universe
as it is, instead of trying to make it
up and interpret it in a wrong way
against the Holy Scriptures!

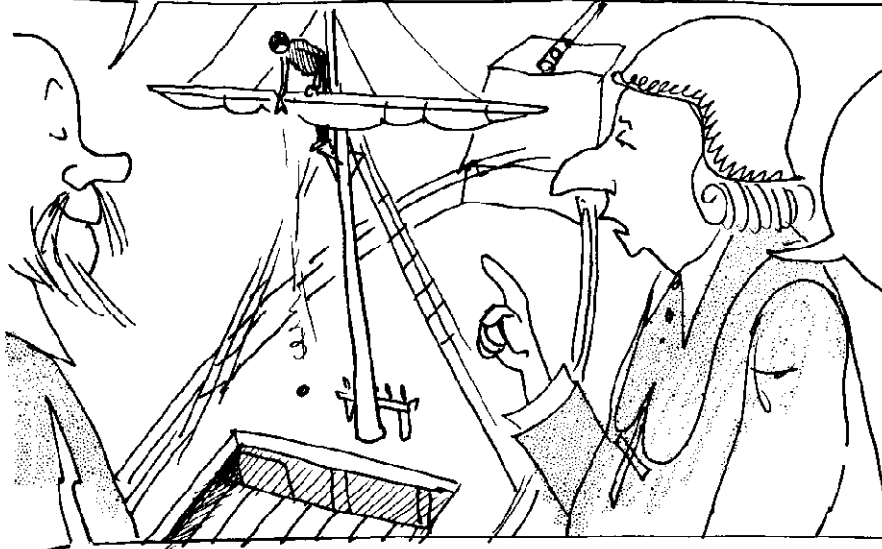
The Holy Spirit is not an astronomer!



These Jews are fools. They believe that if the earth really moved then a stone
if dropped, should fall on a little distance from the point of its drop!!

And, if we are traveling on a ship and if we drop a stone from the top of the mast, it would fall down at the foot of the mast in absence of wind.

I have verified this.



They also say that if the earth really moved, it would burst due to **CENTRIFUGAL FORCE**.



That's enough! His holiness is quite aware that one day is made of 24 hours! The earth thus rotates pretty slowly as not to burst open.

My dear Galileo! Take it easy. Science is bound to progress cautiously.... these are nothing but hypotheses, conjectures, figments.....

Hypotheses! Can't the church be a little more modern in its outlook? I don't understand how the Earth's motion is going to chuck out all the religions from the earth's surface.



The bible is not a scientific book.

Well, lets see your latest inventions.

There are mountains on the moon's surface and the sun has small pox on it...

What are you saying?

The moon is nothing but a big stone - full of crust and the sun is all stained.

I heard everything. it's **TOO** serious.

Galileo was just joking. Simple guesses.

Nuts!, the General of the Jews.

The sun and the moon **HAVE TO BE SPHERICAL!**

You know perfectly well that he wasn't joking.
Mathematics is a devil's tool.

You are all narrow minded.

Ah!.....

Saint Augustine rightly said that he
would rather pray than interfere
with the universe....

They are all too attached to
Aristotle's stupidities;
to statements which would be
incapable of describing any
natural phenomenon.

Well, this is because we do not
in the least believe in the
servants of the church as you
would have wanted us to!

Galileo, you are going too far.
These Jews are powerful.
I just don't understand.....

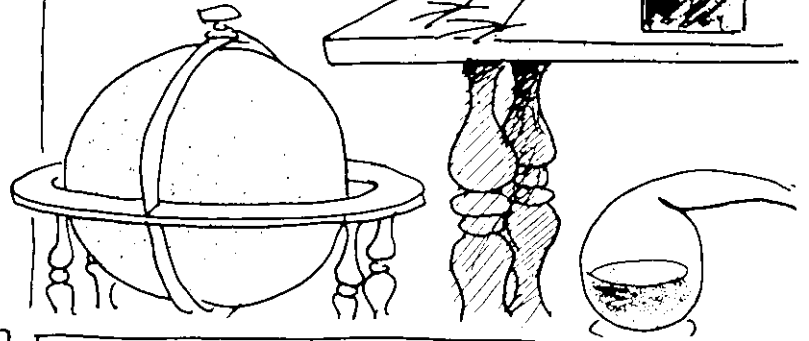
We would soon see whether its logic or
crass ignorance which would triumph.

It was soon obvious.
Galileo was forced to apologize publicly in 1633.

NEWTON

One morning in the year 1690,
at Cambridge.

Master?



He is not answering.

My lord, Newton,
hmmm....

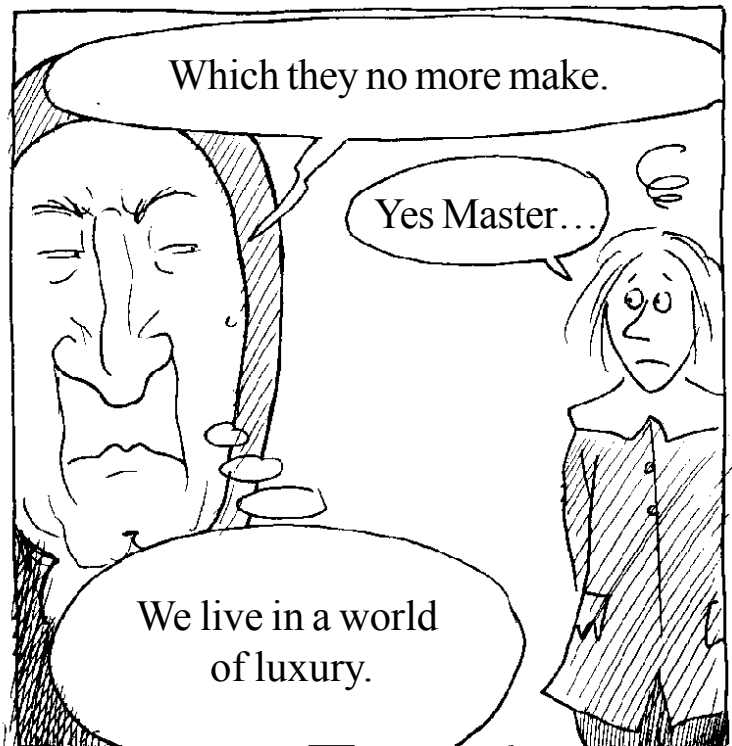
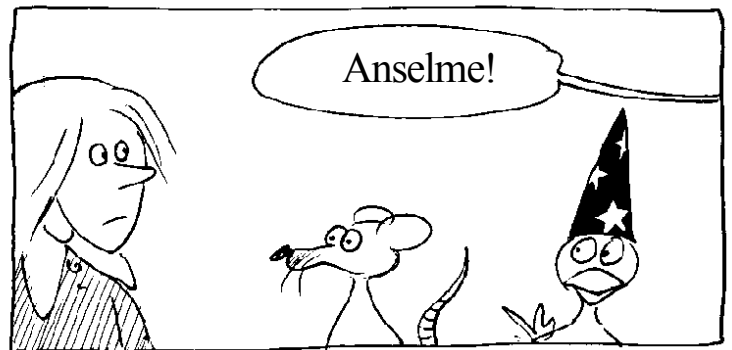
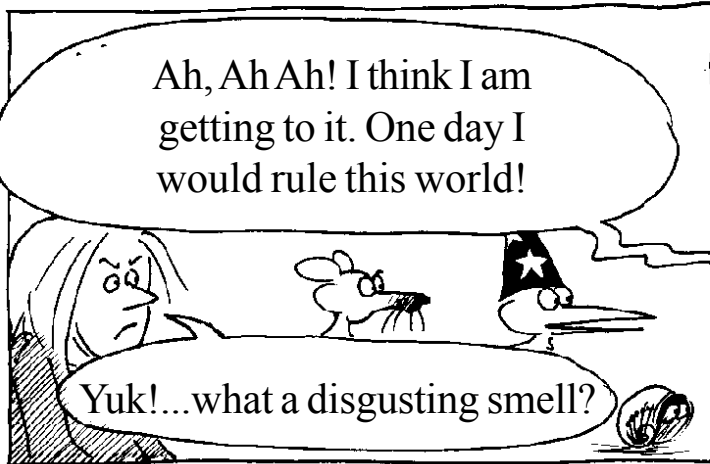
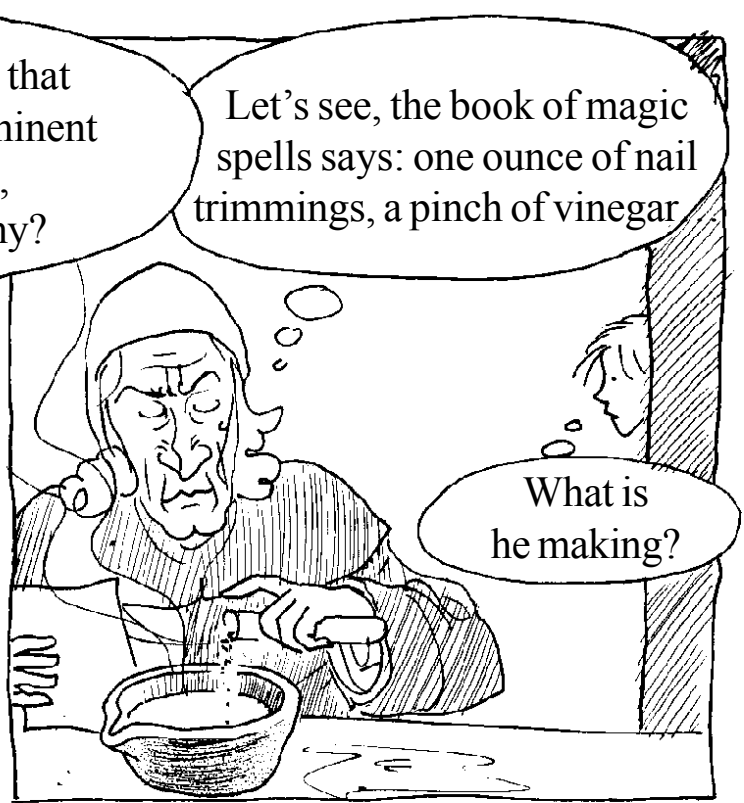
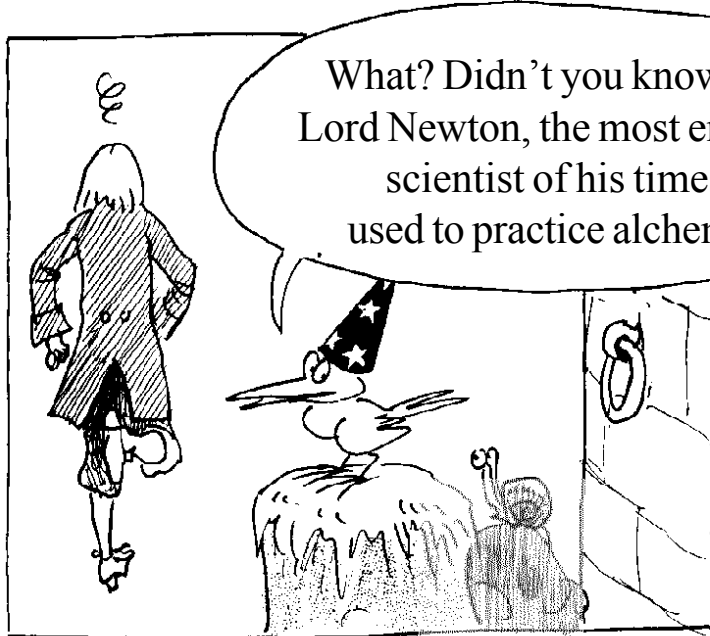
What is it now?

My lord,
your order.....

My order?
Of what?

Of mercury salt,
sulphur and solution of
white lead.

Good gracious! Just get me cured of these drugs, that's all!



My goodness, when I think about
what these fools have written -
that there is no such thing as
ABSOLUTE SPACE.

Anselme, get me a
pint of water.

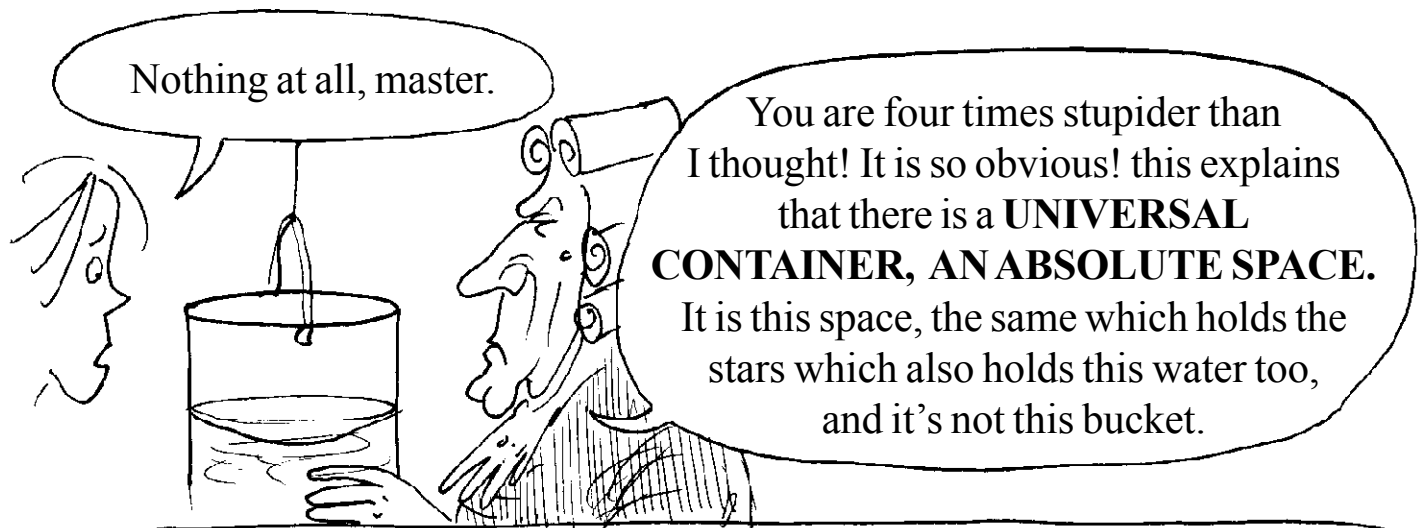
A pint of water....
A bucket, my lord?

I hang this bucket with
a rope, and then I give
it a twist .

Then I just leave it...in
the first few moments the
bucket turns but the water
inside doesn't. Its surface
remains undisturbed.

And then due to friction the
water also moves. And then the
CENTRIFUGAL FORCE creates
a trough on the water surface.

Watch now, I am stopping the bucket, the
water continues to turn, due to **INERTIA**.
The trough on the water surface is
still there. Do you understand?




Nothing at all, master.

You are four times stupider than I thought! It is so obvious! this explains that there is a **UNIVERSAL CONTAINER, AN ABSOLUTE SPACE**. It is this space, the same which holds the stars which also holds this water too, and it's not this bucket.


The **CENTRIFUGAL FORCE** does not act unless this bucket turns with reference to this **ABSOLUTE SPACE**.

Leibniz is a mangy ass, and I am going to write that to him.

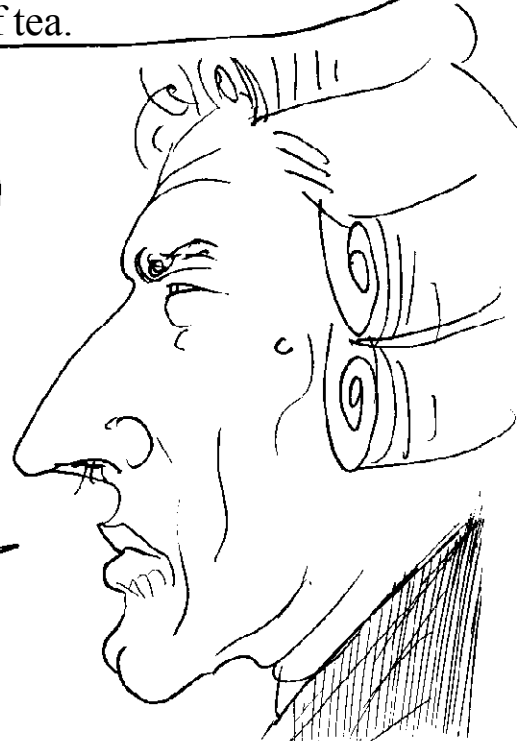


Oh, my, Leibniz is certainly not going to be happy with that...

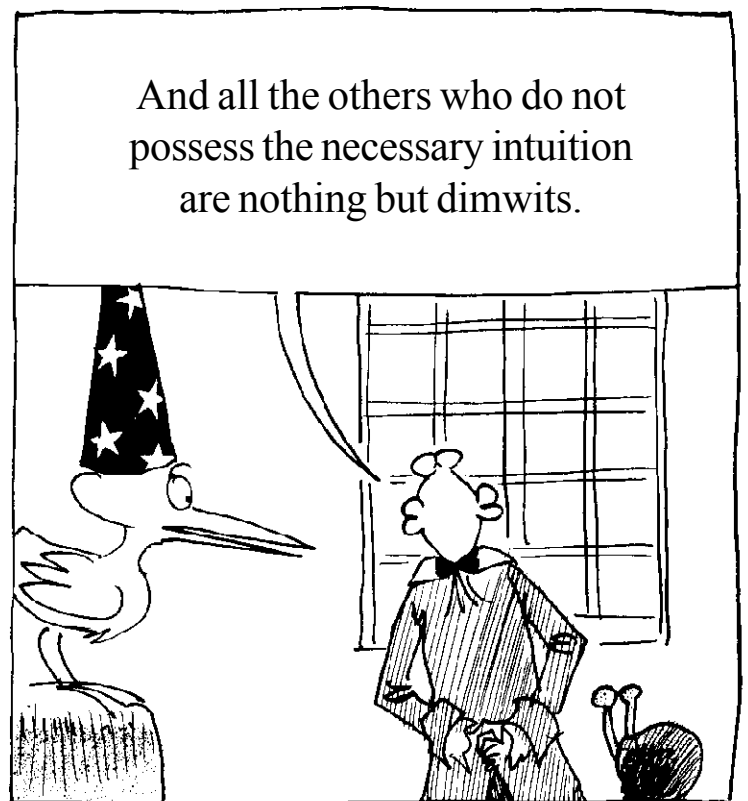
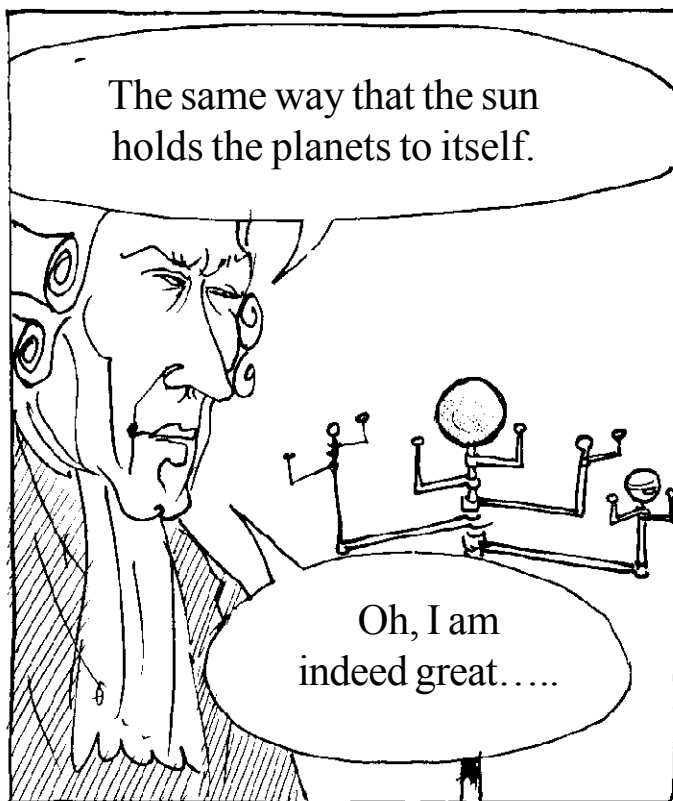
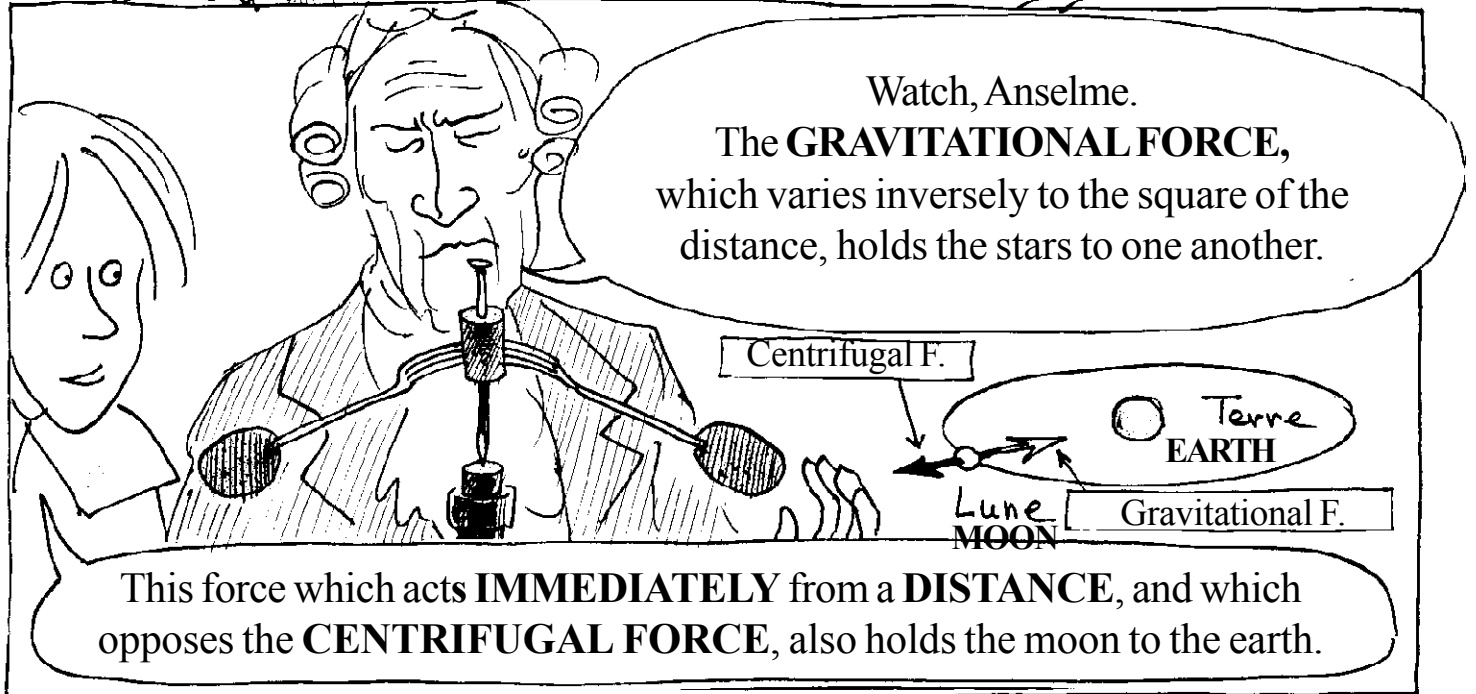
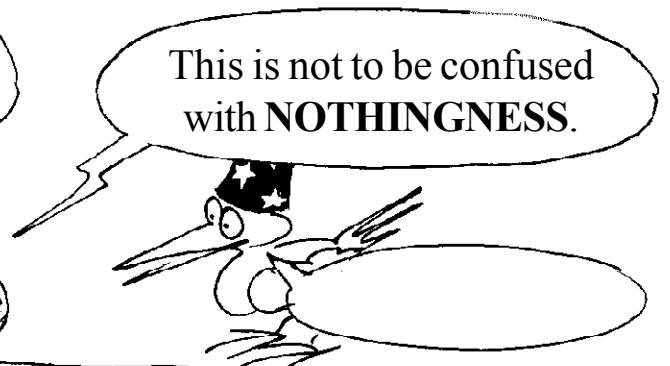
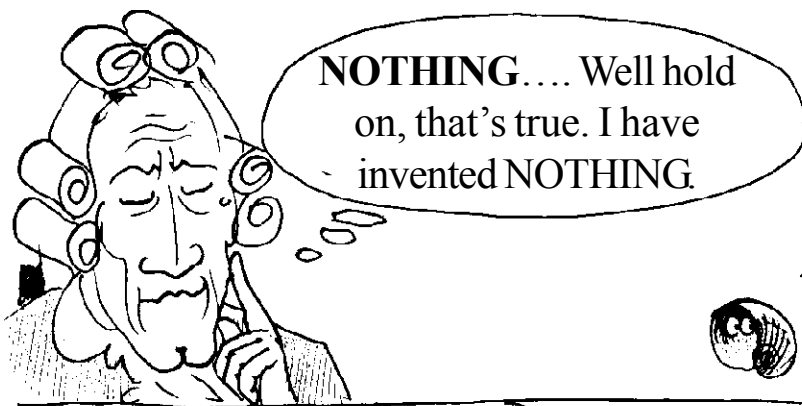
God with his infinite wisdom, has placed the stars in this **VOID**, and not in a space filled with whirlwinds, as is said by Descartes, the French philosopher, who in fact mistook the universe for a cup of tea.



But then between the stars there is.... **NOTHING?**



That's it, there is **NOTHING!**



And he dares to criticize me! I would
crush them, I would crush them all,
do you hear me, **ALL OF THEM!**

Yes my lord....

QUACK!

Hmmm.....

And now go and fetch me the
pounded horn of a cow. Fast!...

Eh!....yes my lord.

WILLIAM HERSCHEL & PIERRE SIMON DE LAPLACE.

Castle of Malmaison, August 1802.

How are you feeling Mr. Lanturlu?

Always great, when I am in your joyous company,
my dear Sophie.

But tell me one thing
isn't he the Baron of
Laplace who is talking
to the General?

Yes indeed it looks like....

But then who is the other person with them who has a strong English accent?

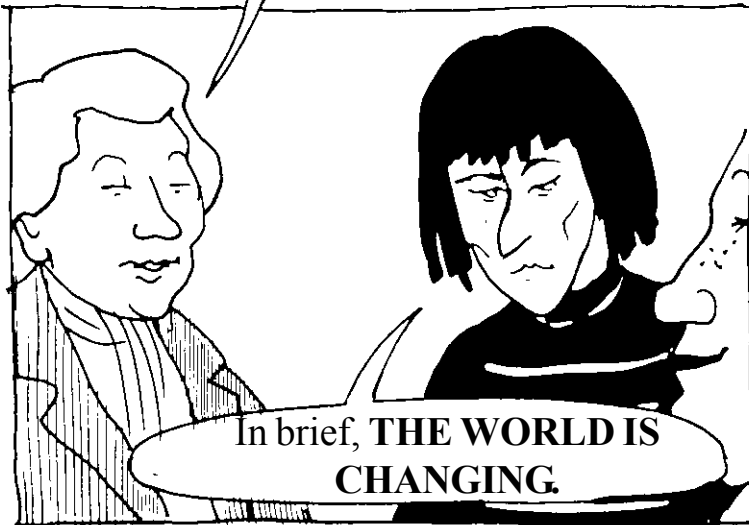
It is Herschel the astronomer.
Let's go and meet him. It looks as
if they are in the middle of a
passionate conversation.

Mr. Herschel, I have been told everything about you. You make telescopes, you have calculated the distance between earth and the sun. And even more, you have discovered other worlds beyond the reach of our imagination.

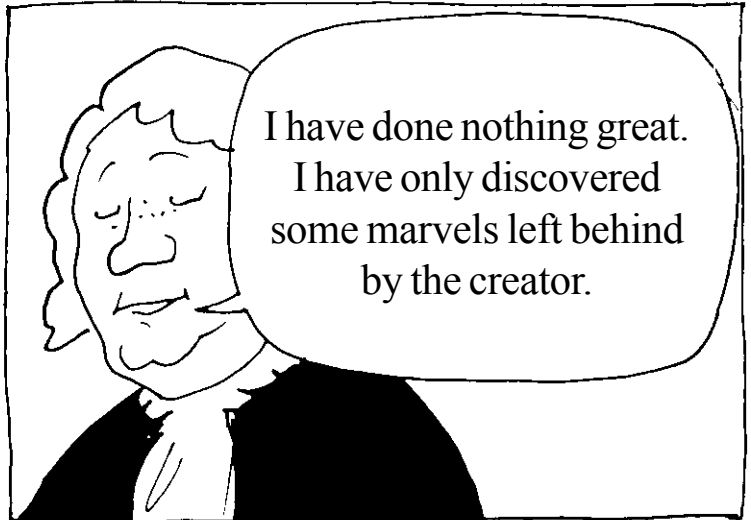


Yes General, it is true that the universe appears much larger than we've ever dreamt it to be, through our instruments. I have myself observed the cosmos - nebulae formed of myriad of stars, the light of which takes millions of years to reach the earth.

Herschel has really shaken our views about the world, and we cannot be sure as to what lies at its centre. The stars are in motion and so is the sun. The milky way is a rotating grand disk - made up of trillions of stars.



In brief, **THE WORLD IS CHANGING.**




I have done nothing great. I have only discovered some marvels left behind by the creator.

But, everyone knows, that it is Mr. Laplace who has thrown light on all this, he has clearly elucidated the latest secrets of the universe, concerning the trajectories of the planets. He is a great mathematician who has drawn precise calculations....




By the way, Laplace it reminds me of Newton who had thought, that when planets leave their orbits, it's God who brings them back to their places.
What do you think of that?



I would say General,
that I did not have to rely upon any
such hypothesis for my calculations.

Herschel and Laplace, it's the beginning of a new world.



But there is something in
Mr. Herschel that amazes me.

And what is that, General?

He leads such a peaceful life, he gets along very well with his wife, his son wants to pursue his work, and he doesn't have enemies. It just does not sound normal.

Yes in the world of science,
I would say it's rather rare!

Oh, excuse me,
here comes Josephine...

Thus, my dear Laplace,
do you think that there are
other worlds like ours,
around different suns in
different galaxies.

Absolutely!

Life surely exists on other
planets. They probably have
their own history and
civilization.

Herschel had discovered the **qualitative** aspects of modern astronomy: existence of galaxies, movements of stars, structure of Milky Way, and sun's movement. The following century would bring the first precise **FINDINGS**.

Sky!

Noting the two exact locations of a star in the Swan (Cygnus) constellation, in August and December, against the background of the faraway stars, (parallax), **BESSEL** a German astronomer found out its distance from the earth - 11 light years.

61 CYGNI

EARTH AUGUST

EARTH DECEMBER

AUGUST

DECEMBER

Steady please!

Later on photography made it possible to capture images of celestial bodies, on a film. This also helped gather more information about the night sky.

In 1912, Henrietta Leavitt.

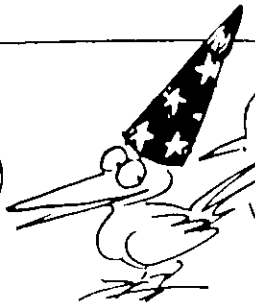


Cepheids are those stars which fluctuate in size and brightness.
Finding out their distance by the parallax method is only
precise to only a few dozen light years.
But it proves that in case of the nearer cepheids their distance is
directly proportional to their luminous intensities.
More the light emitted, longer is their period of oscillation.

In a way, if we record the quantity of light emitted by a Cepheid and evaluate it
on the basis of its period of oscillation, we could calculate its distance.



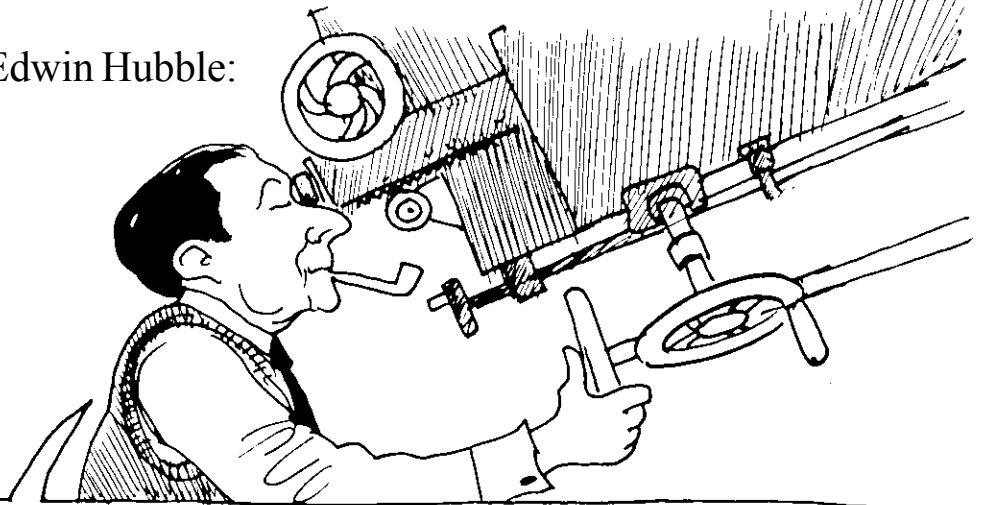
I am
great!



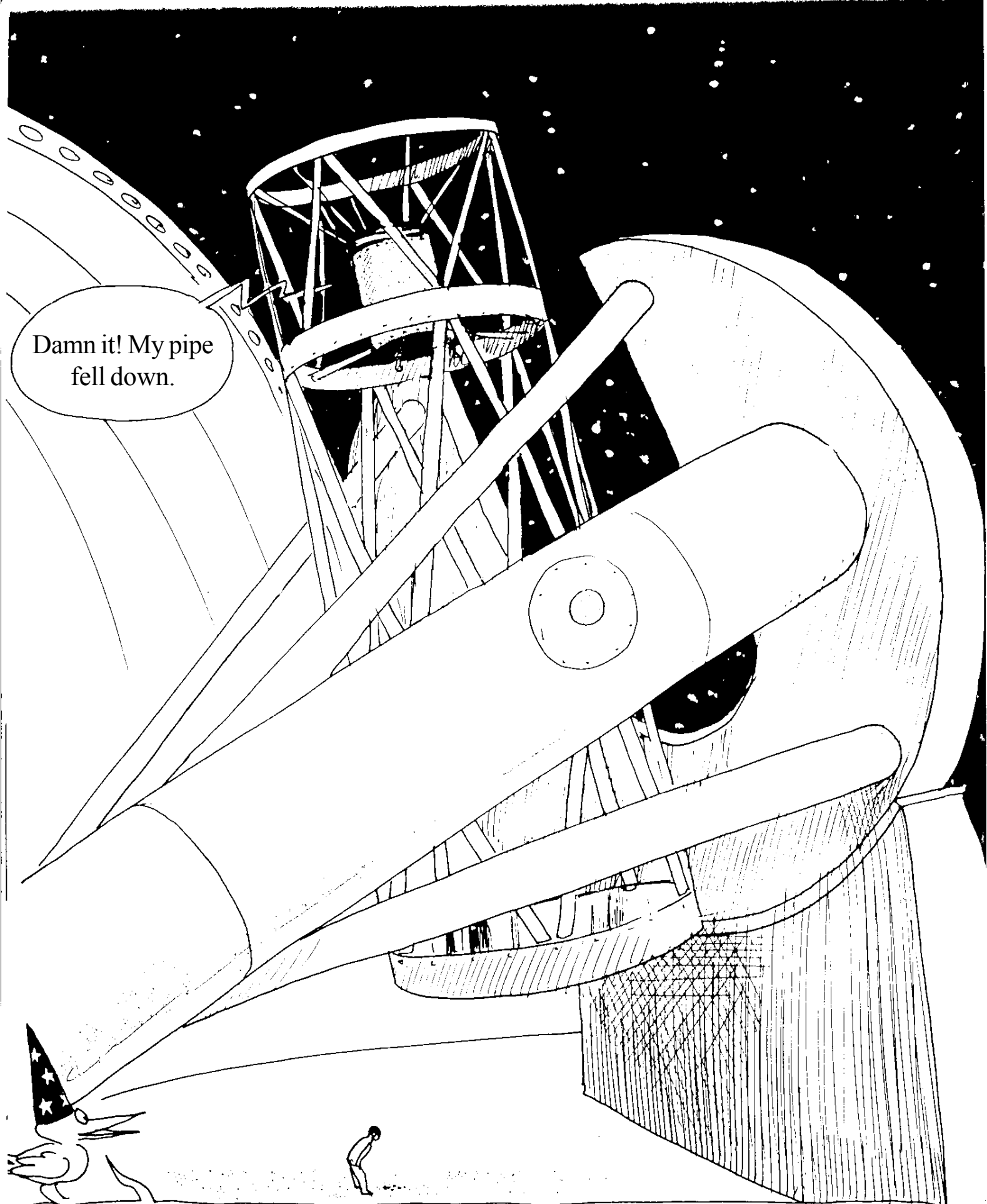
But many still doubt the extragalactic
nature of the famous spiral nebulae.

PALOMAR STORY

In 1924 the American astronomer Edwin Hubble:



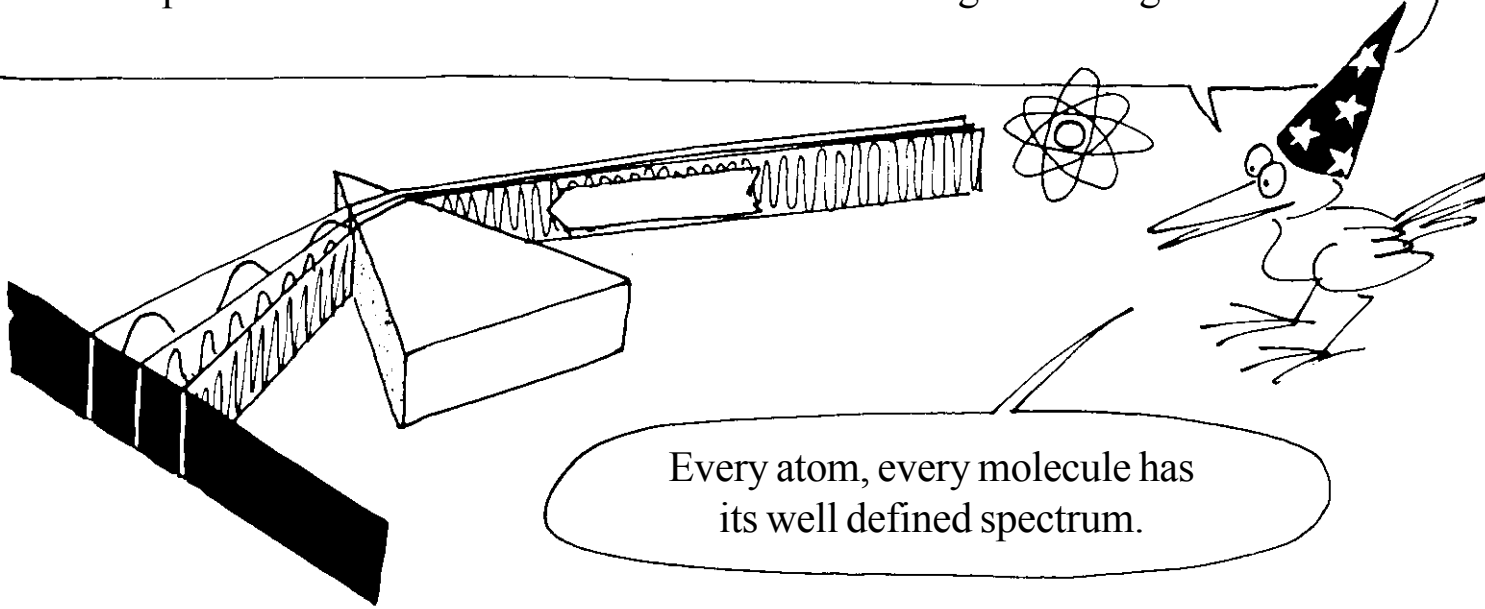
My good friend, this problem is resolved. I have just discovered a magnificent
Cepheid in Andromeda, the spiral nebula. It is thus not a part of our galaxy.
I can say that its distance is about 2 million light years from earth.



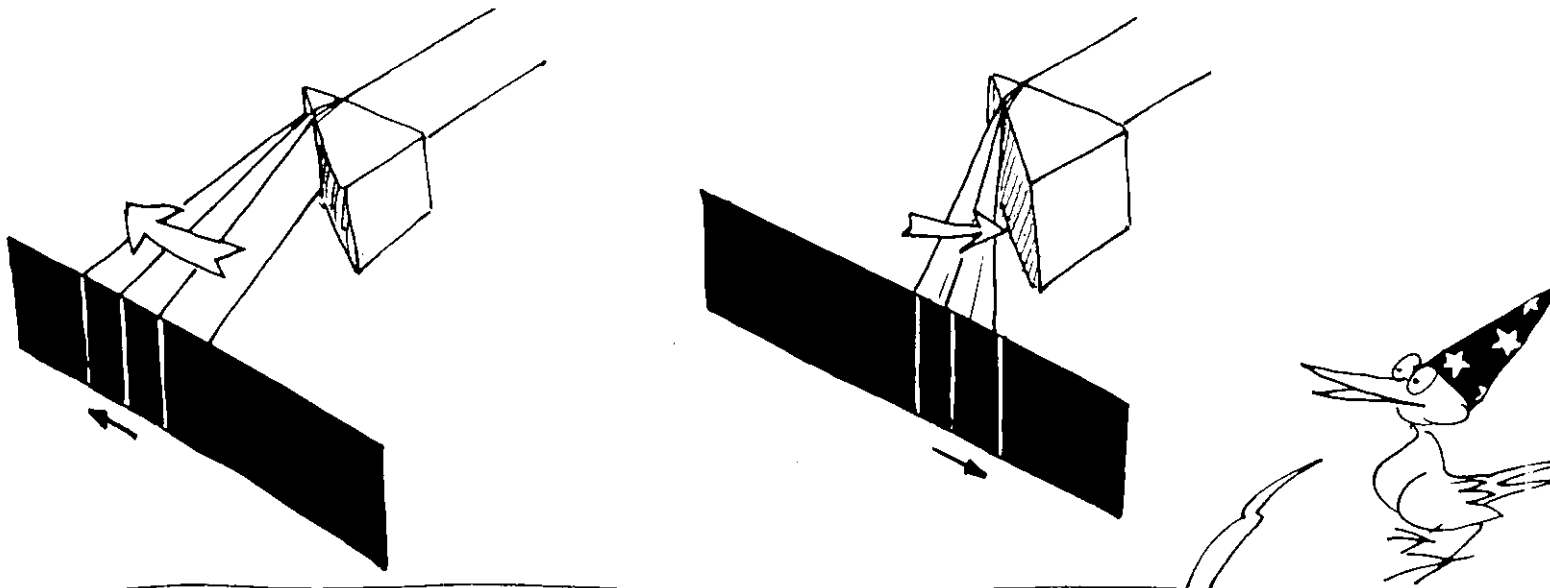
Damn it! My pipe
fell down.

The Palomar telescope could 'see' up to ten billion light years away. Modern cosmology found this instrument useful to investigate the limits of the universe.

But here is one more episode to this tireless quest. Since 1859, thanks to Kirchoff, the astronomical world had started using a **SPECTROSCOPE** mounted on a telescope to determine the characteristic nature of the light emitting bodies.



Every atom, every molecule has its well defined spectrum.

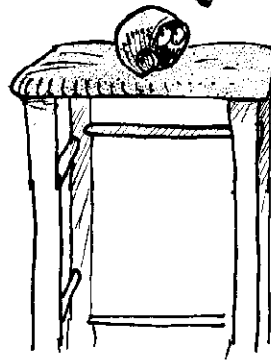
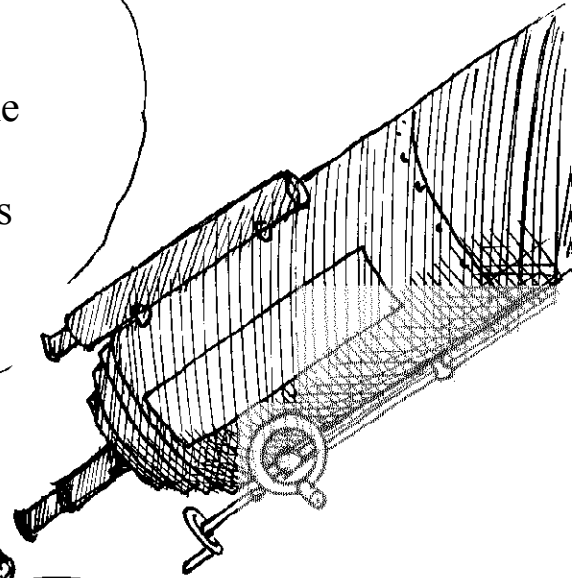


If the source of light is moved away or towards the prism with a particular speed, we observe a **RED SHIFT** or a **BLUE SHIFT**. Thus the analysis of the spectrum not only gives the chemical nature of the star but also its speed with reference to us.

This is called the DOPPLER-FIZEAU effect.
For more details refer: **BIG BANG (BELIN)**.

Analyzing different spectrums of light coming from faraway galaxies, Hubble and Humason discovered that there were deviations towards the red colour, or the **RED SHIFT**. These galaxies were traveling away from us and their speed was proportional to their distance from Earth.

It seems quite logical that the universe must have emerged from an explosion.....

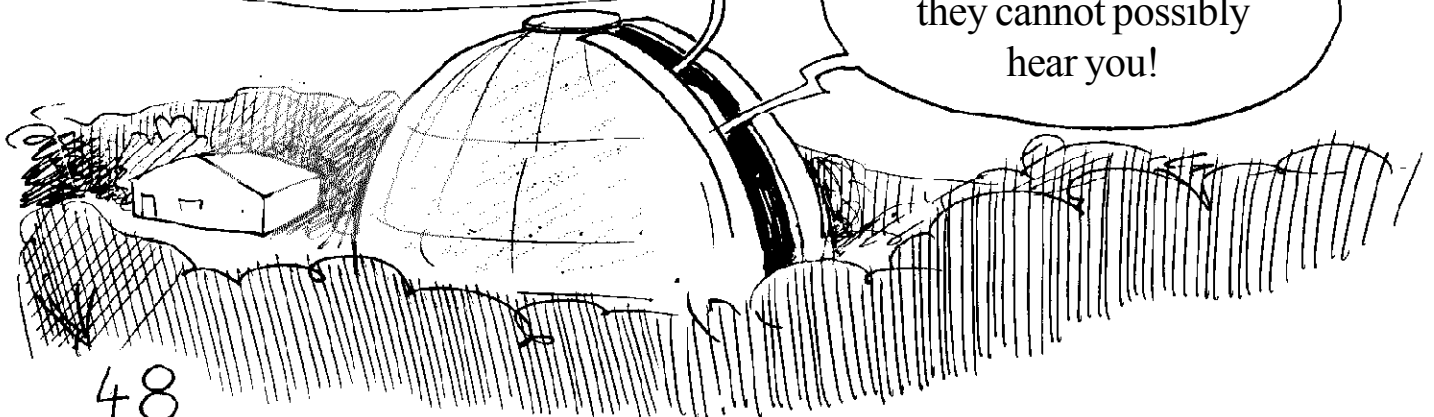



BIG BANG

THE BIG BANG


They are running away from us Milton, they are!

Don't shout so loudly Edwin, they cannot possibly hear you!






But then the
whole universe is
NON-STATIONARY?




And nobody could have possibly
guessed this until this accidental
discovery by Hubble.



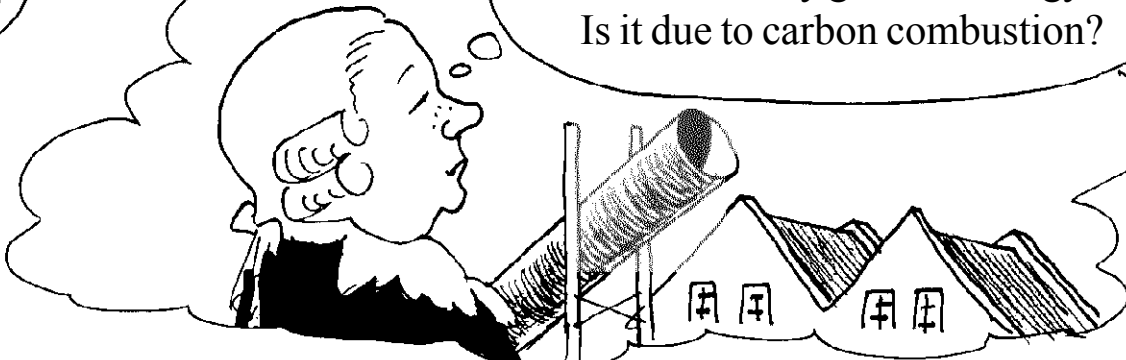
Until 1572, no person would have
believed that stars were ephemeral -
they are born and they die.



Until the time when Brahe observed a
Supernova - the violent end of a star.

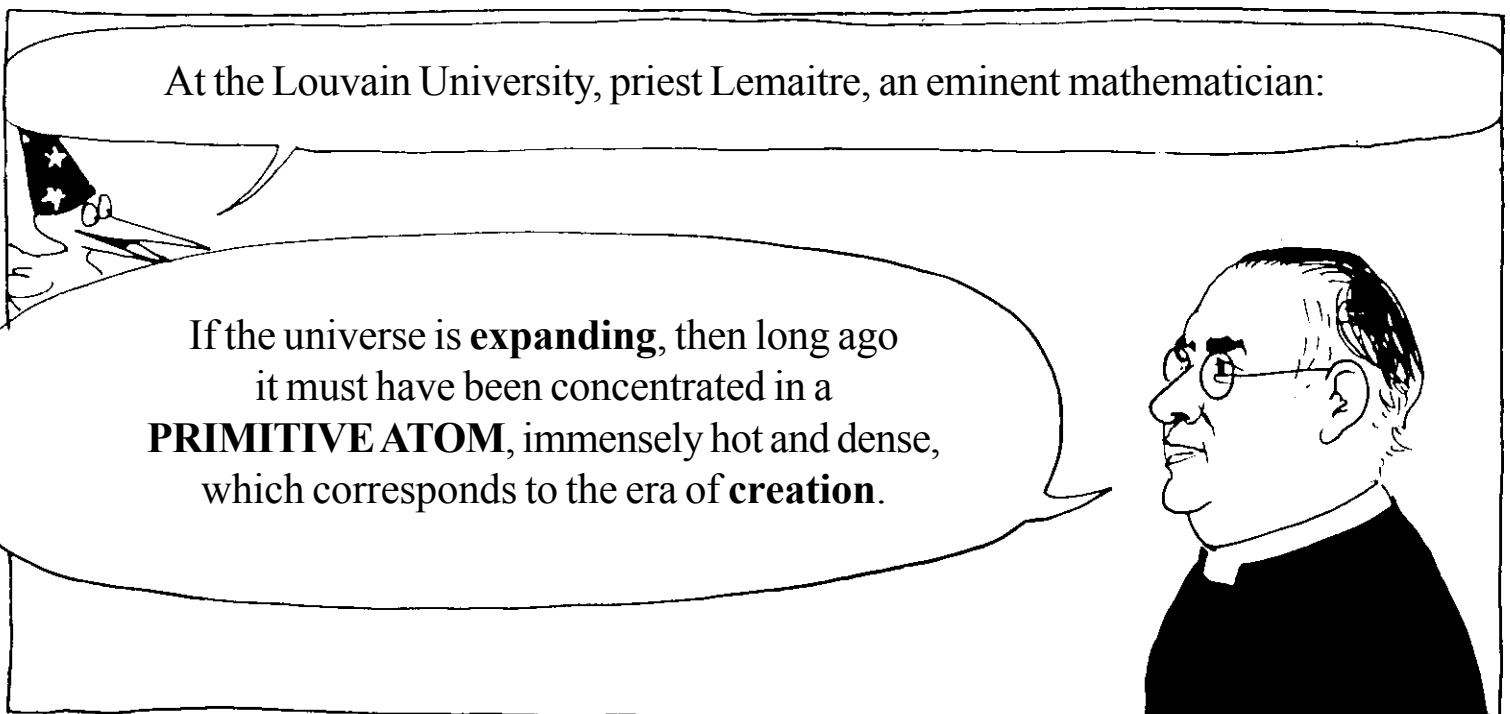
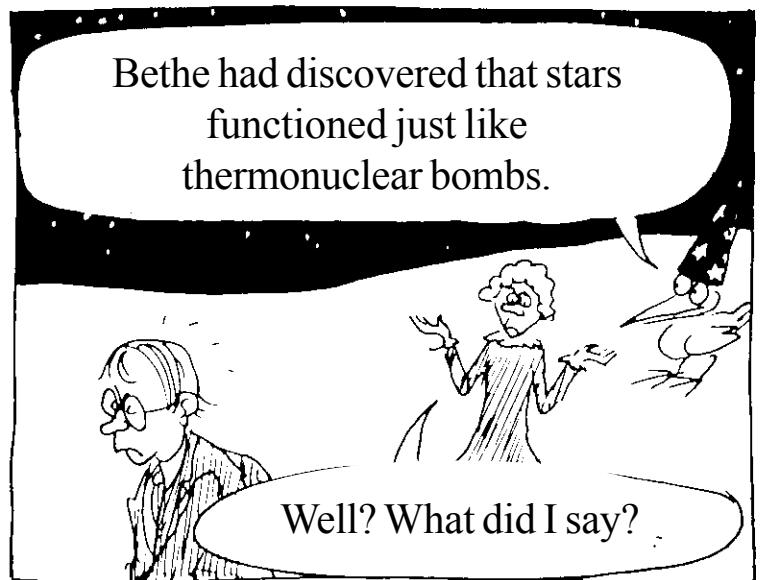
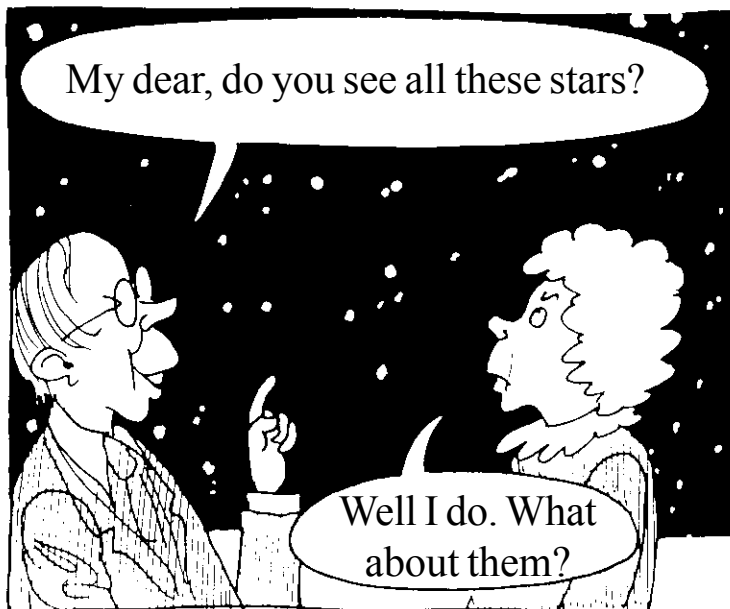


In 1810, Herschel was already thinking
about their means of existence.



How do stars produce
their own light?
Where do they get their energy?
Is it due to carbon combustion?

In 1938 Hans Bethe, in Denmark.



But, the **BIBLE** says that it was from a hair of a beast that the...

There should be an alteration of dates. This was during the Genesis, which was around 12 or 15 billion years ago.



On the other side of the English Channel, in Cambridge, Fred Hoyle, fiercely opposed this theory. According to him the universe grew continuously, with new atoms arising due to the phenomena of **CONTINUOUS CREATION**.



To sum up, Hoyle did everything he could to fight against the stronghold of theology over the domain of science.

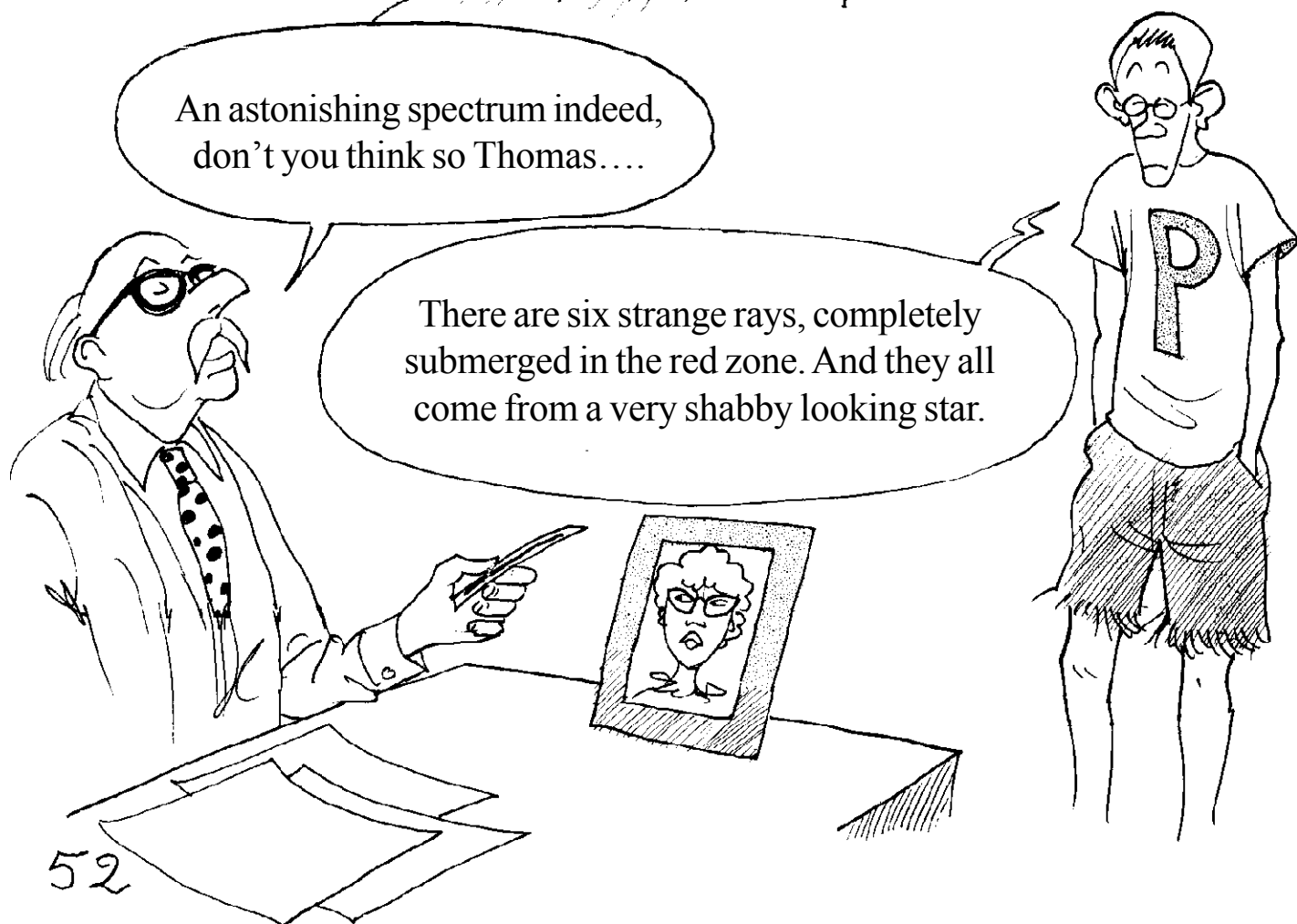
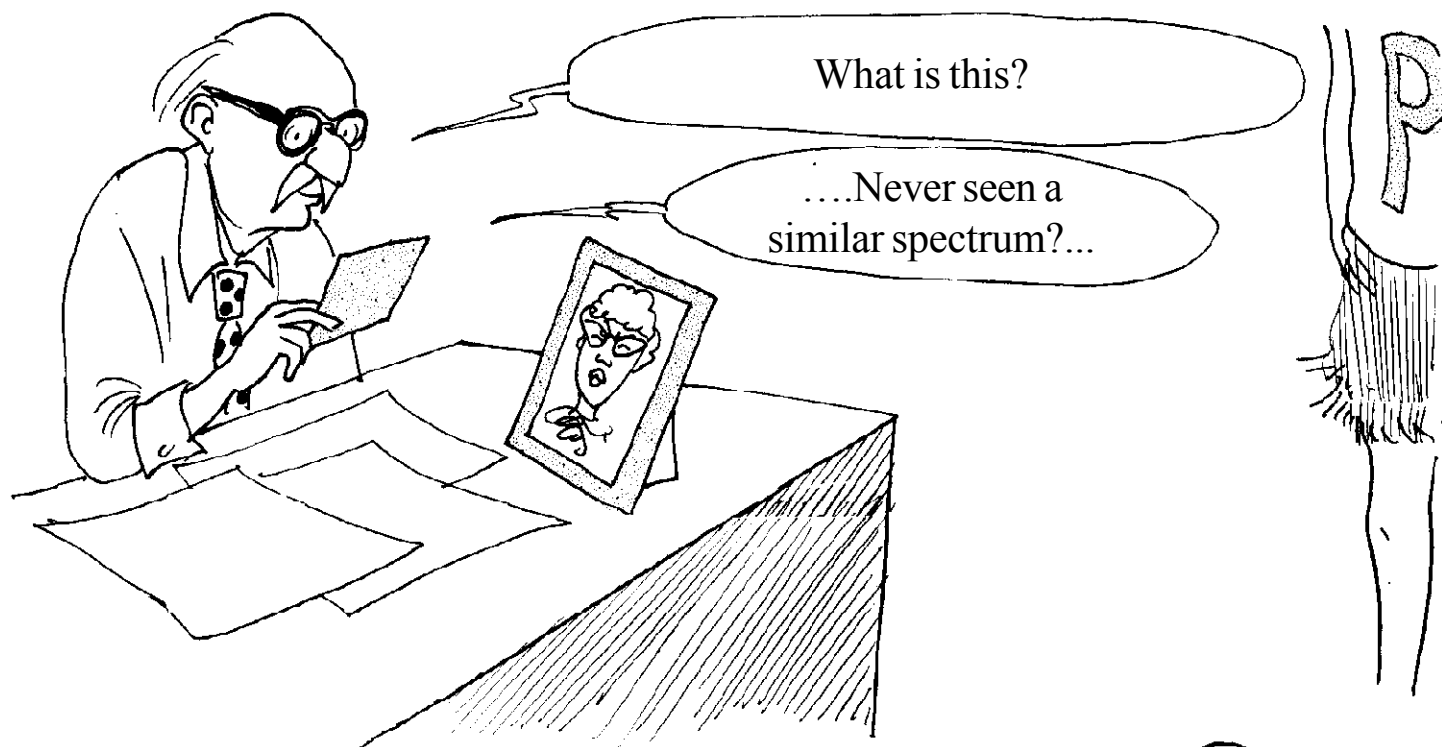


One church against the other.

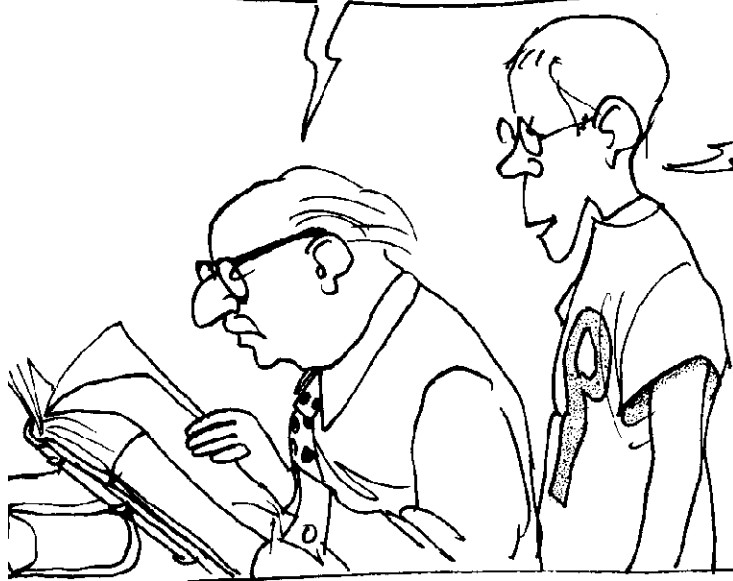


THE QUASARS

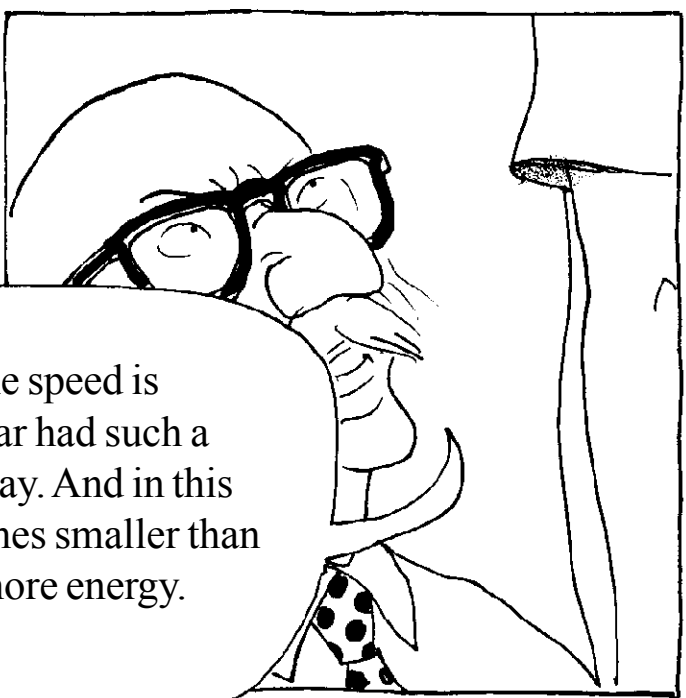
Observatory of Pasadena, Professor Jesse Greenstein has a new student Thomas Matthews.



I have been analyzing spectrums for years now, and I have never come across anything like this. No star emits light like this.



As it is completely in the red zone. Could it be because of the Doppler Effect? i.e. released from hydrogen and moving at a tremendous speed.



Thomas, according to Hubble's law the speed is proportional to the distance. So, if this star had such a terrific speed, it would be definitely far away. And in this case this minute particle which is 50,000 times smaller than the Milky Way, would emit 100 times more energy.

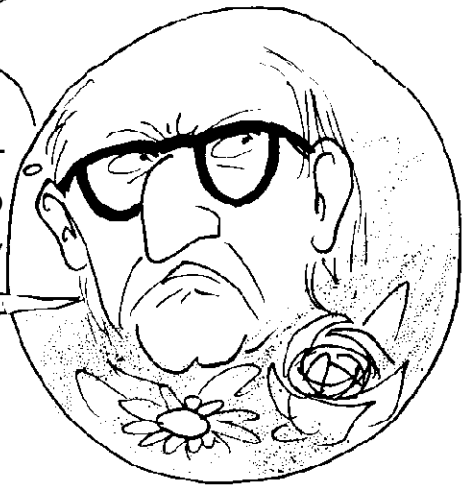
You may leave....



This is the price I have to pay...



What does he know about spectro-scope? He is a radio astronomer.



ONE YEAR LATER.

Maarten Schmidt:

Hey, Jesse, did you see the spectrum emitted by these strange objects, "quasi stellar", these quasars which were detected one year back.

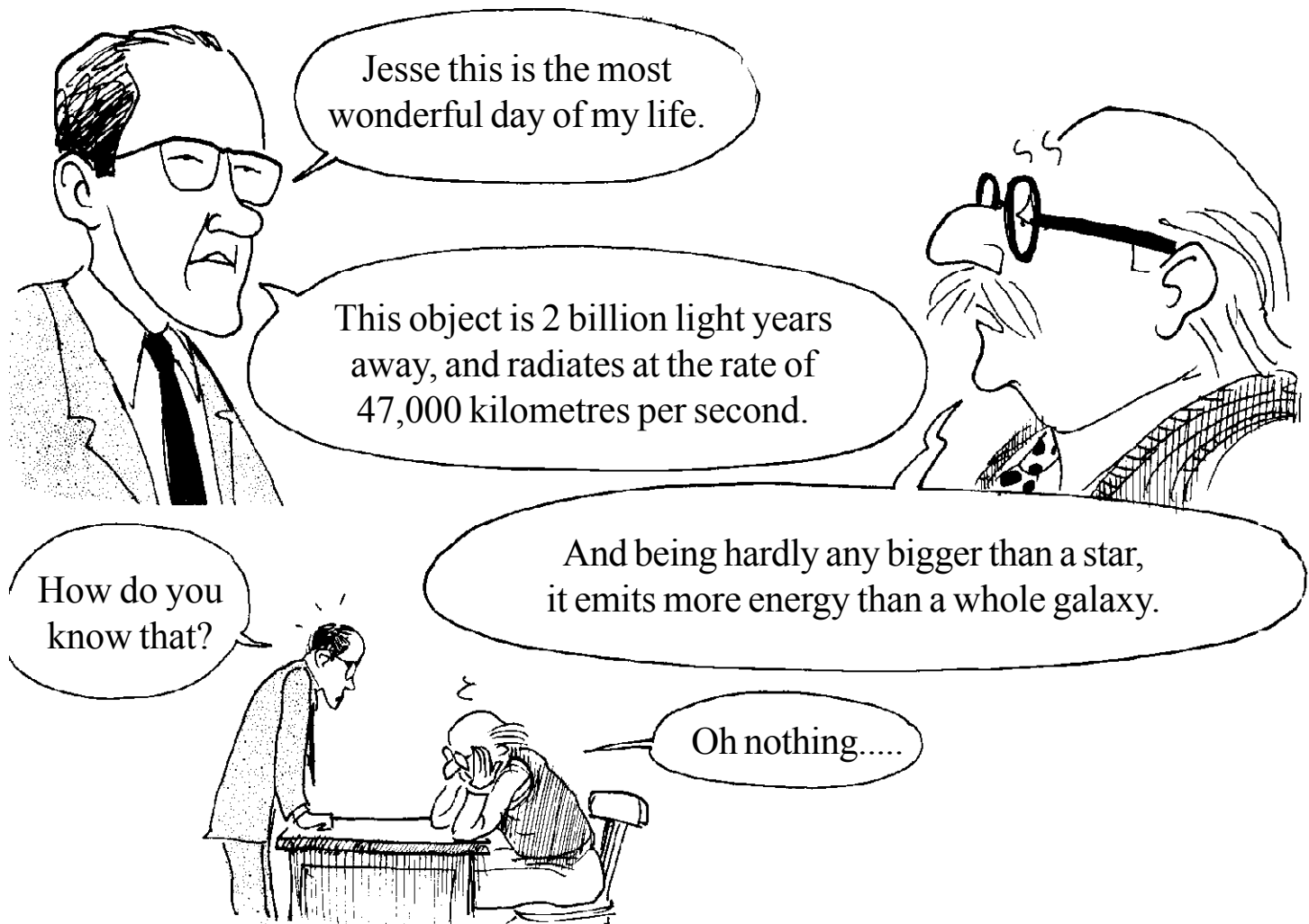
Yes Maarten.

This Dutchman is so calm....

Do you see this spectrum of hydrogen.

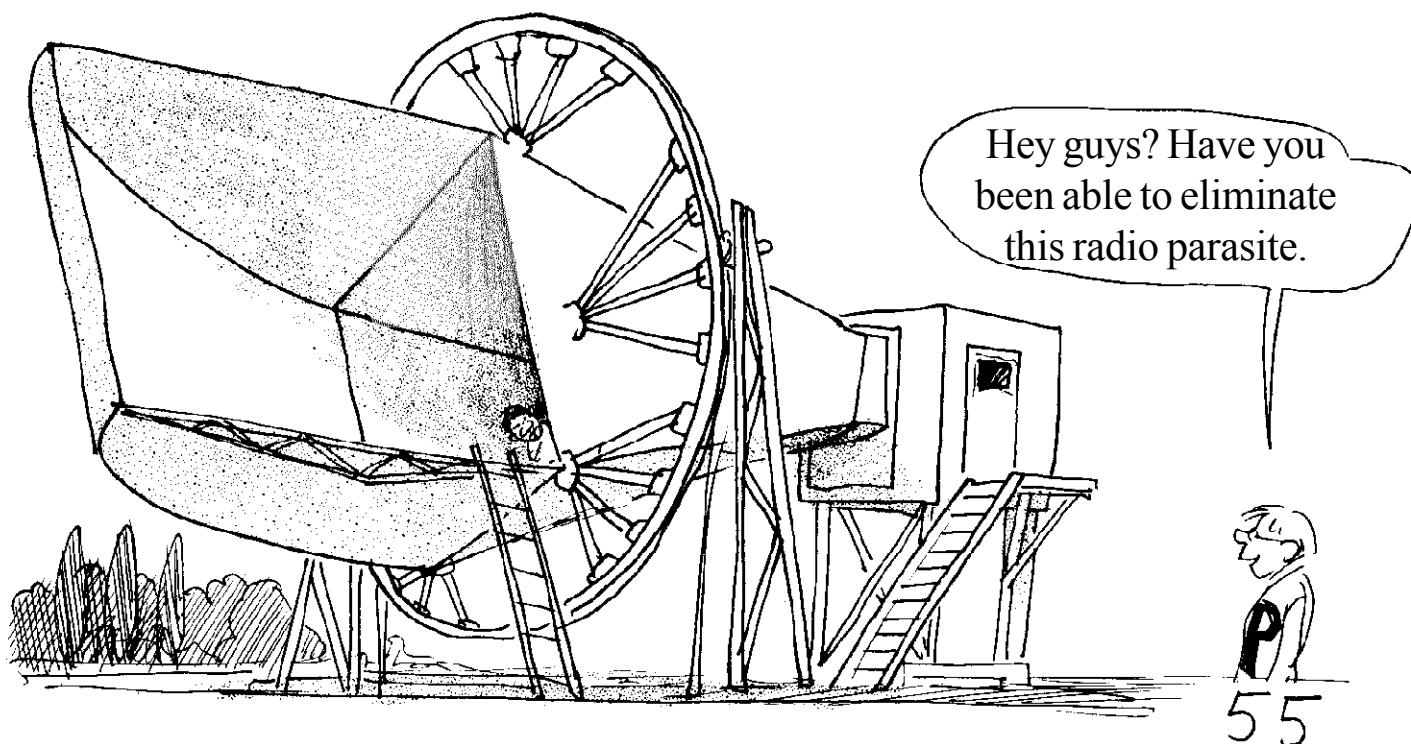
You superimpose it and slide it towards the red.

And they are now identical.

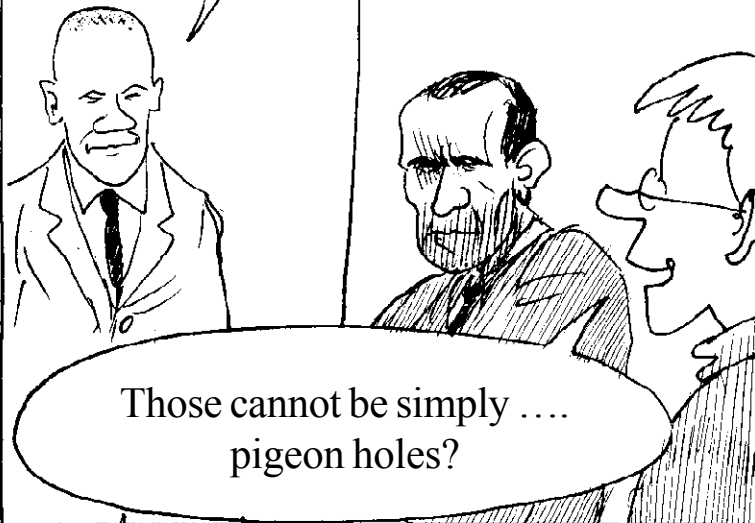


THE FOSSIL RADIATION

In 1964, in New Jersey

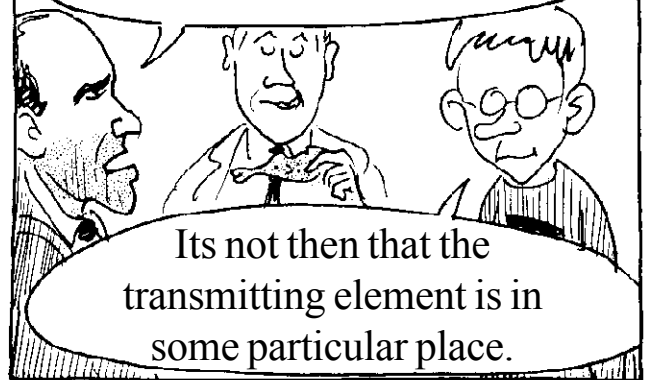


Nothing can be done! Just think of blocking all these cracks with the help of an adhesive tape.



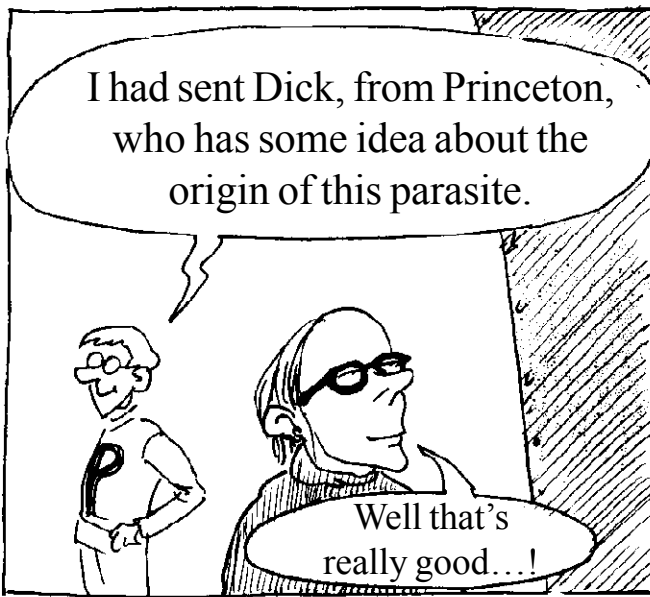
Those cannot be simply pigeon holes?

No, no. Wilson had cleaned everything, still it's the same. We have always had this useless radio parasite. And what is really strange, is that its an **ISOTROPE** it comes from almost all directions of the cosmos.



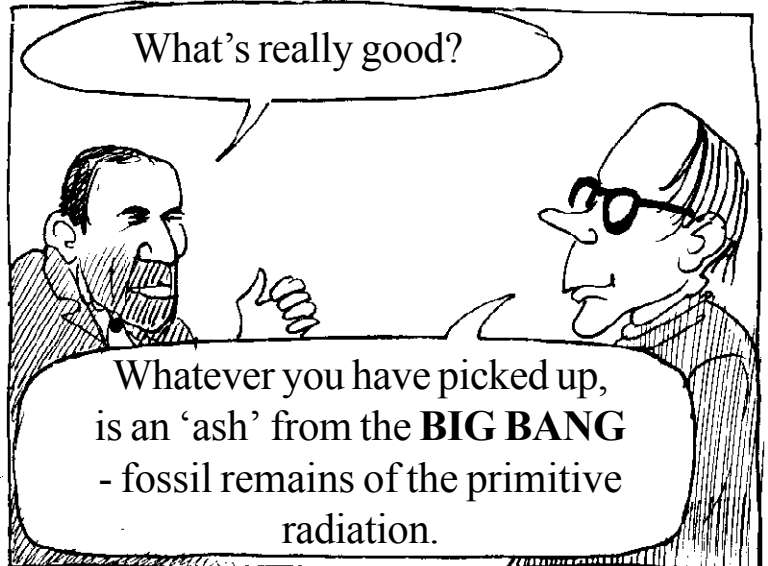
Its not then that the transmitting element is in some particular place.

I had sent Dick, from Princeton, who has some idea about the origin of this parasite.

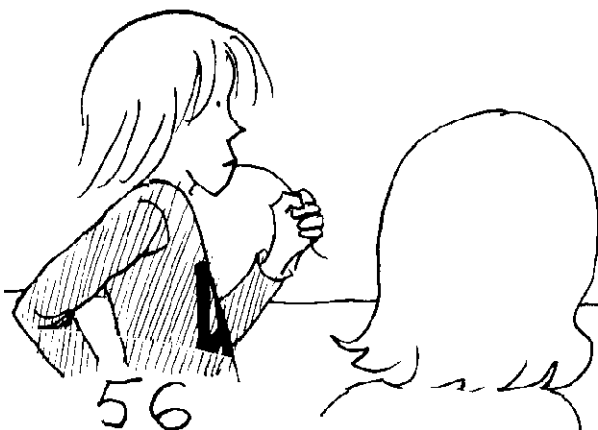


Well that's really good....!

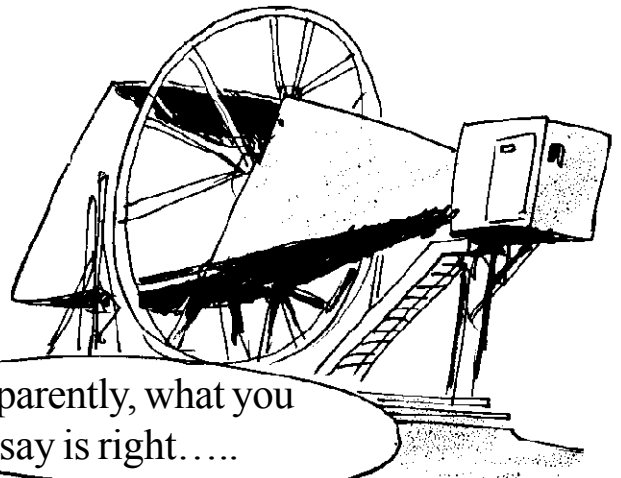
What's really good?



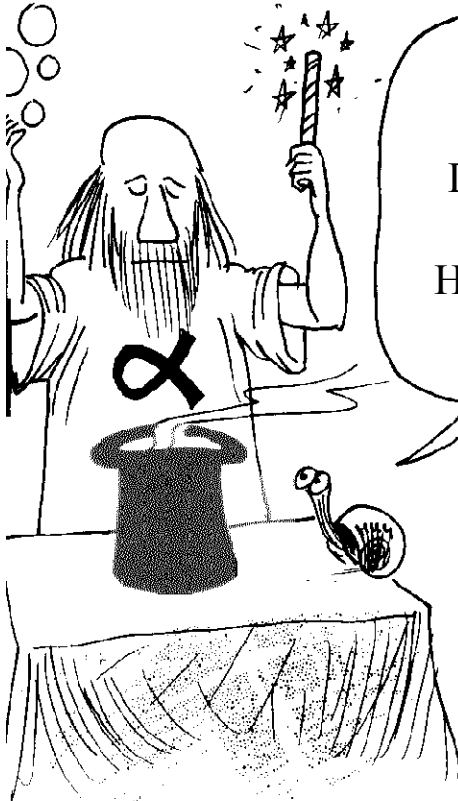
Whatever you have picked up, is an 'ash' from the **BIG BANG** - fossil remains of the primitive radiation.



Apparently, what you say is right.....

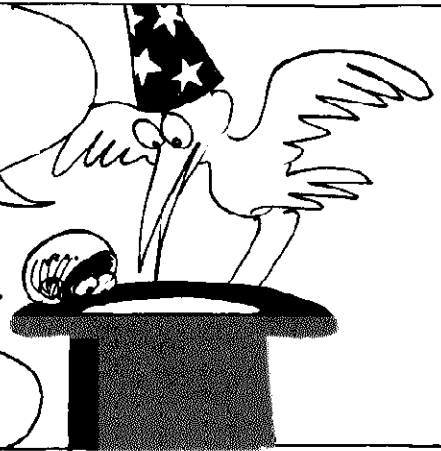


BUT WHERE HAS THE ANTI-MATTER GONE?



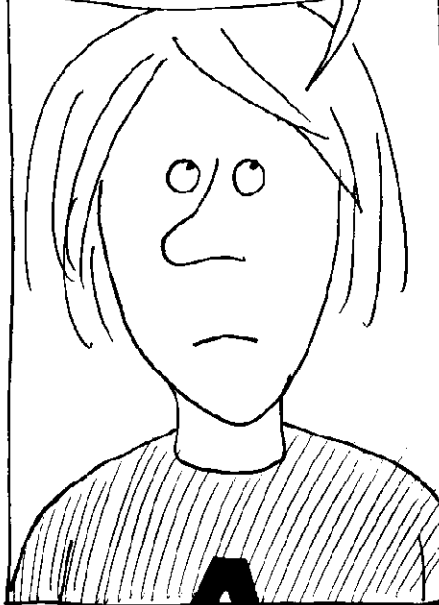
In this magnificent tour of the past called the **BIG BANG** there lies an embarrassing dilemma. Due to this radiation both matter and anti-matter were created. The universe was frozen. This was the Hecatomb. Particles and anti-particles were annihilated. And just one out of the billions remained (*).

But according to the calculations, nothing could have possibly remained.

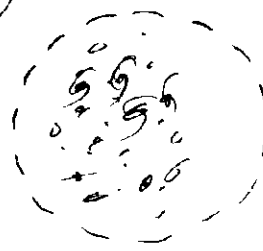


**ABSOLUTELY
NOTHING**

Well then where is the
ANTI-MATTER?



Did it separate on the galaxy level.



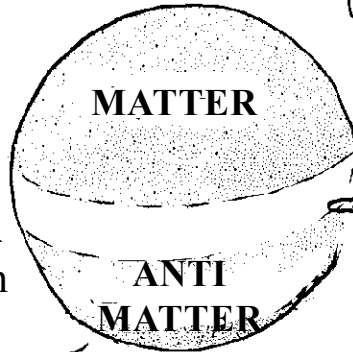
Or in the heaps
of **galaxies**.

(*) See *BIG BANG*, same author, same editor.

Jean-Marie Souriau, professor at the University of Provence, thought that the universe is split into two halves.

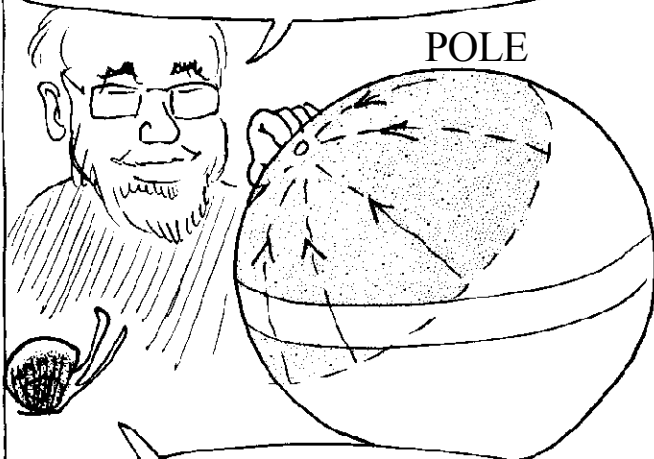
A universe complete and closed in itself. A kind of a **THREE DIMENSIONAL*** hypersphere in which matter occupies one half and antimatter occupies the other half.

Here's a picture in two dimension.



MATTER-ANTIMATTER ANNIHILATIONS occur on the border, which lead to **NO - MATTER**.

We are here somewhere, in one half of the universe on the matter side.



And this canopy, centered above the Earth, represents the field of observation for the powerful telescopes in the world, which detect **QUASARS** coming from fifteen billion light years away.

And what do we observe from such a distance?

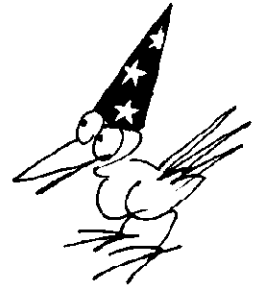
Obviously the **QUASARS**.

As you can see, we can observe one portion lying on the border in the **NO MATTER'S-LAND**. You can similarly observe the anti-quasars existing beyond.

And then?

EARTH

When we observe in the direction
of **OPHIOCUS** (the serpent), in **SAGITTARIUS**,
the quasars disappear from a distance of fifteen billion
light years. They only reappear from a distance of 400
million light years.



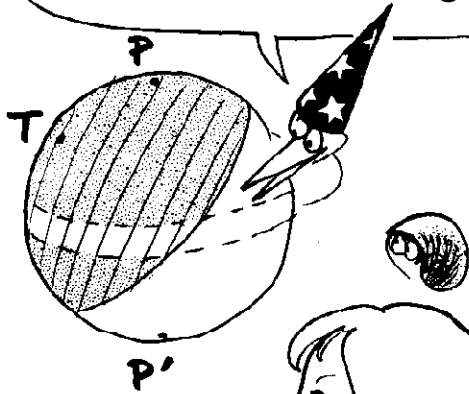
According to **SOURIAU**, this absence of quasars leads to the formation of an
equatorial layer (as a result of annihilations) - which starts thickening from
about half a billion light years away.

And beyond this, what we
might observe would be the
ANTI-QUASARS, made up
of anti-matter.

The far most of the quasar,
or anti-quasar observed, is located
some fifteen billion light years away.

SOURIAU finds the **PERIMETER** of
this particular universe as **60 billion**
light years.

And with the help of modern techniques if we can observe one half of the existing universe.



If I am not mistaken, this model of the universe has **TWO POLES**: one for matter and the other one for the anti-matter.

These are the two antipodes.

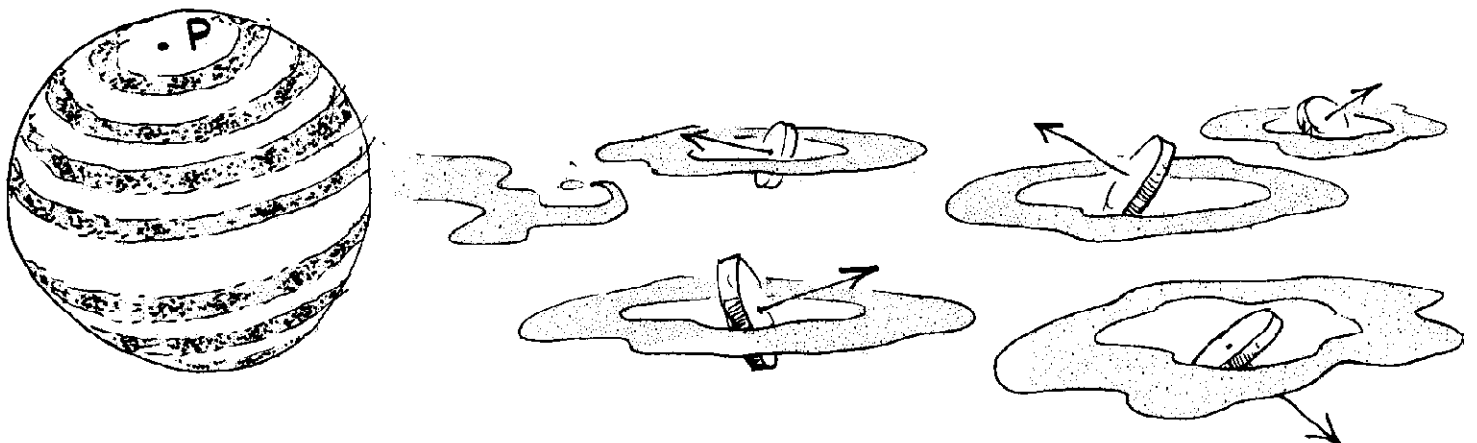
In case of three dimensional figures, we would say that the directions in question are opposite each other.

In the beginning of the century, we had got rid of the concept of the centre of the earth with great difficulty. If this model represents the reality, we would have two. And what do you think we would find at these two points?

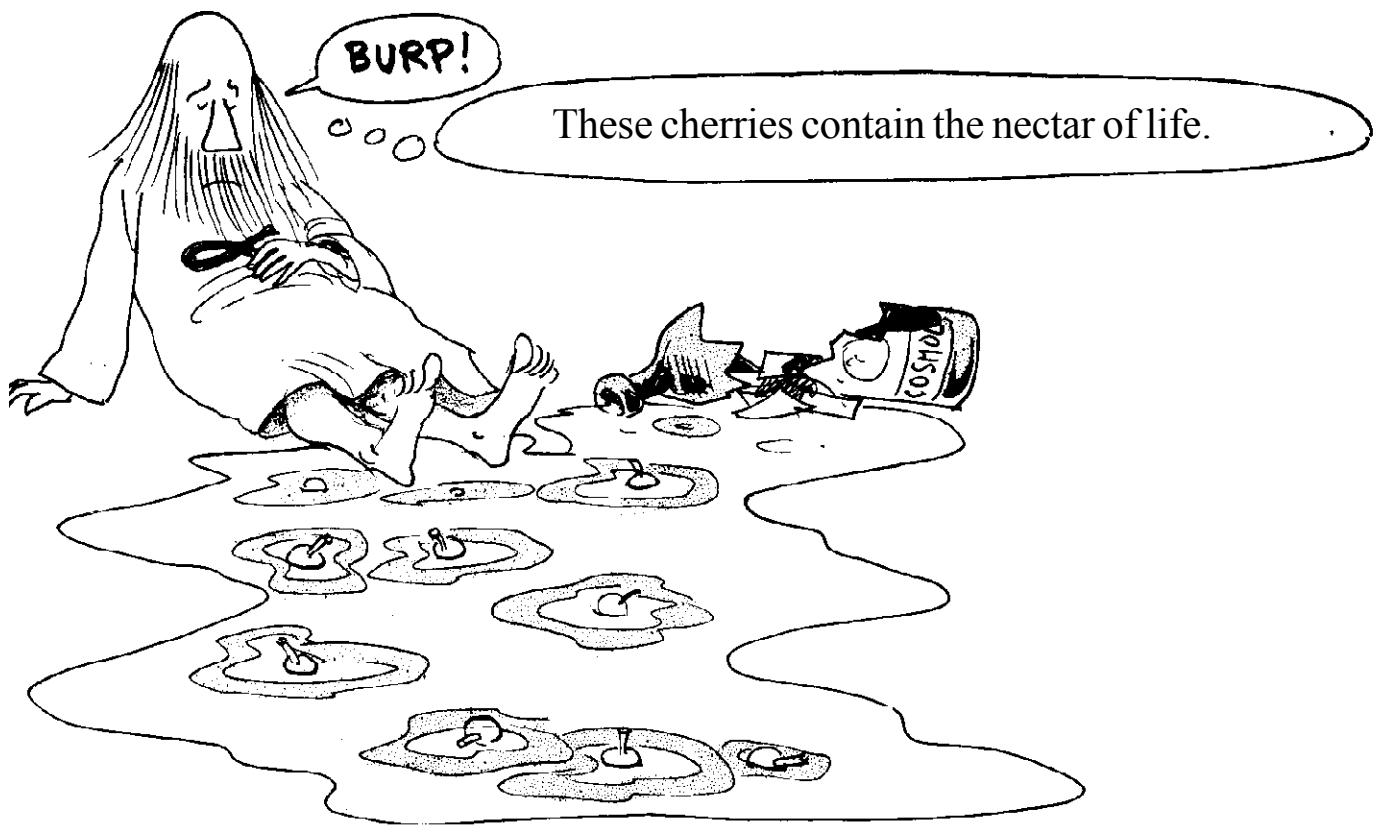
Oh! Those cannot be AHURA MAZDA and ARHIMAN*

And the equatorial band would be then.....MITHRA?

After scrutinizing the astronomical data, SOURIAU also discovered that the universe is **FLAKY** like a **PASTE**. In two dimensions this would look like an accumulation of parallels. The axis of the galaxies would roughly point to the polar axis.



In fact this flakiness was recently discovered. It transformed into huge flat halos of galaxies. The axis of the central parts maintained a completely different orientation.



THE TWIN UNIVERSE

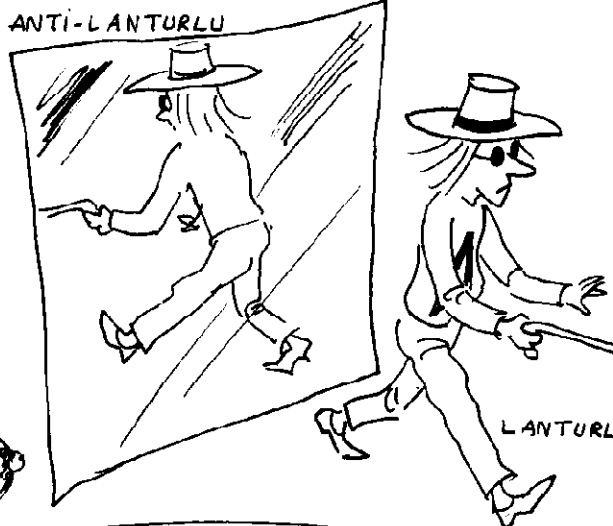
After this theory of creation of the world continued to collapse, came Fred Hoyle, with a new idea.

The universe of matter, as we know it, constitutes just **ONE HALF OF REALITY**. The other half, that is the universe of anti-matter, is situated in the **TWIN UNIVERSE**. On the occurrence of **BIG BANG** these two universes are separated from each other and continue their independent existence. But their **DIRECTIONS OF TIME** are **OPPOSITE** to one another. The future of one is the past of the other, and vice-versa.

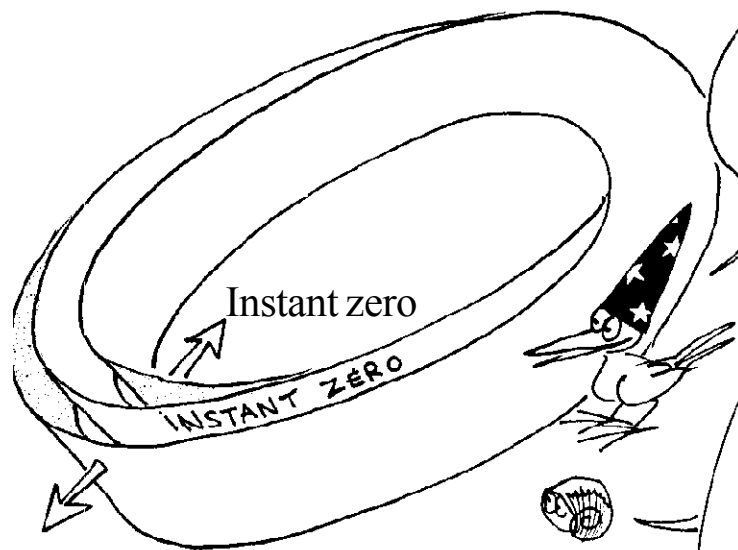
The geometrical context of such a model has something very confusing.

These two worlds could be “mirror images” of each other with reference to SPACE and TIME. What appears to be DEXTROGYRAL (deflecting towards right) in one universe becomes LEVOGYROUS (deflecting towards left) in the other one. And a chain of events in one universe is exactly the chain of events in the other, seen inversely and in REVERSE TIME.

ANTI-LANTURLU

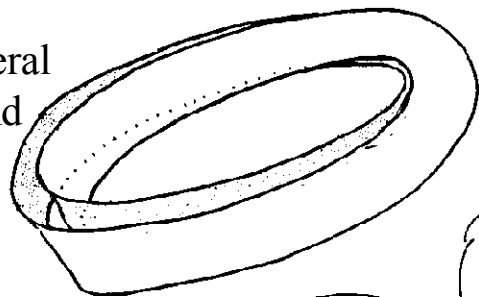


This bilateral band - the classic Mobius band winds twice. If this was a mirror the band would be....its exact image!

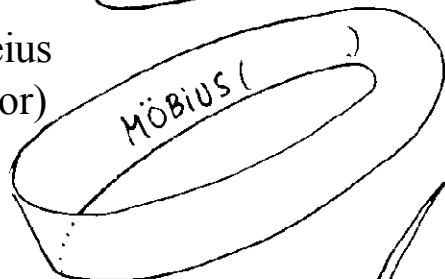


The **BIG BANG** would have caused the detachment of the universe, initially attached to this surface of zero time, not adjustable in space and time (the Moebius band has 4 dimensions). The face-to-face placing of the two regions of the universe would create this twinning appearance.

Bilateral Band



Moebius (mirror)



And the anti-matter would be nothing but anti-podal matter.



THE EXTRA TERRESTRIAL

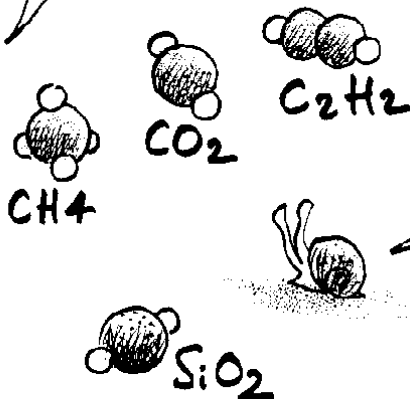
Tiresias, I don't believe anymore in Santa Claus.

And why so, Anselme?

Ok, here's my argument. Since the beginning of the century, we kept on believing that there were a limited number of chemical elements that exist.

A little more than 100 atoms constituting
MENDELEEV'S TABLE.

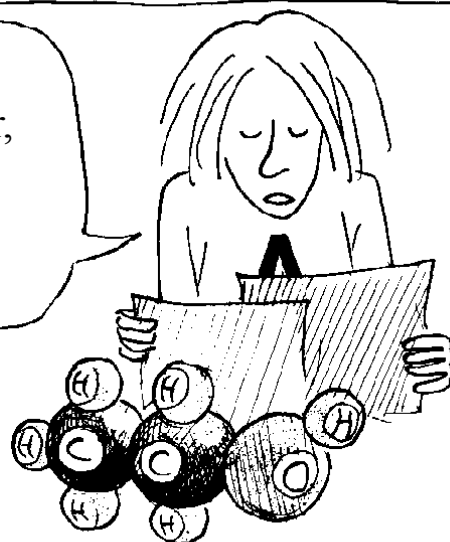
With these hundred atoms we can form various different molecules. Those which are formed from carbon atom are the particular ones.



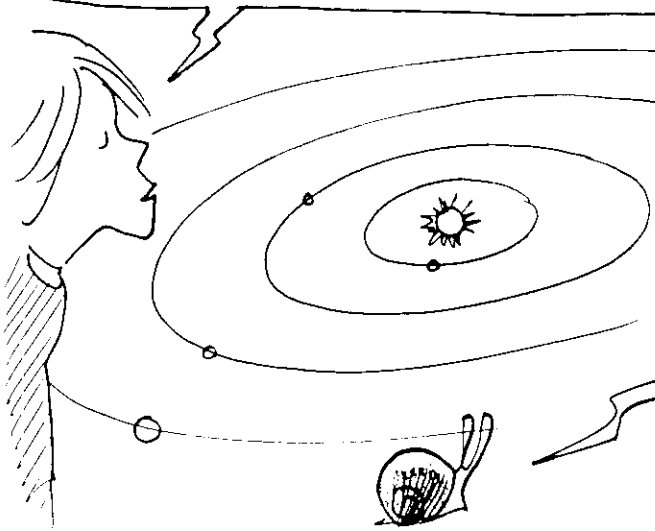
They correspond to the formulas which are pretty **STABLE** to be **VISIBLE**, but not too stable as to allow an extremely different **CHEMICAL EXCHANGE**. Even **SILICON** has many different compounds. But these are **EXTREMELY STABLE** so as to support a basis for life. The plants carry out **PHOTOSYNTHESIS**, quite easily by decomposing **CARBON DIOXIDE** CO₂. They would be inefficient in reacting with silicon compounds, such as: **SILICON DIOXIDE** SiO₂ which happens to be quite stable.

Nature does not possess infinite imagination. Just as 100 atoms are enough to constitute bricks of all matter, similarly we can find out the two ends of our galaxy, and no doubt, we would find the same organic compounds in all the galaxies of the universe.

Like for example, this molecule of ethyl alcohol.

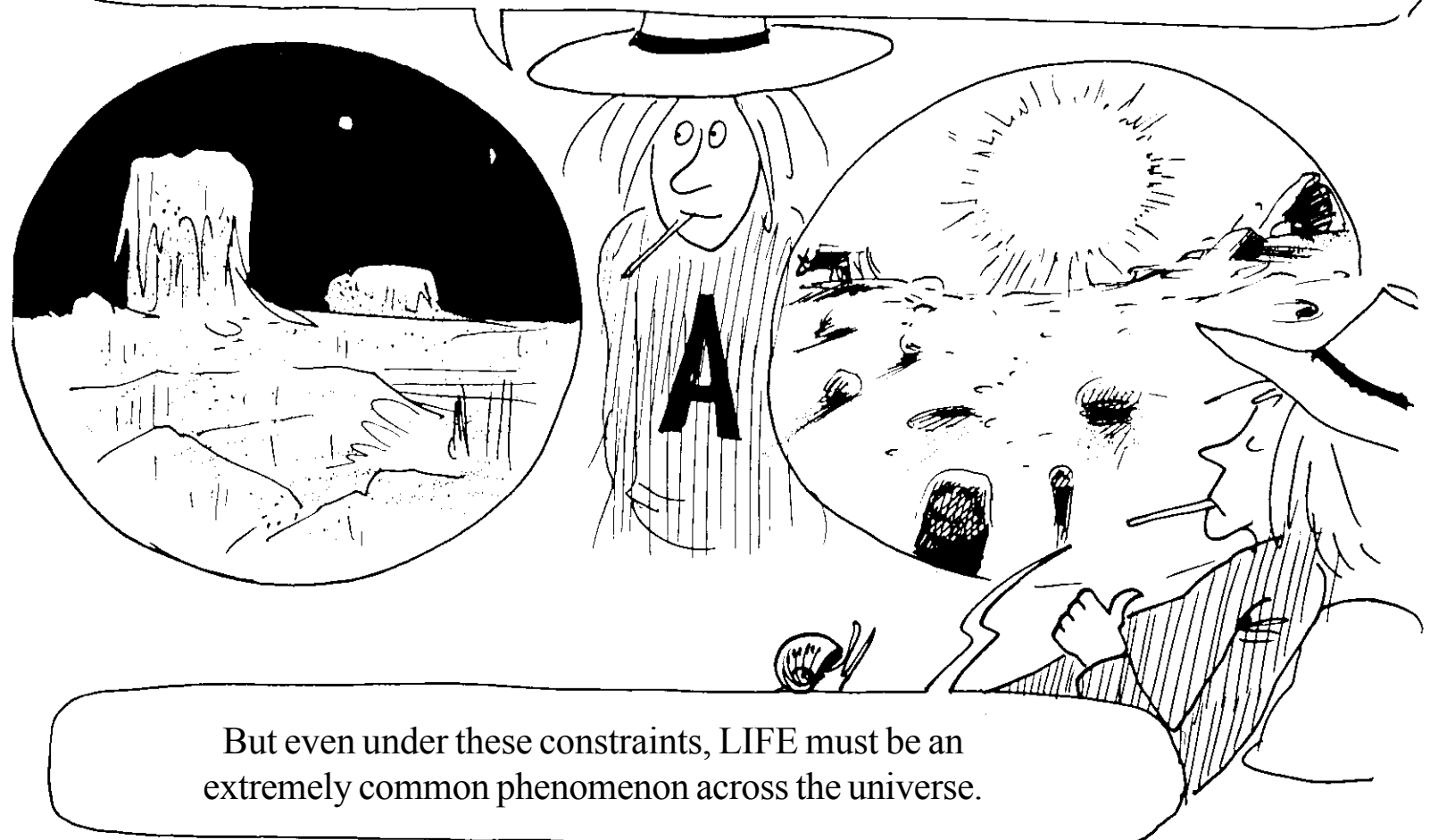


Our sun is considered one of the most ordinary stars of our galaxy. There is no doubt there are billions of other neighboring solar systems like ours.



Computer calculations have shown that it is from dust and gas around the star that a planetary system gets formed. The huge planets such as Jupiter or Saturn are in a semi-liquid state and lie at the periphery. The small planets are found in their solid states closer to the sun.

Once in a while a planet has a considerably huge mass and has its own atmosphere. Such a planet has to be positioned in the straight LIQUID WATER BAND - here the water is in its vapor state. It has to be sufficiently hot here so that life continues to live without being "cooked". On the other side, the water freezes into ICE and the substances lose their mobility.



But even under these constraints, LIFE must be an extremely common phenomenon across the universe.

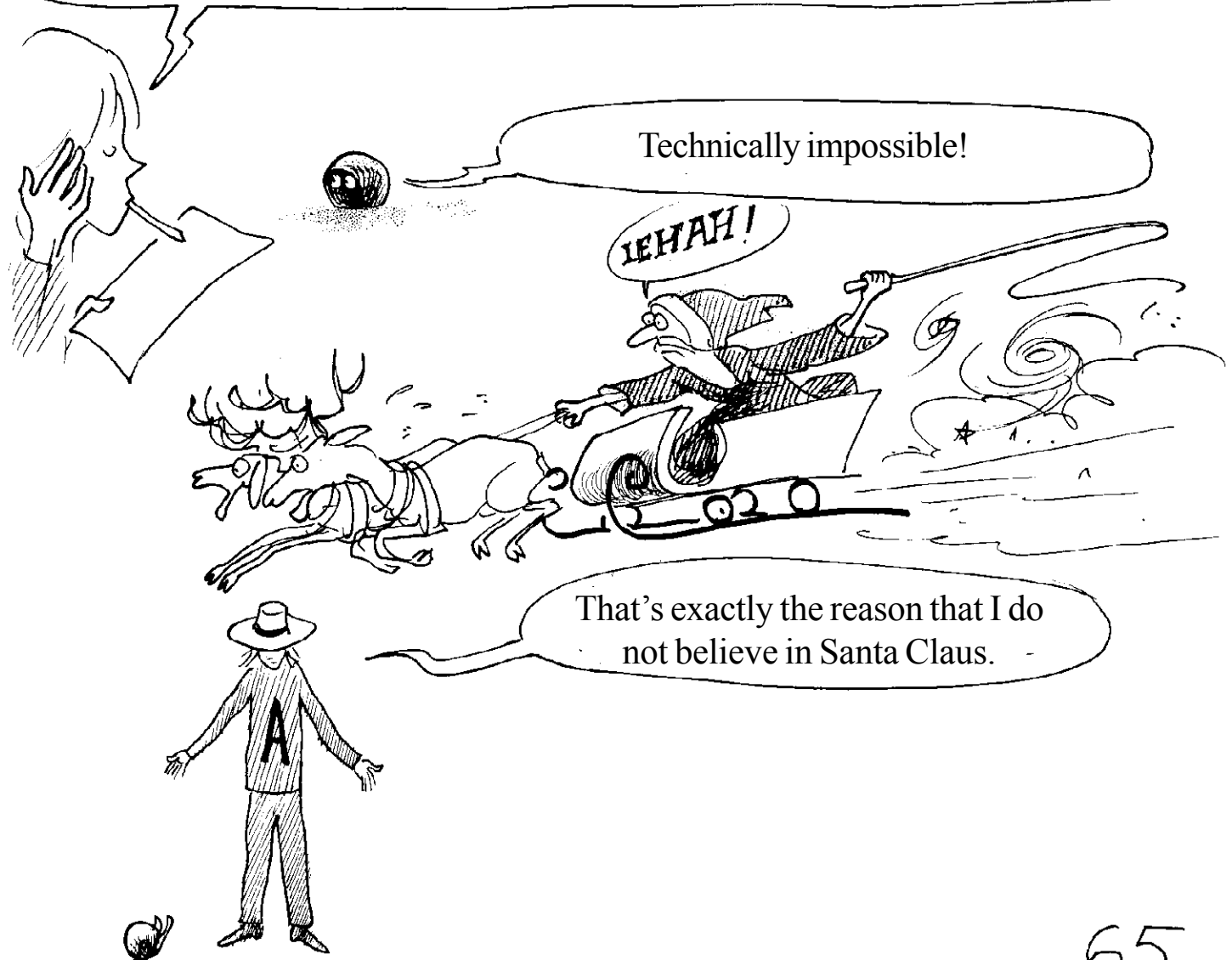
According to my calculations, perhaps there is one star amongst hundred thousands, in our galaxy, which has its own planets, and which has on them DEVELOPED LIFE, and INTELLIGENT BEINGS.



That would make, MILLIONS OF INHABITED SYSTEMS IN THE GALAXY!

And probably thousand million evolved beings per galaxy.

There could be around billions of different galaxies in the known existing universe, and that would make billions and billions of kids for Santa to visit, on one single Christmas night.



CONTACTS?

The Traveling Probe VOYAGER has just crossed the orbit of Uranus.
It has left the solar system behind after having traveled for 10 years.

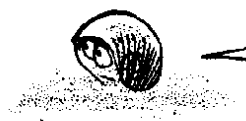


The nearest star is TEN THOUSAND TIMES THIS DISTANCE! Considering its speed, it would reach this star in hundred thousand years....

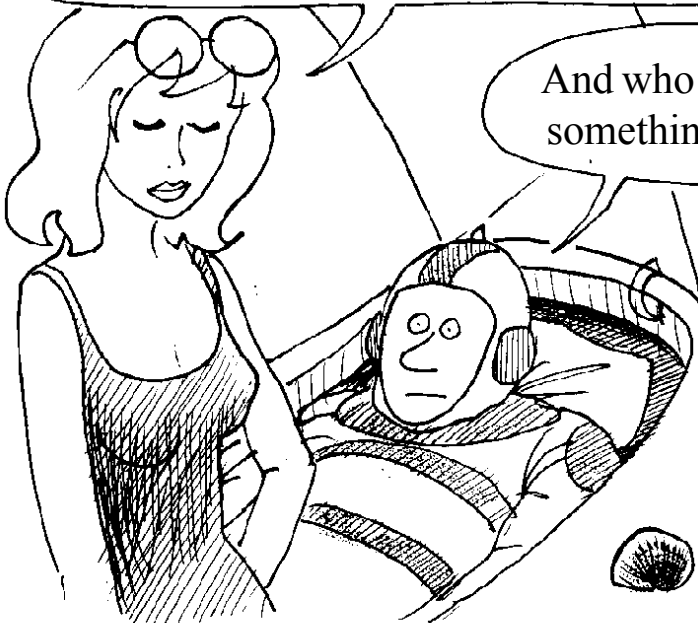
Impossible! Since ALBERT EINSTEIN put the speed barrier for light at 300,000 km per second (*)



And at this speed, we would be literally dragged along.



If we calculate the acceleration and the deceleration with the help of a rocket, by splitting hydrogen bombs, it would take about 40 years of travel to reach the nearest star.



And who would guarantee that we would find something interesting after all this trouble?!?

All this for nothing!

(*) see *EVERYTHING IS RELATIVE*, by the same author, BELIN edition.

One evening in August 1967, Anthony Hervish and Jocylene Bell,
at the radio telescope in Cambridge.

SPRIOUITCH
SPRIOUITCH
SPRIOUITCH



Josylene, do you hear this
transmission of modulated radio?

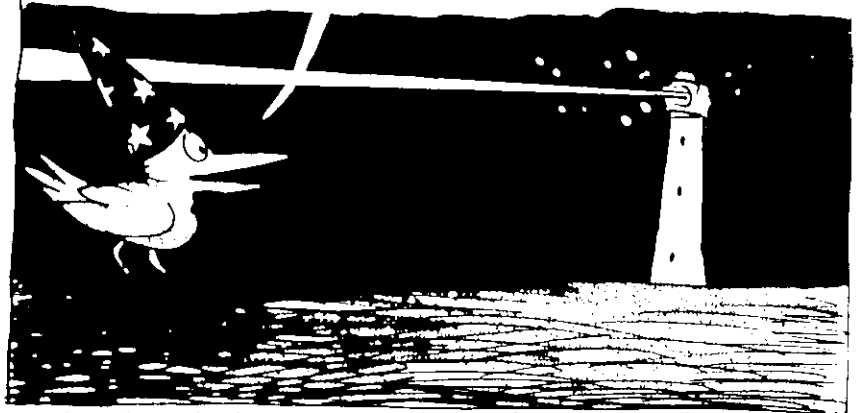
Yes Anthony, I do hear them.

Jocelyn "they" are speaking to us.

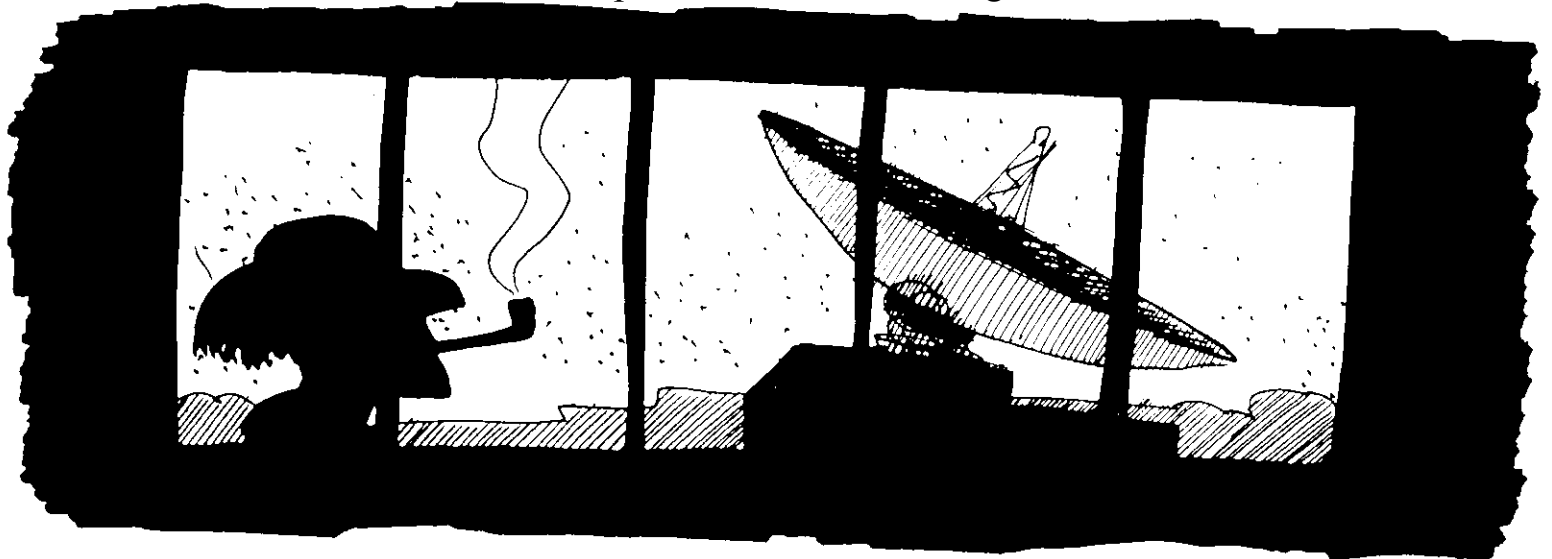


Yes Anthony,
this is great!

False alert. It was nothing but a radio
emission of a **PULSAR** (star composed of
neutrons rotating with a great speed) which
behaves very much like a radio lighthouse.



Since then we have been listening to the signals from space, intently waiting for any
possibilities of a message.

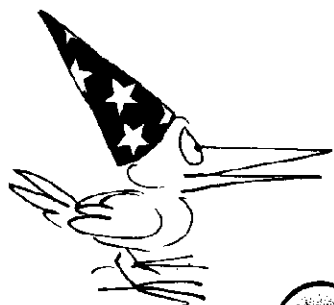


Even the Earth has been sending innumerable messages in cosmic nights.



There are many factors that would answer the absence of the messages. Primarily, taking into consideration the time frame of billions of years required for the development of life, THE INTELLECTUAL PHASE is just a PART OF INFINITE TIME. And what about the time lapsed since the 1st radio emissions which were capable of piercing the earth's atmosphere (1934)!

Our civilization has a great probability self destruction in a few dozen years.

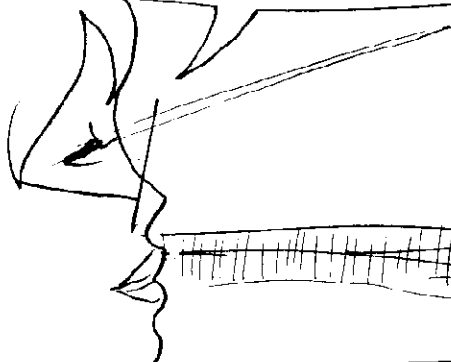


If everybody thinks the same way, this WINDOW OF COMMUNICATION, of less than a century, would look remarkably narrow.



And the chances that other civilizations existing on other planets would be very rare.

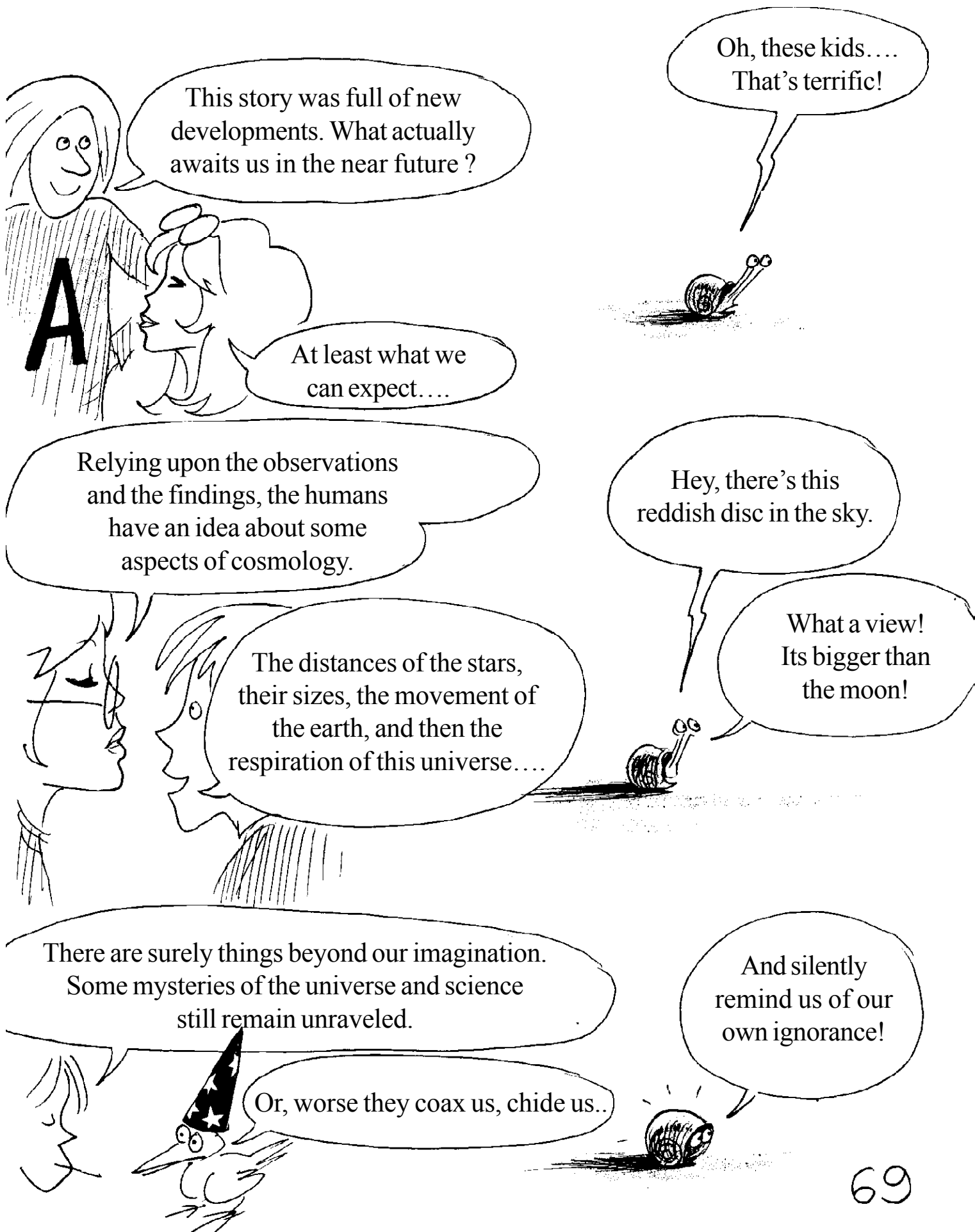
Another idea: taking the aid of radio waves limiting them to the speed of light would not be durable. There should be a faster way out? That would explain this radio silence.



For years and years nobody had seen smoke signals. There just cannot be anybody behind those hills!



Epilogue



I swear that modern astrophysics actually poses more problems than it is able to resolve.

What is it Tiresias? What is it?

You look all upside down.

I have already tumbled across a few of them. What happened to the anti-matter which was created during the Big Bang? From where do Quasars get their energy? Where are the Black Holes heading for?

I saw a strange machine which was stationed on the land and then it traveled at a fantastic speed of several billions of kilometres per hour. That too, WITHOUT MAKING A SOUND.

No sound, but that is absurd!

The cosmological progress has always been related to the GEOMETRIC conception of our universe. It has taken millions of years to abandon the concept of ABSOLUTE TIME which was identical to all human beings.

This is utter nonsense.

Why?

Now give it a thought - the super sonic vehicles create a SHOCK WAVE. If this machine you are talking about reaches a speed as high as that, you would have heard a BANG(*).

You are trying to say that I did not hear anything.

Wellthat's it.

We have now decided once and for all that the universe had only **FOUR DIMENSIONS** (three spatial, one time) and that it was a **CONTINUUM**.

These are the facts which are beyond doubts, never to be questioned, never ever.....



Have you ever heard about negative time. I wonder whether it is a hallucination.



Do you know that anybody can have such a blackout.

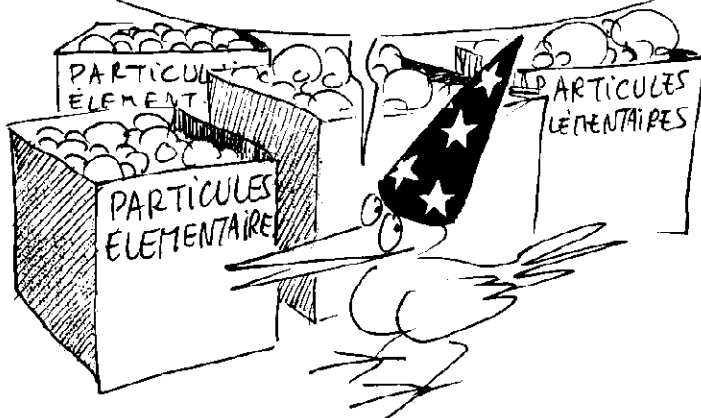
Even me, at times...



But still, I DID SEE!

Even we cling to our models as one clings for safety to lifebuoy, under the pretext that it provides the best services.

Its true that we can at times question ourselves whether the facts as described by the quantam mechanics resemble Ptolmey's system of circles or not.



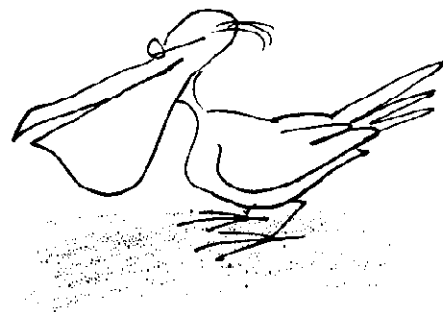
It was a dream. Tiresias...you were just DAYDREAMING.



It seems as you have actually seen them.

Now take these ten experiments, the ten most important phenomena of modern day physics. In the coming century physicist will prove that each one of these would have been impossible to imagine!

I have a friend who is a psychiatrist. If you want...



MANIPULATIONS
FISSION FUSION
VOL
SUPRACONDUCTION
TIQUES

If the universe had a number of "pages" which were 4-dimensional, and in which the laws of relativity were valid...to put it in other words - we would not be able to travel at the speed of light IN THE UNIVERSE (nor towards the east).

But how do we change these "pages" of the universe?

There they go all over again!