

Ingyendo nshakisha z'Anselimi Lanturulu

iNKURU NYAKOSiMOSi

Johani-Petero Petit



Byahinduwe na :
Mohamed Abdel Aziz Kamanzi

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

Ubumenyi butagira Imipaka

Itegeko ryo mu 1901 rigenga amashyirahamwe



Jean-Pierre Petit, Perezida w'iri Shirahamwe

Uyu Jean-Pierre Petit, Peresida w'iri shyirahamwe ry'Ubumenyi butagira Imipaka, yahoze ari diregiteri w'ubushakashatsi mu kigo cy'inzobere cya CNRS, mu Bufaransa. Akaba kandi inzobere ihanitse muri Fizike y'inyenyeri (Asitorofizike); yahimbye uburyo bushyashya by'inyandiko bita: *Ibitabo by'amashusho by'ubumenyi*. “Ubumenyi butagira Imipaka” ni ishyirahamwe ryahimbwe mu 2005 n'abagabo babiri, Jean-Pierre Petit na mugenzi we Gilles d'Agostini. Iri shyirahamwe ryihaye intego yo gukwirakwiza kw'isi hose ubumenyi ku buntu harimwo n'ubumenyi bwa tekhnike, ubukorikori n'ikoranabuhanga. Iri shyirahamwe ribeshejweho n'inkunga rihabwa. Izo nkunga nizo ziraha abantu bahindura inyandiko mu zindi ndimi. Buri nyandiko (igitabo cy'amashusho cy'ubumenyi) ihindurirwa mu rundi rurimi ku mafaranga angana n'amayero 150 (150 euros) kuva mu 2007 kugeza ubu. Iri shyirahamwe rinariha amafaranga ajyanye n'iyoherezwa ucishije muri banke ry'ayo mafaranga y'ihinduranya mu zindi ndimi. Abahinduranyi b'indimi bagiye bongera, buri munsu, umubare w'ibyo bitabo bisomwa hose k'ubuntu. (Nko kugeza mu 2007, hari hamaze kuboneka ibitabo magana abiri (200) bikurwa kuri interineti k'ubuntu kandi byanditse mu ndimi makumyabiri n'umunani (28) harimwo ikinyarwanda n'ururimi rwo muri Lawosi).

Biremewe ko iki gitabo gikopororwa cyangwa gifotorwa, cyose cyangwa igice; kinakoreshwa n'abarimu mu masomo ariko mu buryo butari uburya inyungu z'amafaranga. Gishobora gushyirwa mu masomero y'uturere, y'amashuri cyangwa ya za kaminuza, cyanditse ku mpapuro cyangwa cya shyizwe mu miyoboro y'imbuga z'ikoranabuhanga zigose (intranet).

Uyu mwanditsi w'ibi bitabo yatangiye kwandika ibindi byo byoroshye kandi bigenewe abana bato (bari mu rugero rw'imyaka 12). Ibindi biriho bikorwa n'ibitabo by'amajwi avuga, bigenewe abatazi gusoma cyangwa abashaka kwiga urundi rurimi rutari urwo bakuriyemwo.

Iri shyirahamwe rishaka buri gihe abahinduranyi b'inyandiko bazishyira mu ndimi zabo zakavukire ariko bafite ubuhanga buhagije bwo gutanga inyandiko mpiduranyi nziza z'ibitabo basomye.

Ushatse kugira icyo ubaza cyangwa ugeze kuri iri shyirahamwe, wajya ku rubuga rwaryo ku interinete aha hakurikira: <http://www.savoir-sans-frontieres.com>

Iranga-konti mu Bufaransa → Inyandiko ngaragaza mutungo muri (RIB)

| Ikigo | Umwanya wo kwakiriramo amafaranga | Nimero ya konti | Urufunguzo rwa RIB |
|--------------|--|------------------------|---------------------------|
| 20041 | 01008 | 1822226V029 | 88 |

Aho ikorera: Banki ya Posita
Hagati y'Umujyi wa Marseille
13900 Marseille CEDEX 20
Mu Bufaransa

Mu bindi bihugu → Ibanki Mpuzamahanga (International Bank) Nimero ya Konti (IBAN):

| IBAN |
|----------------------------------|
| FR 16 20041 01008 1822226V029 88 |

→ N' Inyandikobanga ya banki (BIC) :

| BIC |
|-------------|
| PSSTFRPPMAR |

Amategako agenga iri shyirahamwe agaragara ku rubuga rwa yo kuri interineti. Imibare ngaragaza mutungo nayo irahari kandi ihora ishyirwa ku gihe. Iri shyirahamwe nta mafaranga na make rikura ku nkunga rihawe uretse ayo kohereza, bicishijwe muri banki, ahemba abahinduranyi b'indimi ku buryo babona abagenewe yose. Nta munyamuryango w'iri shyirahamwe n'umwe rihemba kuko bose ari abakoranabushake.

Abanyamuryango ubwabo nibo barihira amafaranga ishyirahamwe rikoresha ngo ribeho nk'ayo kwishyura no gukoresha urubuga rwa yo rwo kuri interineti kuko ayo atarihwa n'ishyirahamwe.

Bityo mugaragarizwa neza uko umutungo w'ishyirahamwe ukoresheka kandi mukibonera ikizere ko, muri icyo "mirimo y'ubwitange mfashamuco", inkunga yose mutanga ikoresheka neza mu kwishyura abahindura ibitabo mu zindi ndimi.

Dushyira ku rubuga rwa interineti buri kwezi, ugereraniye, nk'ibitabo cumi bihinduwe mu zindi ndimi.

Utabwo ari ngombwa ko ibi bitekerezo-ntumbera
biba nyabyo, cyangwa se bijya gusa n'ukuri.
Ikintu kimwe kirahagije : Ko bigaragaza imibare
ihwanye n'inyitigerezo.

Osiyandere (*)



(*) intangiriro ya OSIYANDERI, umukosozi-nyandiko wa Koperinike.

INKOMOKO Y'INKURU

Imyaka 2000 mbere y'iki gihe cyacu turimwo, muri PERISE, i BABILONI.



Nyakubaha **ZURUVANI**, ariwe mana yacu y'Igihe, umunsi umwe yifuje umwana w'umuhungu. Yabanje gukora amasengesho imyaka igihumbi...



Ariko rwose, **ZURUVANI**, byandikwa na $E!$ cyangwa na $1=$?



Ceceka, ugiye kudutwikisha!



Humu ?..



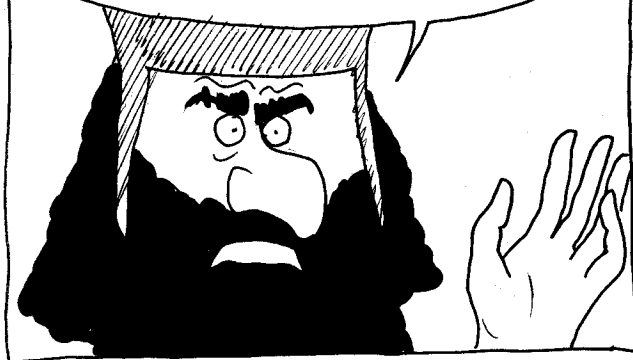
Byagatinze yaje kubona abahungu **BABIRI**...

OHIRIMAZIDI na **AHIRIMANI**.
OHIRIMAZIDI yari mwiza, naho **AHIRIMANI** yari mubi.

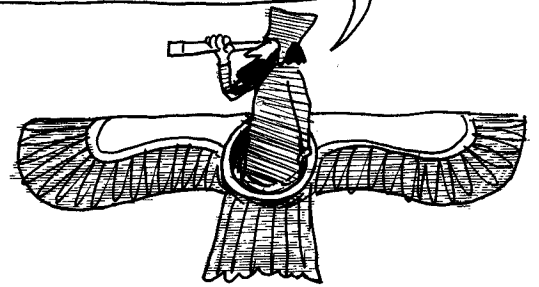


Abahungu babiri b'imbaraga zingana

Kuva bakivuka,
batangiye kuva ubwo barwana
kandi basenyana!



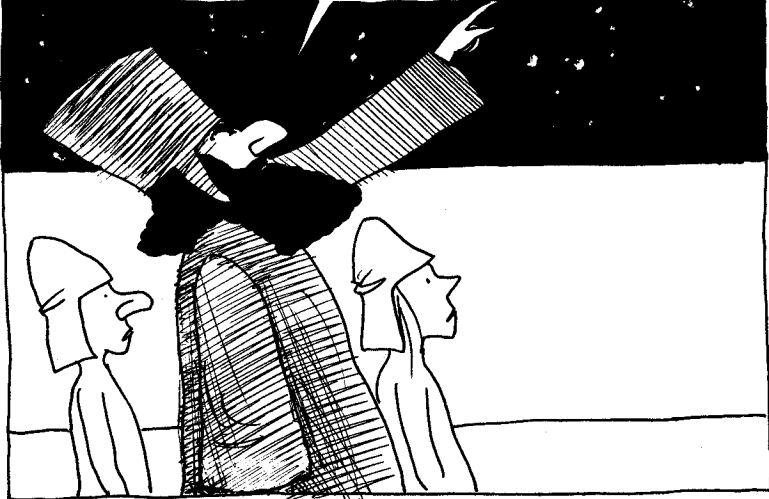
Kazoya ka Iniveri yacu kari
gatangiye kumererwa nabi. Iby'amahirwe
Imana **MITIHIRA** yaraje ibajya hagati
kugirango irinde umwe wese!



Muri make, kugirango ibuze abo
bavandimwe babiri bangana, izo
MPANGA ebyiri, ibyo bice bibiri
bya Iniveri ku**RIGITANYA**.



Noneho ubu, mubyangirwe
neza kuri mudasobwa za nyu
ibibanzankoreramwo by'amamana.



AHIRIMANI aherereye
ANTARESI, mw'itsiko rya
SKORUPIYONI.



Naho **OHIRIMAZIDI** ari ku rundi
ruhande rw'ijuru, mu ntumbero
irebana nah'uwambere,
ni ukuvuga mu gatsiko
ka **MPYIZI**.



Ariko kandi rero, bishyitse ko **OHIRIMAZIDI** na **AHIRIMANI** bahura, haba amakuba akabije...



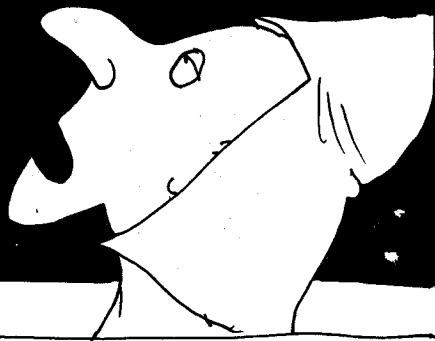
Yego, ariko ku bw'amahirwe, umwe ari kure cyane y'uwundi k'uburyo buhagije .

Uko bimeze uko, turi mu mutuzo. Ibintu byo mw'ijuru biri mu myanya ya byo.



Ikintu cyose mu mwanya wa cyo kandi n'umwanya kuri buri ikintu.

Mwarimu agira ati inyitegereze yonyine hamwe n'ubumenyi-yigwa by'ikirere ni byo byatuzanira ubwitonzi...



Ikindi kandi **MITARA** arabacunga buri gihe. Ni we rubibe hagati y'izo **INIVERI** ebyiri **Z'IMPANGA**.



Yego, ariko kandi rero...



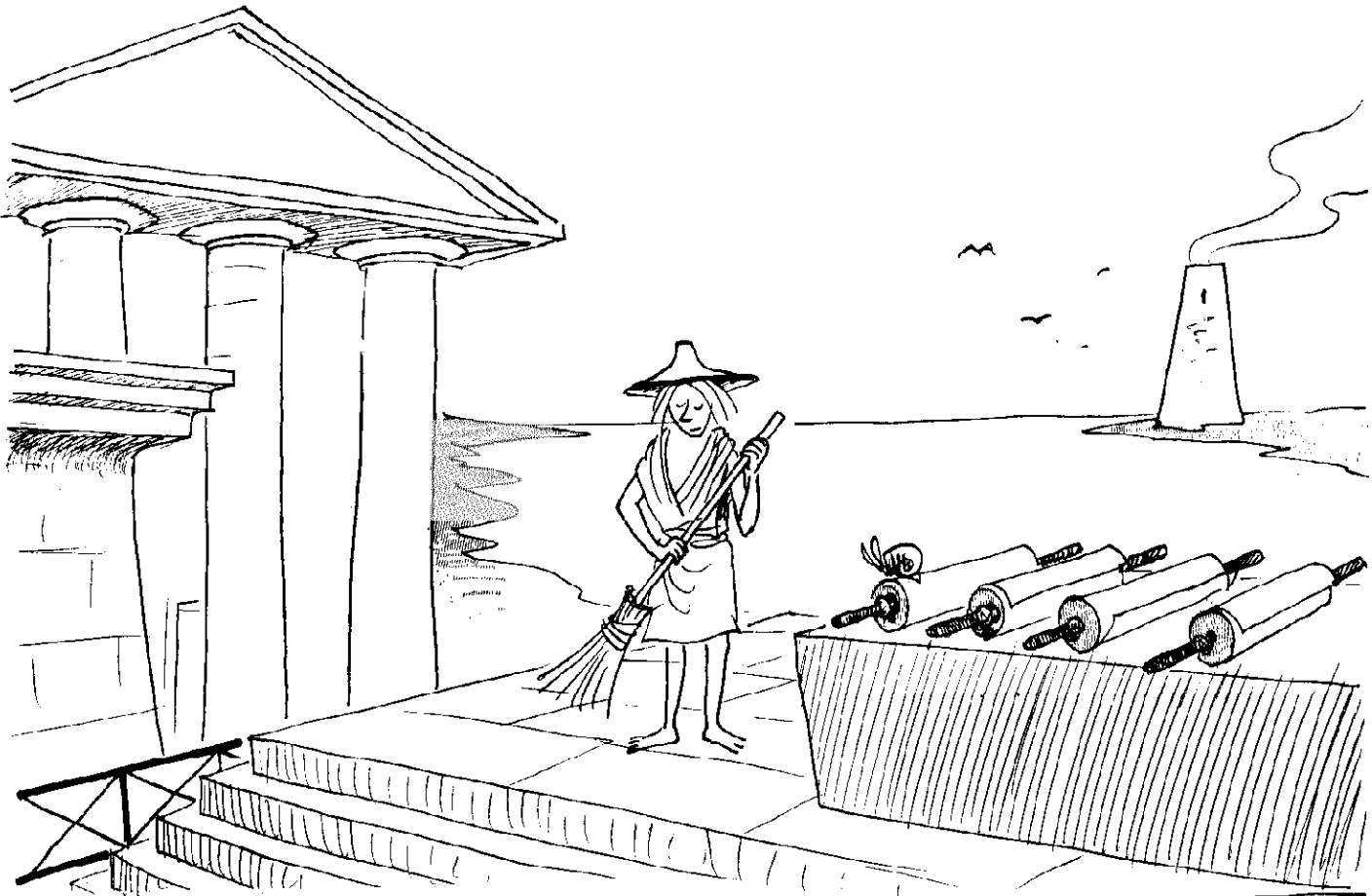
Uranyumva ?



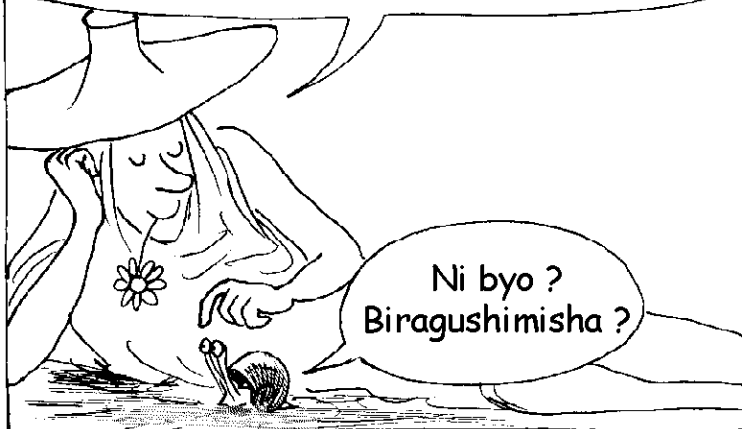
Yeye, Yeye ...

PUTOLEME

ALEGIZANDIRIYA, umugyi mukuru w'ubumenyi mu gihe cya kera.



Urabizi, Tireziyasi, ndanzezerewe cyane kuba narabonye uyu mwanya m'ubusomero bw'Alegizandiriya.




Ni byo ?
Biragushimisha ?


Ni yo yambere nziza muri Iniveri. Hari ibitabo 700000 kandi hahora huzuye abasomyi benshi cane.



Ahaa, iyaba byibuze narinzi gusoma...




Nari gushobora gusoma ibitabo bya Ekilide. Ngo yaba yaravuguruye Imibare.




Biravugwa ko i Alegizandiriya, abahanga bazashobora gusobanura byose, no gusobanukirwa na byose.

Ohu, urabizi, ubu si ubwa mbere numvise ibyo.

Ariko se Tireziya, izina rya we rikomoka he?



Lifite inkomoko yikigiriki. Umwe mu basokuruza ba nnye yabaga i SAMOSI, mu kinyejana cya III mbere ya Yezu-Kirisitu.



Icyo gihe, Umwalimu we yitwaga **ARISITARIKYE** kandi yashyiraga Izuba hagati na hagati ya Iniveri. Kuri we, Iyi Si yacu yazengurukaga Izuba naho Ukwezi kukazenguruka Isi.

Isi ... mu muvuduko ? Ariko ibyo byagombaga gutera induru iteye ubwoba.

Ni ko utekereza ! Ni ibifuti ! Iyo uri mu bwato bwahuranya inyanja ituje noneho ugafunga amaso, ese icyo gihe wumvako ubwo bwato buri mu muvuduko ?



Eehe... oya

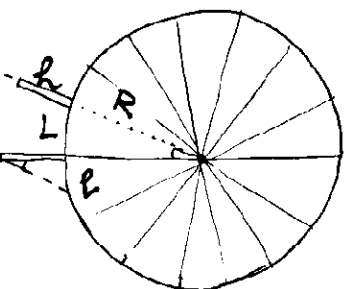
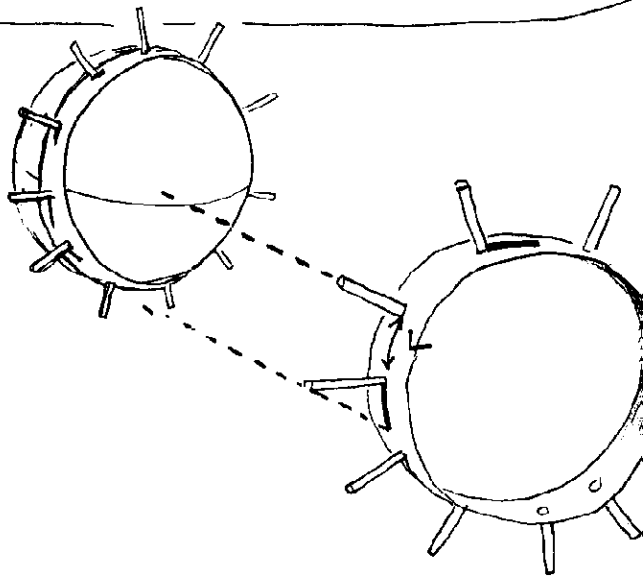
Eratositene yari yaranabaze reyo y'Isi, apima gusa igicucu cy'inkoni.

Biroroshye : iruhande y'umuzenguruko w'isi uwariwo wose, omekaho akabande k'urufunzo. Noneho, kuri ako kabande, ukurikije inshingo bugororoke kuri ubwo buso, omekaho utugiga nk'uku nguku :

Ariko se gute ?

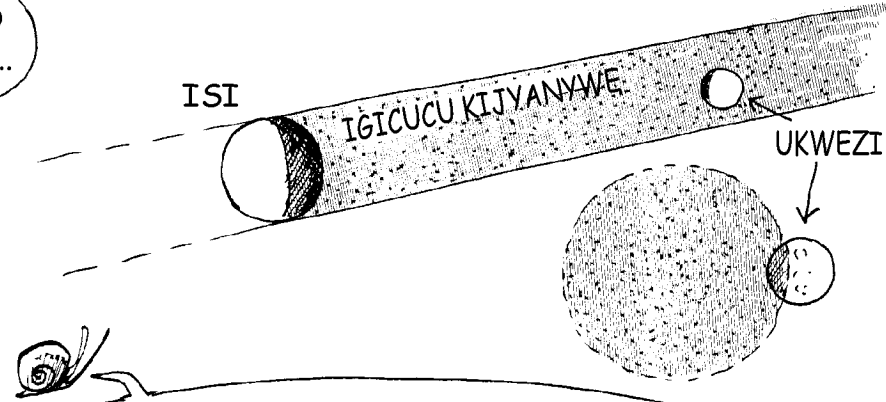
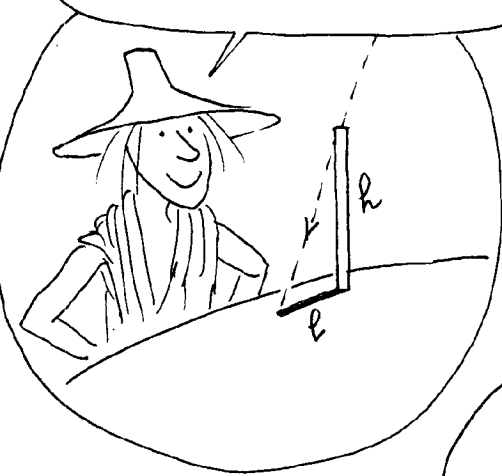


Iyo aka giga kamwe gatumberana n'izuba, igicucu cya ko kizareshya n'ubusa.

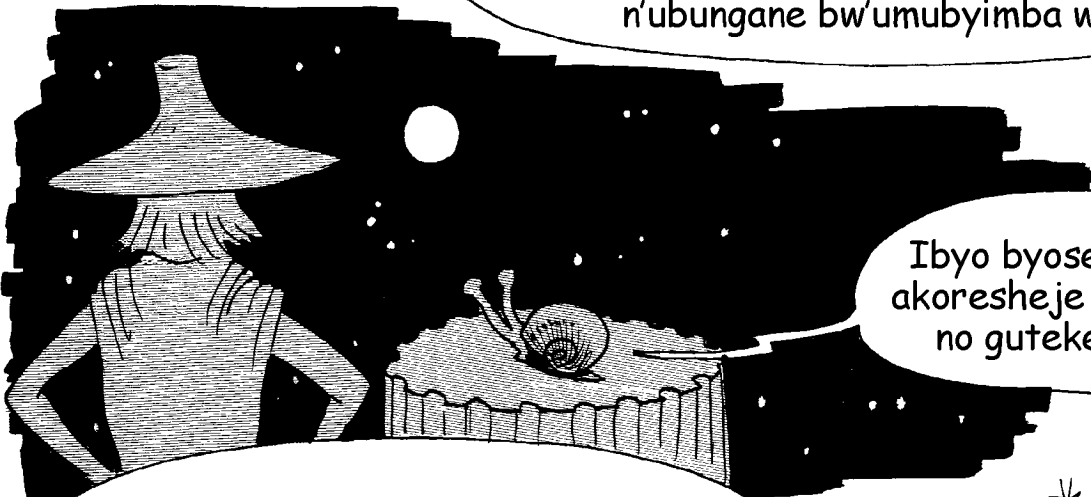


Akagiga gafite igicucu l . birtyo rero, iyo uzi urugendo L ruri hagati y'izo ngiga kandi ukamenya n'uburebure bwa zo l , ushobora gushaka reyo R y'icyo kintu nyasiferi.

Aha yego, wifashishije ubwo buryo bwa jewometiri nshya...

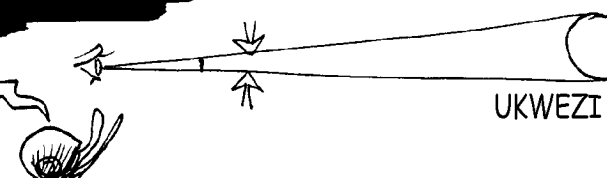


Ariko hariho n'ikindi kandi gikomeye. Yitegereje **AMIRAKABIRI Y'UKWEZI**, aho ubuhetame bw'Isi bwigaragaza no kuri satellite ya yo, Eratositene yari yarashoboye kugira igitekerezo kitahushanyije cyane n'ubungane bw'umubyimba w'ukwezi.



Ibyo byose yabigezeho akoresheje inkoni hamwe no gutekereza neza.

Biryo, ahereye kuri **DIYAMETERO YIGARAGAZA (*)**, yashoboye kubara igipimo cy'intumbere igera aho ukwezi kuri.



Ariko, urwo rugendo rw'Isi rwagombye ibyaribyo byose kwigaragaza. Oya?



Ngaho, dore porofeseri **PUTOLEME!**

(*) Imfuruka ureberaho ikintu.



Nshuti yanjye, mu bigaragara nashoje
igitabo cyanjye kytwa **ALUMAJESITE**



Noneho se,
Isi yaba
igendagenda ?



Ndemeza neza ko
ari igitekerezo kigeze kunza
mu bwonko igihe kimwe...



Reka dukomeze !



Ariko ni igiterasoni
cya yuma. Kurikira
ubusobanuro bwa njye.



Nk'uko mwarimu wacu **ARISITOTE**
yabigaragaje neza, ibintu bimwe
birazamuka, ibindi bikamanuka.



Simbihakanye.

Ibintu bitaremereye
birazamuka naho ibiremereye
biramanuka.



Ni ibyumvikana
kuri wese !

Imbaraga zigaragaza
cyane ku bintu binini,
biremereye.



Ibikorwa birigaragaza...



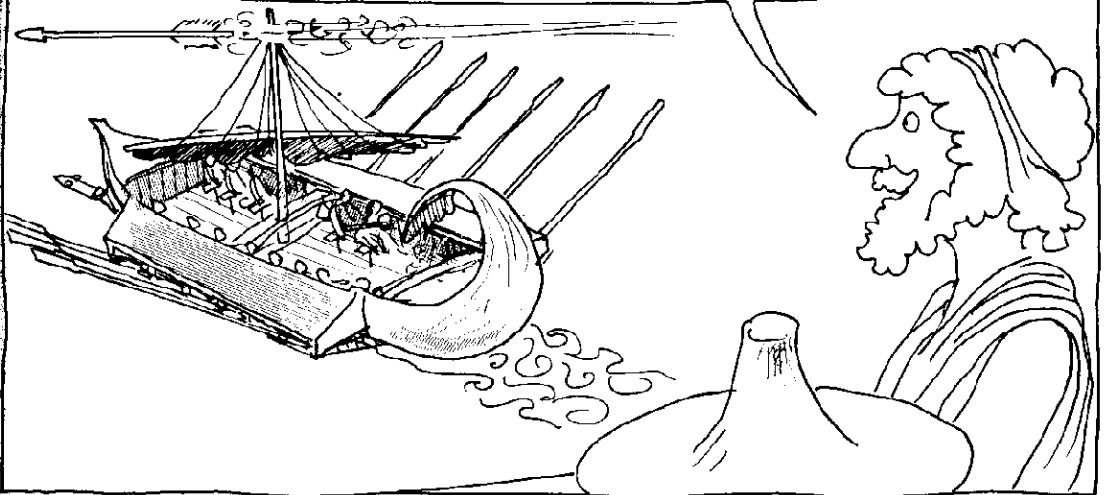
Bikuruwe n'izo
MBARAGA zibiganisha kw'Isi,
ibuye n'ibaba biragwa.

Ariko ibuye rimanuka
vuba kurusha ibaba.

Amageza ni yo
mucamanza yonyine.

Tireziyasi, itonde !...

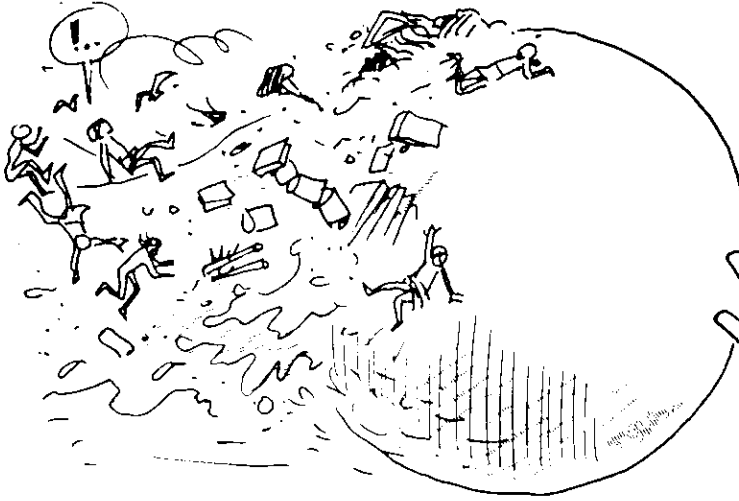
K'urundi ruhande ibintu binyeganyega iyo hari imbaraga zibigizeho igikorwa. Kandi matsiyeri ihererekanya imbaraga. Birtyo rero, iyo ubwato bwiruka ku nzira ya bwo, ingashyo zose zimanitse, ni imihengeri y'amazi ibusunika. Kandi rero ni nk'uko bigenda ku mwambi igihe uvuye mu ruvuto rw'umuheto (*).



Birtyo rero, kandi ibyo ni ingaruka z'amahame twasomewe na
ARISITOTE : niba Isi igendagenda, ni ukuvugako haba hari
IMBARAGA ZIYISUNIKA.

Noneho se twebwe, ibiremwe bisanzwe byipfira, twumva izo mbaraga ariko buhoro cyane, kuberako indemere yacu ari nto cyane.

Ingaruka : Isi yagenda naho
twebwe tugasigara inyuma ya yo...



Ibyo byose ni urukozasoni...

Urugendo rw'Isi ? Ni igitekerezo ubwambere gisetsa,
ndabyemera, ariko kitabangamira isesengura. Amakuba... imibumbe
y'amasi agomba rero kuba nk'ibintu bitumuka, bitaremereye...

Biryo rero Ukwezi
kurareremba mu muyaga.

Nk'uko mugenzi wacu **PALATONI**
abyandika, ikireremba muri eteri ntikigizwayo
kandi ni nyacyo. Hasi ku butaka, mu nsi y'Ukwezi,
ni **UMUBUMBE W'AKAVUYO**,
w'**IMPINDUKA**, wa kawosi.

Ariko, iyo uzamutse,
byose bipanze neza kandi ni byiza,
bifite agaciro, biritonze kandi
bitera ibyishimo.

Ni **PALATO**
wavuze ibyo ?

Oya, iyo siyo
nganzo ye.

Muri iyi **SI YO HASI**, byose bigira inenge, ariko, hariya hejuru, ibintu byo mw'ijuru ni ntamakemwa, birakuyengeye kandi ni nyasiferi.

Uhuza ute Imana n'umuzingi na siferi ?

Wemeranya na nje ko ibintu byonyine bishobora kwerekana imiterere y'Imana ari **IBINTU BY'AMAFOROMA NYAJEWOMETIRI**, ni ukuvuga **UMURONGO, IKIBYATARARE, SERIKERI na SIFERI**.

Ndagukurikira nk'igicucu cyanyu.

Umurongo ugororotse, ikibyatarare, bifite ntakabuza, iherezo, umusozo.

Afite ukuri. Iserikere na siferi, ko bitagira itangiriro, ntibigire iherezo, ni byo byonyine bishobora kwerekana Uhoraho, Imana. Ni **PITAGORU** ubivuga.

BIRTYO RERO, imibumbe y'amasi ariburungushuye, ari **BURUNGUSHUYE NEZA**, kandi akora ingyendo zayo zikurikiye inzira nyaserikyeli.

VENUSI

Ariko, buretse urebe, iyo umuntu arebeye inzira ya Venusi k'urusenge rw'ijuru, abona iyobera ryiza ritangaje. Uwo mubumbe w'isi ugabanya umuvuduko, ugasubira inyuma, hanyuma ukongera ugakomeza urugendo rwa wo. Ibyo ntibisa na gato n'inzira y'urugendo nkurikiraserikeri ?

IRINGI RY'AMENYO
AMASEHO RIFASHE
KWISI

VENUSI

INZIRA Y'URUGENDO
NYA EPICIKLIDE

ISI

Maze gusobanura
ayo mayobera.

Inzira y'urugendo rwa Venisi,
birtyo rero, ni uruterane rw'ingendo
nyaserikeri.

EPI, mu kigiriki bivuze
« kuri », « hanze ya ».

Ubundi kandi, ingyendo zose z'imibumbe y'amasu,
urw'izuba n'urw'amapalanete, zishobora kugaragara
nk'ingerekerane z'ingyendo nyaserikeli.

Ntako bisa! Birtyo amayobera avuye mu nzira.

Ubitekerezaho iki
wowe, Tireziyasi ?

Nta nakimwe. Ndabibona nk'ibintu
biruhije mu buryo bukabije.

Iyo Imana ziba zarambajije mbere yo kurema ibiriho,
nari kuzigira inama kubiryanye n'ikintu kimwe cyoroshye.

Ukurikije **IHAME RYA ARISTOTE, MODELI YA PUTOLEME** yagize
agaciro yonyine mu gihe cy'ibinyejana hafi 16 kandi ibuzura muri icyo
gihe cyose amajyambere ayariyoye muri asitoronomi. Mu kinyejana
cya 15, hakenerwaga byibuze serikeli 48 zinjiranyemwo zimwe mu zindi
kugirango usobanure, mu buryo bwemewe, wifashishije ubwo busobanuro
bw'ibinyoma, urugendo rw'imibumbe y'amasu.

... ariko, mu 1530, ateganyeye n'amazi asa n'ivu ya Balitikye...

KOPERINIKYE



Hansi Elimi !
urakora iki muri biro
ya nje !?!

Ehoo, nta nakimwe, databuja, negeranyaga,
inyandiko za we, igitabo cya we...

Uburyo mwasubiyemwo inyandiko
za **ARISITARIKYE** kingaragariza
ubuhanga. Ibyo byose bifite ukuri,
bishamikiraniye neza. Ese urateganya
ku bishyira ahabona ryari ?

Amakame :

- 1) Siferi zose zo mu kirere ntizizenguruka irukande ya santeri imwe.
- 2) Santeri y'Isi ntabwo ari santeri ya Iniveri, akubwo ni icya garavite kandi n'icya amuzengurako-rugendo rw'Ukwezi.
- 3) Izo serikyeri zose zizenguruka Izuba kandi, biracyo rero, Izuba ni yo santeri ya Iniveri.
- 4) Urugendo kagera ku nyenyeri zidatirimuka ni rurerururwa ku burya, ugereranyije, urwo kuwa kw'Isi ugera kw'Isaba rwaba ari akuzagururanya.
- 5) Imivudako igaragara mu ijuru ntabwo iterwa n'urugendo rw'ijuru abwaryo, akubwo bituruka k'amavudako w'Isi yo yizengurukaho.
- 6) Ikitagaragarira nk'urugendo rw'Izuba ni, mu by'ukuri, urugendo rw'Isi ikoma, kimwe n'izindi pabarete, izizenguruka Izuba.
- 7) Iyigendo nsubiriyuma z'amapabarete zitagaragarira zizenguruka urwo rugendo rw'Isi, rurabagije gusobanura izo nzira z'ingendo zitagararotse z'ayo mapabarete yandi mu kirere.

Ngo ndivanga mu biki ? kandi ubwa mbere na mbere,
nsubiza urupapuro rwa njye ! ubumenyi ntibugombwa guhabwa uje
ubwambere. Ese ntunibaza ingorane nahura na zo mbaye niyemeje
gutangaza icyo kintu !



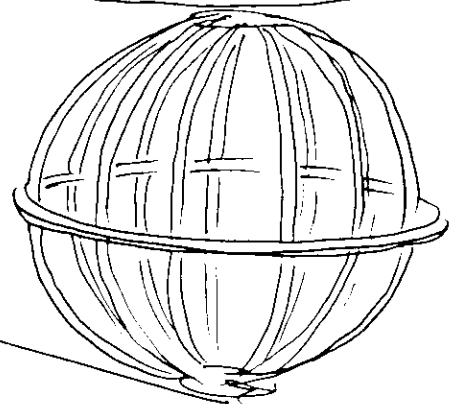
Jyewe, sinshaka
ingorane na Kiliziya,
na ba Bwengembwa!

Ariko... musenyeri
mukuru wa Kapone ubwe
agusaba izo nyandiko
za we...

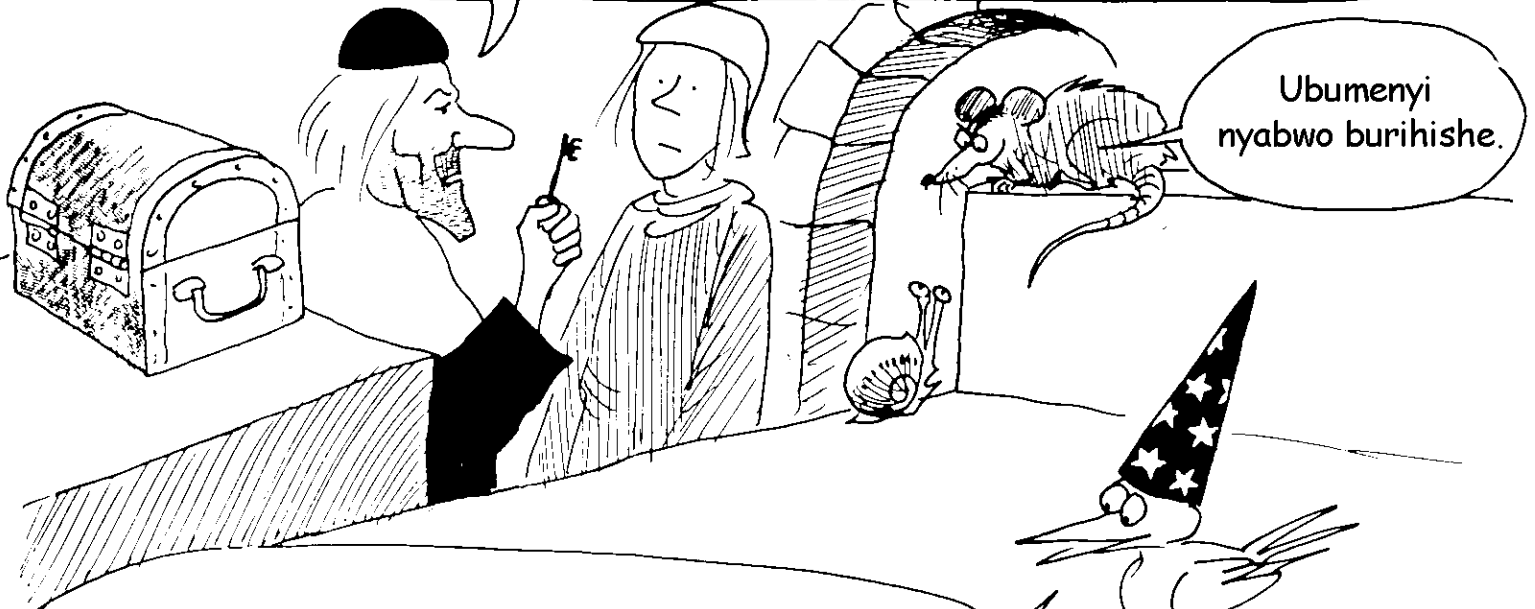
Kandi noneho uriho urasoma
urwandiko rwanjye ! Munyabwuzu...



Ariko, mwalimu,
ni ngombwa cyane kugarura
isi y'abantu ku ntangiriro
nziza, si byo ?



Muhungu wa nje, ndashima cyane uko guhumuka k'ubwonko kwa we. Ariko, emera ibyo nkubwiye, aha, i Karakoviya, dufite amahoro hamwe n'ibitubeshaho. Ntitubyonone. Abantu b'iyi si ntibarahunuka bihagije k'uburyo bakwakira ubu bumenyi...



Kugirango arebe imyitwarire y'abantu, Koperinike yaretse umwe mu banyeshuli be, Retikase, akwiragiza mw'izina jye bimwe mu bitekerezo bye.

Birtyo, nibigenda nabi, nzavugako, uwo Retikusi, jye ntamuzi.

Koperinikye yahaye uburenganzira Retikisi bwo gukwirakwiza inyandiko ze zibumbiye mu bitabo, mbere gusa gato ko yisazira, ku buryo igitabo cya mbere cya zo cyamusanze ku gitanda yapfiriyeho.



Umunyacapiro yagize impungenge, k'uburyo yongereshe jemwo mu ntangiriro z'icyo gitabo ibi bikurikira :

Tureka izo ngenekerezakuri nshya zimenyekarishye hagati y'izindi zisarazweho zikasa cyane n'ukuri, cyane cyane ko zo zigaragara neza, mu buryo bworoshye kumva kandi ziherekejwe n'ubukungu bw'ibyitegererezo nta ngano byazuye abwenge kurusha ibindi. Rero ntihagire umuntu n'amwe, ku bijyanye n'izo ngenekerezakuri, witegaho Asitororomi hari ikintu na kimwe cy'ukuri imugezaho, kuko yo nta kintu ishaka kuduka nk'ibyambere kuko nabo umuntu yafata nk'ukuri ibyo bikorano byagerewe undi murimo, yasoza iryo somo rimwinjije mu bajiji busamba ubwo yaritangiranye.

Mu yandi magambo : bisome ariko ntubifate nk'ibintu nyabyo rwose.


Yenda Koperinikye ntiyabeshyaga pe. Mu 1600, imyaka 57 nyuma y'urupfu rwa Koperinikye, **GIYORUDANO BURUNO** yafunze imyaka 8 hanyuma aratwikwa azira kuba yarakiriye izo nyandiko nk'ukuri.

Itsinda ry'ibigoryi. Hariho ama miliyoni y'amazuba nk'iryacu kandi hakabaho ama si nka yo atuwe.


Mureke aganire noneho unyihere ikibiriti.

TIKO BUREYI & KEPELERI

MURI DANIMARIKYE, ITARIKI YA 4 GASHYANTARE 1600.




Hansi,
tugeze URANIBORUGE, umugi
mushyashya w'ubumenyi.



Aha, mwalimu Kepeleri !
murakaza neza mu masambu
yanjye.

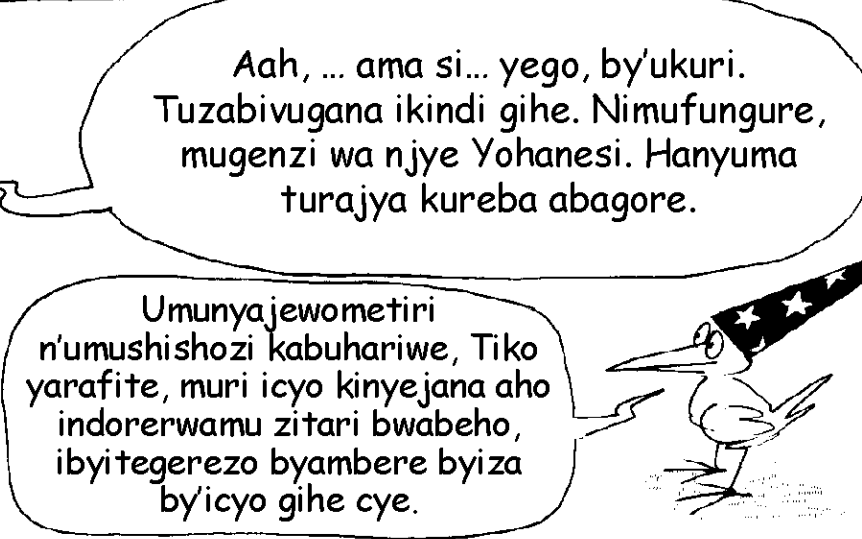
Muranyemerera ko
mbahamagara Yohanesi ?

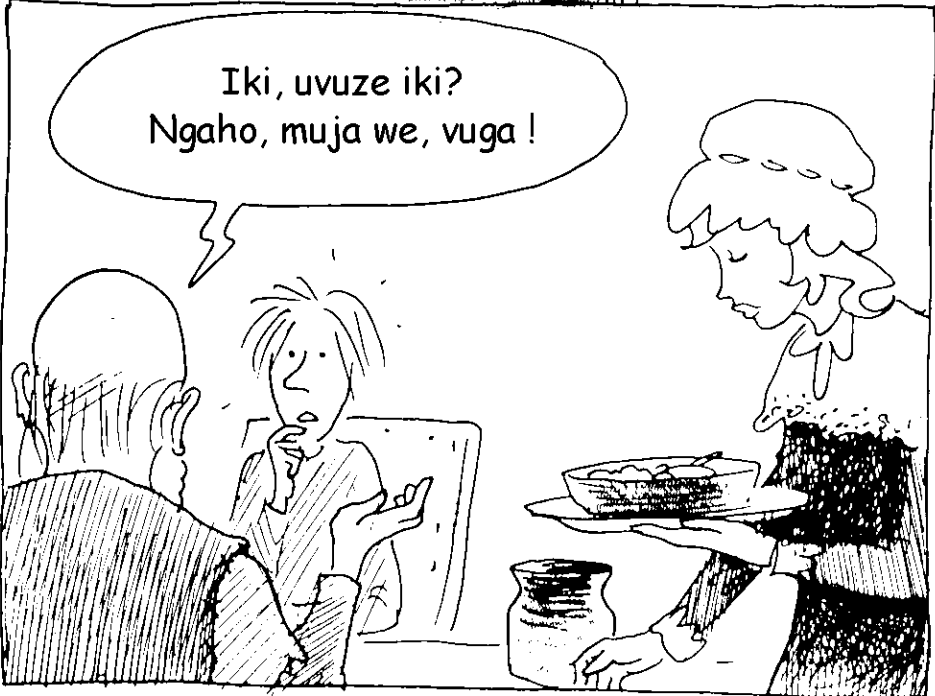


Aha, bwana
TIKO BURAYE

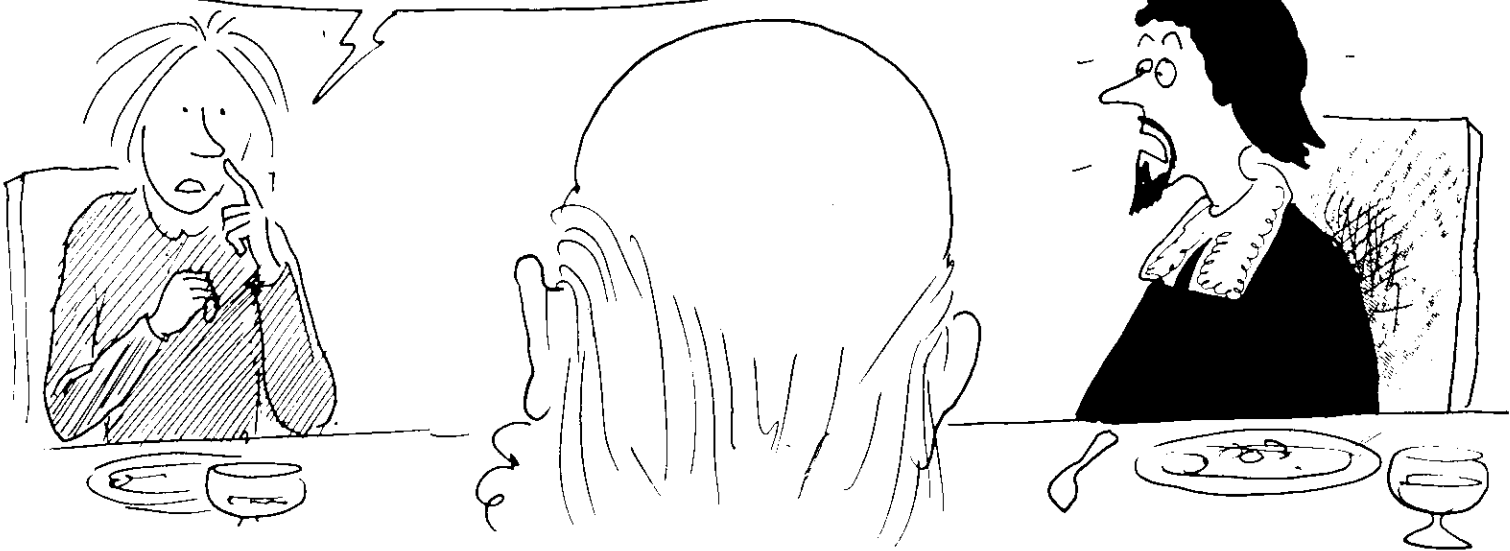


Mwalimu Burayi, nk'uko mubizi, nshimishwa cyane n'ibipimo nyabyo ku ma si, mwakomeje kwegeranya.





Uretse icyubahiro cyanyu, Nyakubahwa yatakaje izuru rye ry'ifeza (*).



(*) Tiko yarafite izuru ryaciwe mu mudwano w'inkota wa babiri.



Aah, uranshimisha muja we. Tureke iyi nshuti yanjye Kepuleri aharagate ameza, ko abikunze cyane, naho twebwe tujye kwirebera abagore.

Mana yanjye, mbega ubutunzi! Mbega imyaka ngirakamaro y'ibyitegerezo....

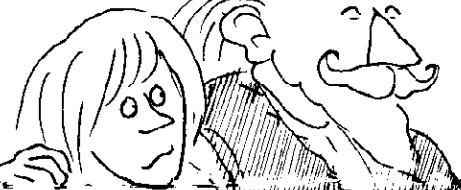


Aaha Kepuleri, ntimwigera murambirwa na gato no kurya imibare n'impapuro ?

Abagore !

Nsanzwe mfitanye ingorane n'uwanyje...

Umuntu agira abagore akwiye. Sibyo muja we ?



Mushobora kubisubizayo.
Mwadhaye byiza kandi bihagije.

Ese uraziko mu 1572, nabonye inyenyeri ivuka?
Sinemeraga ibyo amaso yanjye yanyerekaga.
Hanyuma, Yuma y'amezi make, nayibonye ipfa (*).

Biryo se ni ukuvuga ko inyenyeri ntabwo zihoraho !?

Ni byo nibaza... reka mbabwize ukuri,
byarampungabanije.

(*) Iyo ni superinova yitegerejwe na Tiko Buraye.

Ndatekereza... ewuhe... ko amapalanete azenguruka iruhande y'izuba.

Nahose... Isi ?

Ko Isi igendagenda, ibyo byaba ahubwo ari nyabyo.

Ingingonshingiro ya Arisitote ?

Oya pe. Ni icyigaragaza gisanzwe gituruka ku cyitegerezo.

Urareba, ishyire mu bwonko ko inyenyeri zikwirakwiza hirya mw'ijuru nk'amababi y'ibiti cyangwa nk'iriya misozi.

Iyaba Isi yagendagenda, twakagombye kubona umuvuduko w'inyenyeri zitwegereye zica imbere y'iziri kure cyane.

Nk'uko mbona ibi bita bigendagenda imbere y'imisozi iyo nyeganyeye umutwe.

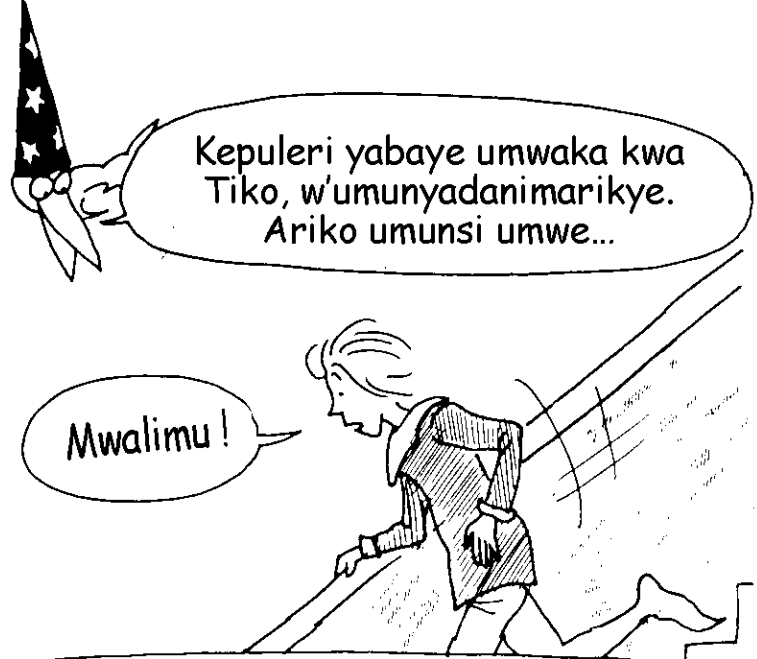
Ndabara, nemejeko inyenyeri zaba ziri mu miliyoni n'imiliyoni z'amamayilo.

Twakagombye, byonyine twifashishije ino mibare myinshi, itangaje, gushobora kwitegereza iyo **BUSANE**. Noneho kandi nta n'**UBUSA RUKUMBI** tubona!



Hagomba kuba iyakirwa ry'ibitekerezo bihabanye ibyaribyo byose. Ariko kandi, oya pe, ibyo ntibyumvikana. Isi ntinyeganyega!

Bigomba kwemerwa nk'ibigaragarira uwariwe wese : ijuru ni ryo rigendagenda !



Kepuleri yabaye umwaka kwa Tiko, w'umunyadanimarikye. Ariko umunsi umwe...

Mwalimu !



Nyagasani BARAHE amaze gupfa azize kwifunga kwimitsi mu bwonko.....

Kwifunga kwimitsi mu bwonko...

Ibyo, byabaye neza.



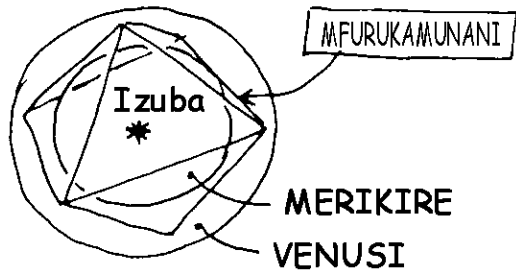
Kepuleri yakomeje igihe kirekire gutohoza yifashishije ibipimo nyasitoronomi bya Tiko Barahe, ari byo byari byarapimwe neza muri icyo gihe.

Ariko, naho akurikira inzira yafunguwe na Koperinike, atsimbatarara ku bitekerezo bimwe na bimwe.

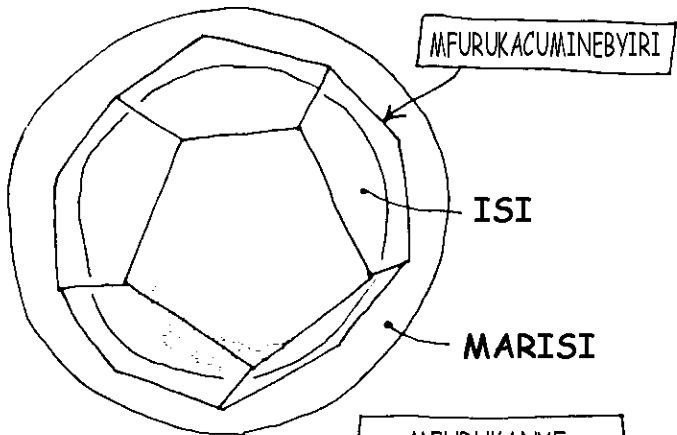
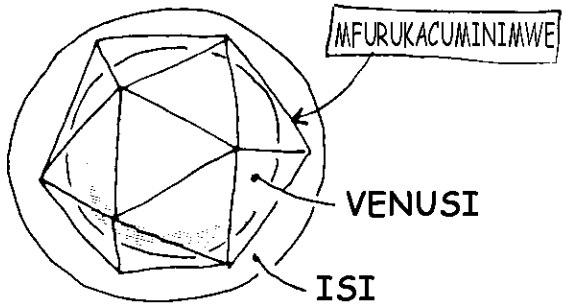


Hansi, Koperinike afite ukuri : Izuba ni ryo riri hagati na hagati ya Iniveri, ndabyemera rwose.

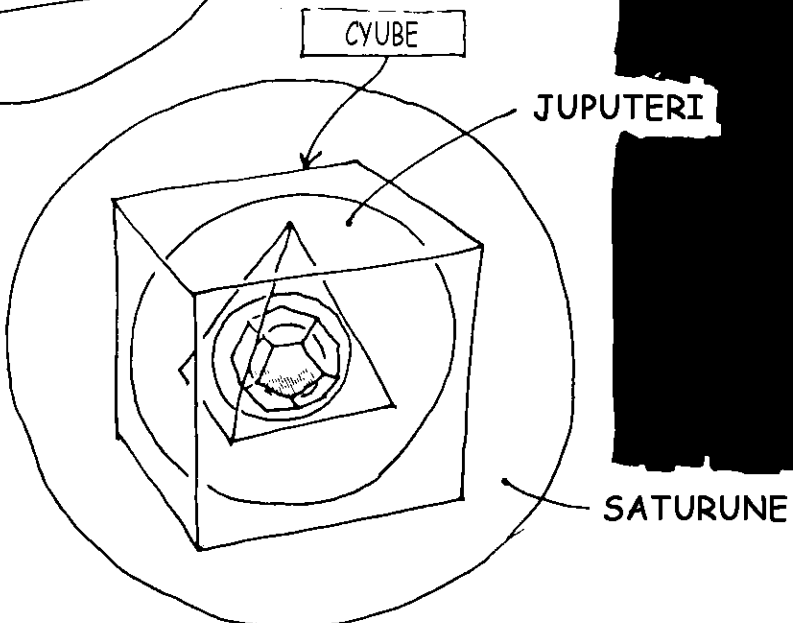
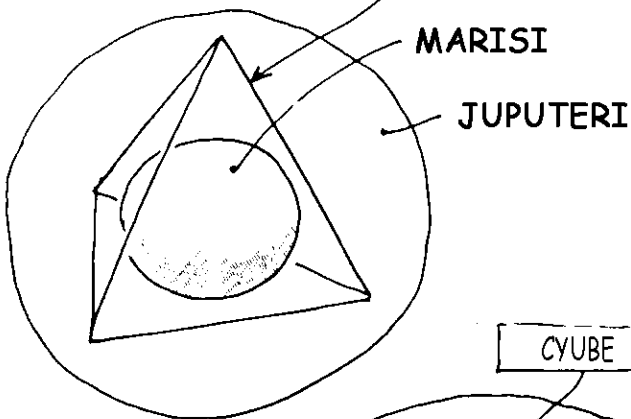
Cyo, Hansi, reba: ku kibyatarare, nshobora gushushanya kare muri serikeri. Hanyuma kandi ngashushanya serikeri ya kabiri muri iyo kare. Nkanashushanya mwo tiriyanjeri nganyampande kandi ngasubira ngatangirana mpande-shanu.



Palanete, ibiremwa nyabyo,
bigendagenda kuri za siferi nsangirahagati.
Aho hagati birumvikana ko hari Izuba.



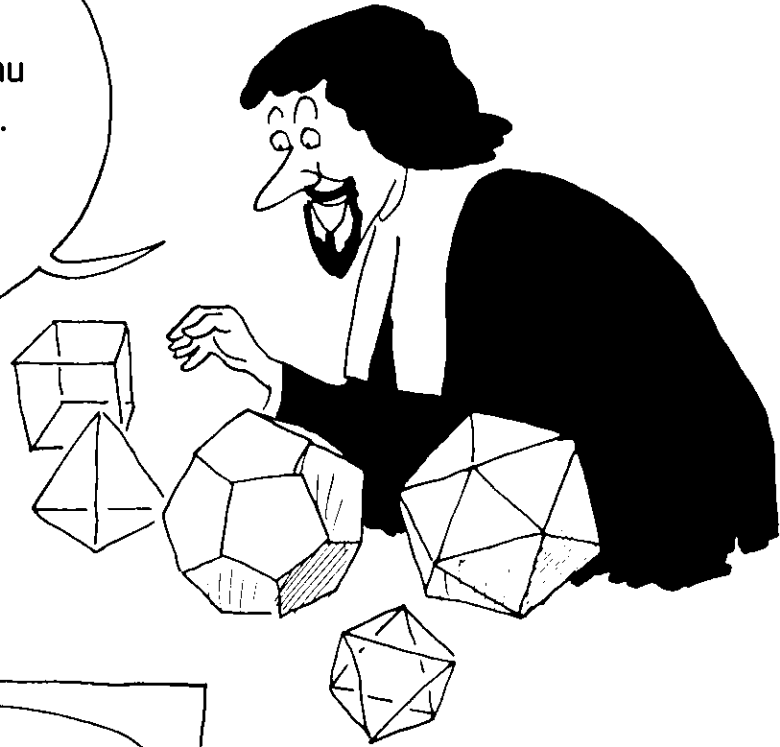
MFURUKANYE



Buri siferi yiyegeka ku mitwe
ya MFURUKANYINSHI naho iyindi
ikiyegeka ku mpande za yo. Noneho
bikagenda bikorwa birtyo...

Dore, Hansi, ibanga rya Iniveri :
inzira za palanete esheshatu zubakwa
hifashishijwe **MFURUKANYINSHI** eshanu
Z'IMPANDE ZINGANA ZA PALATONI.
Narimbizi. Byose birongera bikifunga,
byose bigenda byicomekanya.
Ndi umunyabwenge, umunyabwenge !..

Kandi undi ufata
uruhago rwe nk'itara!



Mwalimu, ese ibyo byose bihuje
n'ibipimo byakozwe na Tiko Barahe ?

Wagacyawe oya.
Ariko hari ikintu
kimwe gitangaje.

Ibipimo bya Tiko
bijyanye n'ingendo za Marisi
ni ndahakanwa. Nakoze
nasubiramwo inshuro ijana
imibare ya byo. Hari ikintu
kitagenda nk'uko bikwiye.

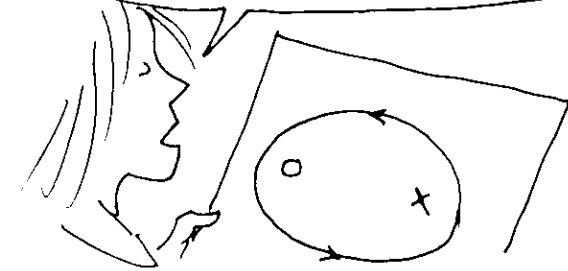
Ibyo byose, mu by'ukuri, bishobora gusa guhura,
niba aho kuba ifite inzira **NYASERIKERI**, Marisi
igendera mu nzira **NYAYELIPUSI** aho Izuba rigira
ikicararo mu mwanya w'igicaniro umwe wa yo.



Ariko se noneho Mwali, **IHAME** rya **PITAGORE**, iriya nryanaburyo yagatangaza ya za serikeri, igitekerezonyemezwa cya **ARISITOTE GIHUZA IKINYA SERIKERI N'IMANA**, ibyo byose bicika ubusa !!!

Yego, Hansi. Ni iherezo ry'ibyo byose. Serikeri za Putoleme n'ibisigaye...

Nanjye ubwanjye navugako mfite ikibazo cyo kubemera neza.

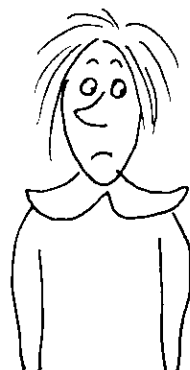


Tekereza ko, kuri ayo ma elipusi, umuvuduko unahindagurika. Marisi irihuta cyane iyo yegera izuba hanyuma igatangira kugenda gacye iyo iriho irijya kure. Ibyo byari gutangaza Pitagore !

Polisi ? Ariko se ihuriye he na Pitagore ?



Yohanesi, ni Polisi !



Ntabwo tuzi uwo mugabo Pitagore muvuga. Twaje guhagarika mama wa nyu, uregwa ubupfumu. Yahaye Yakobo, umuconzi w'ibirahure, umuti watumye arwara cyane.

Abagore bakomeje kubera uwo mupfayongo Kepuleri, isoko ry'ingorane.

Hansi, iyo umuhengeri ukubye, ntakindi kiba gisigaye kuri twebwe cy'ubupfura uretse gushyira ahagaragara hahoraho ibyavuye mu masomo yacu akozwe mu buryo bw'amahoro.

Dayimoni we, bimeze nabi.

Fata ikaramu wandike :

Muvandimwe Galile, uri umuntu uteye ubwuzu. Ese ushobora kunyohereza imwe mu ndorerwamu z'agatanga zawe...

GALILE

Mu 1623, mu biro bya papa Urubeni VIII, umurinzi wa Galile.

Mama gada !
uriya muntu wo mumajyaruguru aranshakaho iki ?..

Nonese, muntu wanjye mwiza Galile, ibiki bishyashya ?

Ibaruhwa yindi kandi iturutse kuri uwo Kepuleri. Hamwe n'amakuru y'I Rome. Hariya ziriya njiji ziravugako ngo indorerwamu yanjye ihindura iforoma y'igaragara ry'ibintu. Ikibigaragaza cyabo : inyenyeri zigaragara ziri mw'itsinda nyabubiri...



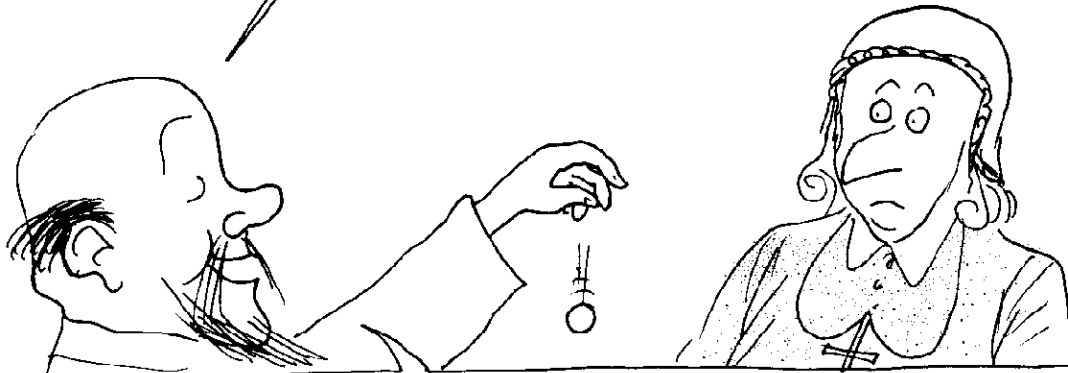
Ese ibyo wowe ntibigutangaza ko zigaragara ari ibimane nyabibiri kandi urebesheje ijisho gusa atariko uzibona ?

Galile, ziba !

Kandi, Bikiramariya we, kuki zitaba ibimane by'ebyiri nyuma !? Kuki tutagerageza kureba byibuze Iniveri nk'uko iteye, aho kugerageza kuyubaka hakurikijwe inkamuro z'ibinyoma n'ubujiji bituruka mu Nyandiko Ntagatifu !

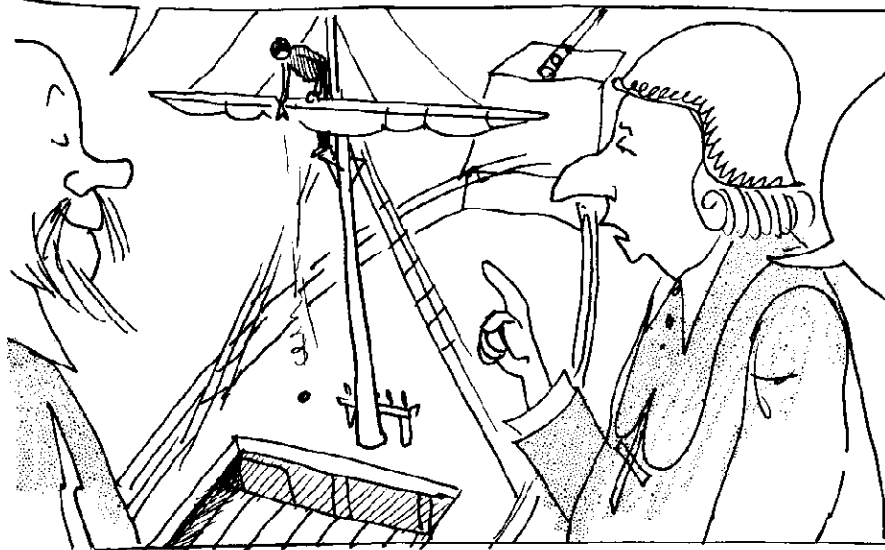


Mutima-mutagatifu ntabwo ari inzobere muri asitoronomi !



Bariya ba yezuwite ni injiji. Bemeza ko niba Isi igendagenda, uwatera ibuye hirya isi yagenda irisatira ku buryo ryagwa hafi y'aho waritereye !!

Kandi noneho, iyo ugendera mu bwato hanyuma ukarekura ibuye riturutse hejuru ku giti cy'ibendera, hatari umuyaga, rigwa ku kirenge cyacyo. Narabisuzumye.

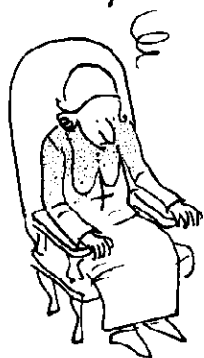


Bavuga kandi ko iyaba Isi yazengurukaga, yakabaye iturika kubera ingaruka **Z'IMBARAGA NYAMWIZENGURUKAHO.**



Yewega we ! Nyirubutungane azi neza ko umunsi ugira ntagushidikanya amasaha 24 ! Isi rero izenguruka gahoro kuburyo idaturika.

Mwiza wanjye Galile, tuza. Siyanse igomba kugenda yitonze. Igizwe n'ingenekerezakuri...



Eshe ingenekerezakuri!
Ma, ese Kiliziya ntiyakagombye kwivugurura igatera imbere?
Simbona uko urugendo rw'Isi rwakubita hasi idini rwose?

Bibiliya ntabwo ari igitabo cya siyanse !

Byiza, turebe ubuvumbuzi bwawe bushyashya.

Hari imisozi ku Kwezi
kandi Izuba rifite ubuheri...



Aho uriho uravuga ibiki ?

Ukwezi ni urubuye rufite ibishishwa
bicyoroshe byinshi naho Izuba rifite ibibara hose.

Nabyumvise byose
kandi ni ibintu bikomeye
CYANE.

Suwu,
generali
w'Abajezwite...

Galile yarisekerezaga
gusa... yari ingenekerezakuri
isanzwe y'akazi.



Izuba n'Ukwezi **BIGOMBA KUBA ARI NYASIFERI !**

Murabizi neza ko atasetsaga.
Imibare ni igikoresho cy'amadayimoni.



Ntabwo muri abantu b'imyumvire ifunze.

Ayiwe!

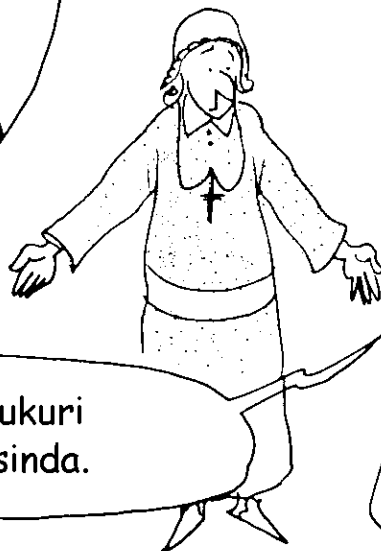


Mutagatifu Agusitini
yajyaga avuga n'ukuri kose ko gusenga
Imana biruta kubaza Iniveri...

Batsimbataraye
ku mafuti ya Arisitote,
kuri fizikye itarashobora no
gusobanura fenomene
na nto n'imwe...

Byiza, niba ari uko, niba musuzuguye
ubutegetsu bw'abashumba ba Kiliziya,
uzaba ari byo wishakiye!

Galile, warenze akarimbi.
Bariya ba jezuite ni ibihangange.
Ntacyo nashobora....



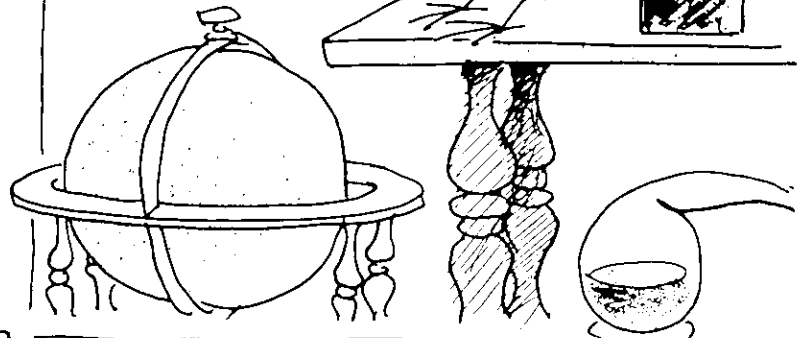
Tuzareba neza, hagati y'ukuri
n'ubujiji bukabiye, ikizatsinda.

Byari birangiye. Galile yagombye
kwivuguruzwa mu ruhamu mu 1633.

Niyutoni

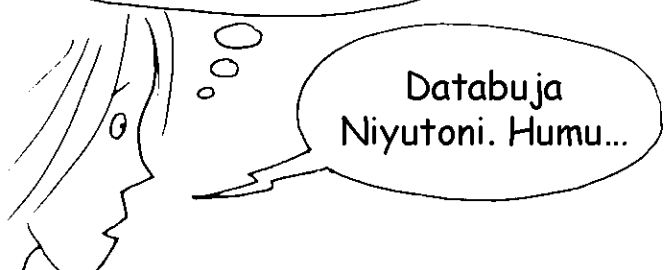
Igitondo kimwe cyo mu 1690, i Kamburiye

Mwalimu ?



Ntasubiza...

Databuja Niyutoni. Humu...



Iki kandi ?

Databuja, ibyo mwatumije...

Uti iki, ibyo natumije ?




Umunyu wa merikire, sufure, akwaforutisi, imbuto z'imizabibu...




Icyorezo ! Jyenda unzanire ibyo biyobyabwenge, Ni ibyo gusa !





Iki, ntimwari muzi ko Umutware Niyutoni, igihanganjye mu bumenyi bya siyanse ko mu gihe cye, yakoraga Alishimi ?

Turebe...igitabo cy'ubumaji cyavugaga : akamanyu k'urwara, vinegere y'akunzugunya...



Ese ariho arakora iki ?

Aah Aah Aah !
ndumva ndi hafi... umunsi umwe nzategeka isi !



Wawuu ! ... mbega impumuro !

Anselimi !

Narababonye ejo muri kumwe n'umuturanyikazi...

Uriya mukobwa wiyambitse ubusa mu gatuza.

Ibyo ntibizogere kuba na rimwe !

Yego, databuja...

Tuba mw'isi yihebeye ubukire.

Nyagasani, iyo ntekereje ibyo iriya ndogobe ifunze mu mutwe ya Leyibunize yandika, ko nta **ESIPASE NYAYO** ibaho.

Anselimi, jya kunzanira igice cy'ikirahure cy'amazi.

Igice cy'ikirahure cy'amazi.....indobo, Nyakubahwa ?

Ndashumika iyi ndobo k'umuguzi, noneho nwhotore cyane.

Hanyuma ndekure byose... ubwambere, indobo iri zungurutza, ariko amazi yo aba agumye hamwe. Hejuru ya yo haba hafite ubuso bubyataraye.

Reba noneho, mpagaritse indobo. Amazi, kubera **INERISI**, akomeza kuzenguruka. Ubuso bwa yo bwo hejuru bukomeza kuba bucukuye. Murabyumva?


Hanyuma, kubera itsirimana, n'amazi nayo yinjira mu muzenguruko. Biryo **IMBARAGA NYIZENGURUKAHO** zicukura ubuso bwayo bwo hejuru.



Nta nakimwe, Databuja.


Igicucu inshuro ennye !
Ubundi ni ibintu bigaragara !
Biriya byerekana ko hariho **IKICARIRO
RUSANGE, ESIPASE NYAYO**. Ni iyo
esipase, y'inyenyeri zo mw'ijuru,
ayo mazi yicayemwo, si iyo ndobo.

IZO MBARAGA NYAKWIZENGURUKAHO zikora gusa, nk'uko mwashoboye
kubyibonera, iyo ayo mazi azenguruka **UGERERANIJE N'IYO ESIPASE NYAYO**.
Leyibunize ni indogobe yasenzekaye, kandi ngiye kubimwandikira.



Uuu la la, Leyibunize
ntabwo azishima...

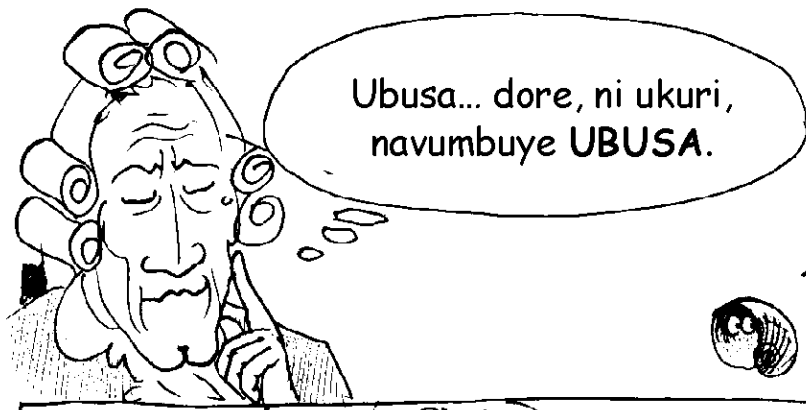
Imana, mu bwitonzi bwayo buhebuje,
yashyize za asiteri mu **BUSA**, ntabwo yazishyize muri
esipase yuzuye za serwakira, nk'uko uriya mufaransa
abyandika, Bwana Dekarite, wimiranya Iniveri
n'igikombe cy'icyayi.



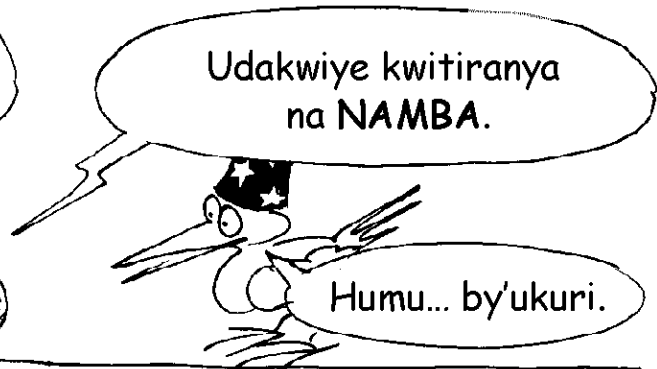
Ariko se, hagati ya za asiteri,
nta... gihari ?



Ni uko,
nta **KINTU NAKIMWE** kibayo.



Ubusa... dore, ni ukuri,
navumbuye **UBUSA**.



Udakwiye kwitiranya
na **NAMBA**.

Humu... by'ukuri.



Reba, Anselme.
Imbaraga **NYAGARAVITE**, ihinduka
nk'incurame ya kare y'urugendo, igumiza ama
asiteri ashumitse amwe ku yandi.

Imbaraga Nyawizengurukaho

Isi

Ukwezi

Imbaraga Nyagaravite

Kubera izo mbaraga, zikora **AKO KANYA** kandi **KU IBIRI HIRYA**, kandi
ihanganye n'**IMBARAGA NYAWIZENGURUKAHO**, Ukwezi kugumana n'Isi.



Ni nk'uko izuba
ricigatira ama planete yose
ku imizenguruko ya yo.

Aa,
ndi umhanga,
umhanga...



Naho abandi bose
ni injiji zitagiramwo
n'umwe wagira gutekereza ku
ibyangombwa bisanzwe.

Baratinyuka kunegura!
Ariko jyewe nzabasya, nzabasya bose,
uranyumva, **BOSE!**

Yego, Nyagasani

WARIKE!

Humu mu...

Genda unshakire
ihembe ry'inka risekuye,
n'ingoga !...

Ehee... yego nyagasani...

WILIYAMU HERISHELE & PETERO SIMONI WA LAPALASE

Umutamenwa wa Malimezoni, mu kwa munani 1802.

Noneho rero, ameze ate bwana Lanturulu ?



Neza cyane burigihe iyo ndi iruhande rwawe hanogeye, mwiza wa nje Sofiya.

Ariko, mbwira, ntabwo uriya ari igikomererwa cya Lapalase, uri iruhande ya Konsile wa Mbere ?


Birasa nka byo, ni iby'ukuri...

Ariko, uriya muntu, urikumwe na bo uvuga nk'abongereza ni nde ?



Ni asitoronome Herishele. tubegere. Ikiganiro cya bo kigomba kuba kiryoshye.

Bwana Herishele, Lapalase yambwiye byose kuri mwebwe. Mwubaka za telesikope, mwabaze uburebure bw'urugendo hagati y'Isi n'Izuba. Ariko, ikindi kandi, biravugwa ko, mwavumbuye ayandi ma si yatangaje imitekerereze yacu.




Bwana Konsile wa Mbere, ni iby'ukuri ko Iniveri igaragara, mu byuma bya cu, ngari cyane kurusha uko twayitekerezaga. Nitegereje za **INIVERI-BIRWA, AMAHUMBAGIZA AGIZWE NA ZA MIRIYARIDI Z'INYENYERI**, k'uburyo urumuri ruziturukaho rwagenze yenda amamiliyoni y'imyaka ngo rutugereho.

Herishele yahindaguye cyane imyumvire yacu y'isi k'uburyo tutakimenya neza aho santeri yayo yaba iri. Inyenyeri ziragendagenda, Izuba na ryo riragendagenda. Inzira Nyamata ni idisikye nini igizwe n'amatsinda y'inyenyeri, kandi igenda yizengurukaho...



Muri make rero, **IYI MONDE IRAHINDUKA.**



Icyo nakoze gusa ni ukuvumbura ibyiza Rurema yasize mu busanzure bwa Iniveri.

Ariko, abantu bose bazi ko umuntu wasubije ibintu mu buryo, wasobanuye neza bidasubirwaho amabanga ya nyuma y'inzira z'ama palanete, ari umunyamibare Lapalase wakose iyo mibare y'agatangaza, yuzuye kandi nyayo ku buryo...



Kuri icyo kintu, Lapalase, reka nkwi butse ko Niyutoni yatekerezaga ko, iyo ama palanete avuye mu nzira za yo, Ari Imana iyasubiza yo. Urabitekerezaho iki ?

Nakubwirako, bwana Konsile wa Mbere, ko ntigeze nkenera iyo ingenekerezakuri mu mibare yange.

Herishele na Lapalase, monde nshya iravutse.

Ariko, ikintu kimwe kirantangaza kuri uwo muntu Herishele.

Igiki kandi, Konsile wa Mbere ?

Afite ubuzima butuje, yumvikana bisesuye n'umugore we, umuhungu we agiye gukomeza ibikorwa bye kandi nta banzi agira. Ntabwo bisanzwe.

Muri monde y'ubumenyi, ibyo ni ibidasanzwe !

Ohu, mbabarira, dore Jozefine !..

Birtyo rero, nshuti yanjye Lapalase, mutekerezako monde zisa n'iyacu zishobora kuba ziriho mu nkengero ya zamiliyaridi z'amazuba ya buri galagisi.

Rwose pe.

Hariyo ubuzima ku yandi ma palanete imwe yose n'amateka yayo, n'imicongenderwaho bya ho.

Herishele yavumbuye uburanga MITERERE bya asitoronomi nshya : kubaho kwa za galagisi, ingyendo z'inyenyeri, imyubakirwaho y'Inzira Nyamata, urugyendo rw'Izuba. Ikinyejane gikurikira kizazana **IBIPIMO** nyabyo biminuje, bya mbere.

IJURU !

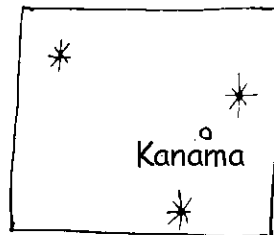
Akora amagaragazwa abiri nyayo aminuje y'inyenyeri yo mw'itsinda rya Sinye, mu kwa munani no mu kwa cumi na kabiri ugereranije n'indiba y'inyenyeri za kure (paralagisi), umudagi **BESELI**, yagaragaje, mu 1838, uburebure bw'urugendo ruyigeraho : imyaka-rumuri 11.

Isi Kanama

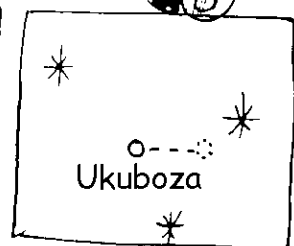
Izuba

Isi Ukuboza

61 Sinyi



Kanama



Ukuboza

Ifotora ryaje gushobora kugaragaza hanyuma amashusho yo mu kirere kuri za pelikile, kandi no gukusanya urumuri rwinshi mu gihe cy'imituze miremire ya manjoro.

Ntimusubire kunyeganyega !

Mu 1912, Hariyeta Leyavite

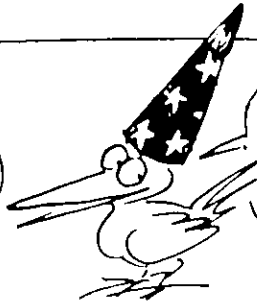


Ama SEFEYIDE ni inyenyeri zitanga urumuri ruhinduka nyuma y'igihe runaka. Igipimo cy'uburebure bw'ingendo zizigeraho, hakoreshejwe uburyo bwa paralagise, butanga ibipimo nyabyo kugeza ku butandukane bw'amacumi y'imyaka-rumuri. Ariko cyerekana ko, ku masefeyide ya hafi, igihe cy'ihinduka cya zo kihinduka mu nnyana imwe n'ubukana bw'urumuri zitanga. Uko zicana cyane ni nako igihe cy'ihinduka cya zo cyiba kirekire.

Kuburyo mpimye ubungane bw'urumuri nakira buvuye ku sefeyide runaka kandi nkanabara, ntangiriye ku gihe cy'ihinduka cya yo, urwo yakagombye gutanga, nshobora kubara uburebure bw'urugendo ruyigeraho.



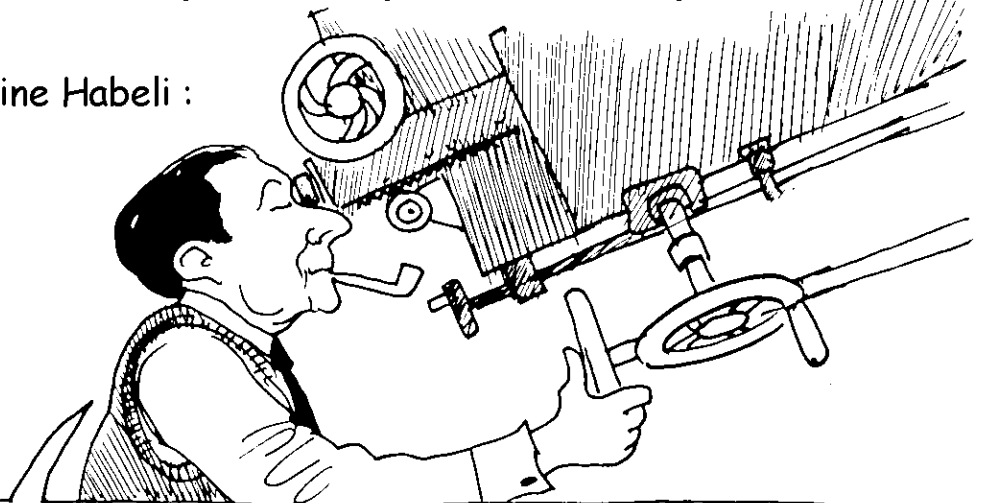
Ndi umunyabwenge buhanitse.




Ariko benshi bafite amakenga kandi ku miterere itari iy'amagalagisi y'amahumbagiza yihotoye atangaje.

INKURU YA PALOMARI

Mu 1924, umunyamerika Eduwine Habeli :



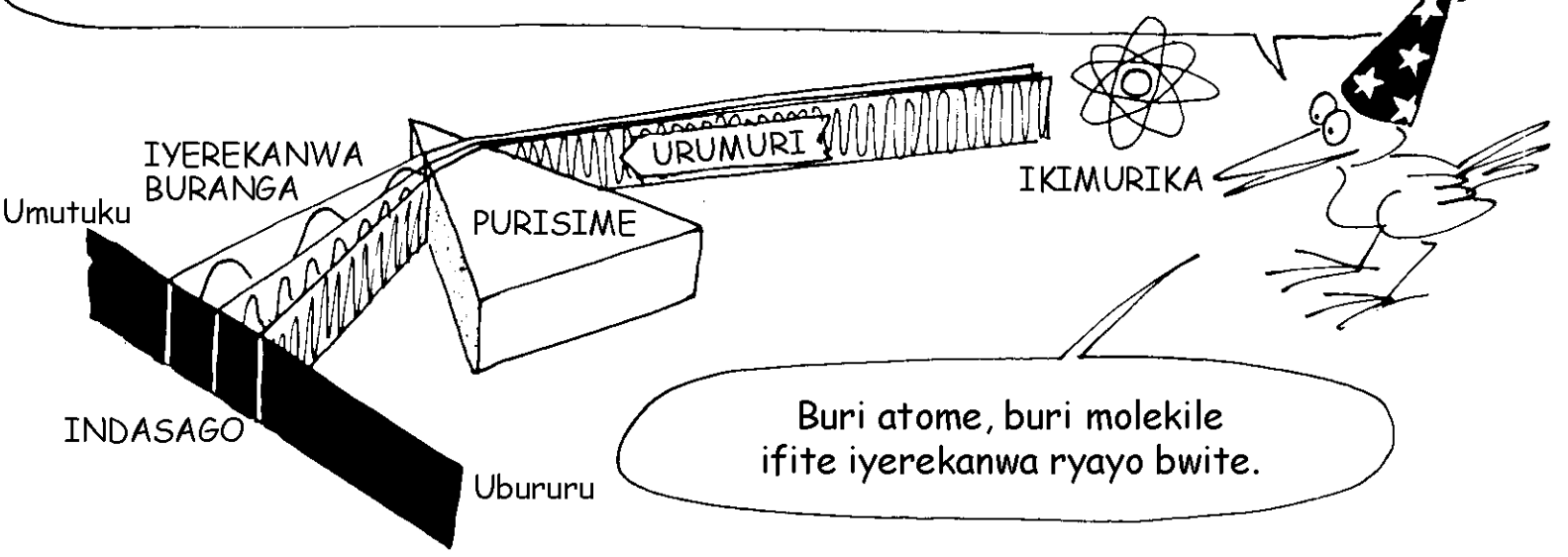
Nshuti yanjye nkunda, ikibazo cyakemutse. Maze kuvumbura sefeyide yagatangaza mu ihumbagiza ryihotoye rya Andromede. Iyo ntabwo iri muri galagisi yacu. Njyereranya urugendo ruyigeraho ko rungana na miliyoni ebyili z'imyaka-rumuri.



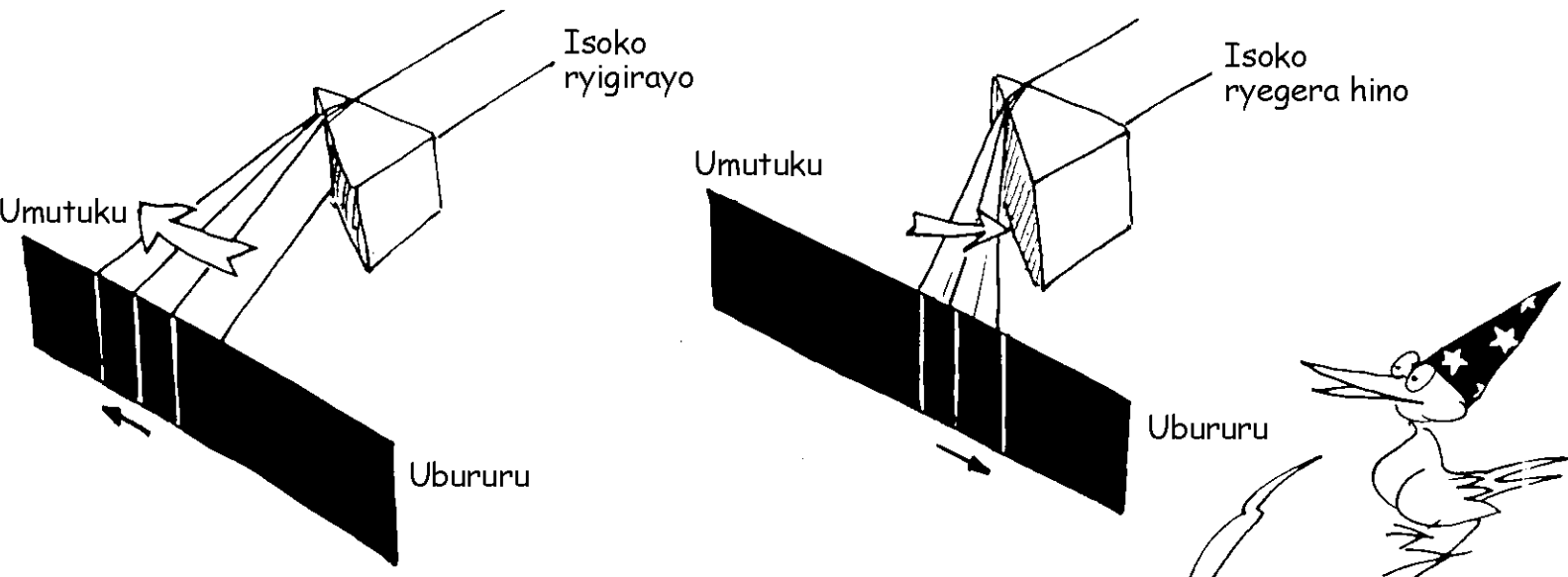
Mbega amakuba!
naretse inkono
yanjye igwa hasi.

Telesikope ya Palomari « ibona » kugeza kuri miliyalidi cumi z'imyaka-rumuri.
Kosimologi nshya yarigiye kubona aho igikoresho kisesengura
gihwanye n'ibyifuzo-ntego bya yo.

Ariko dore ikindi gice k'iryo shakashaka rikomeza.
 Kuva mu 1859, uherye kuri Kiricofu, abantu bari bafite akamenyero
 ko kugaragaza imiterere buranga by'ibintu bitanga urumuri bacomeka
IMVANGURARUMURI kuri za telesikope.



Buri atome, buri molekile ifite iyerekanwa ryayo bwite.



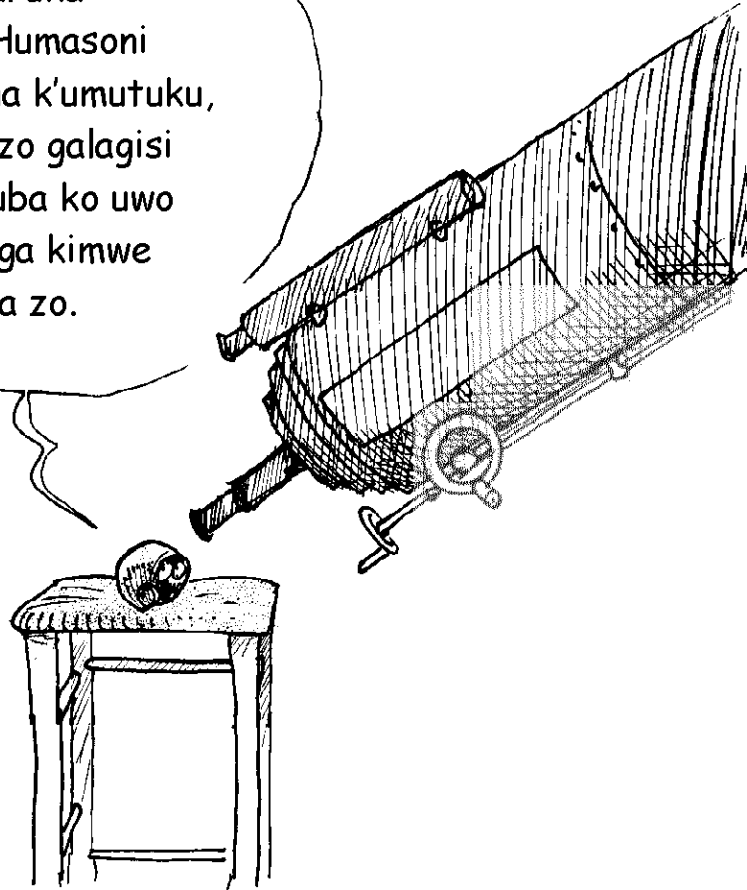
Iyo isoko ry'urumuri riri mu muvuduko wo kwigirayo cyangwa wo kwegera hino, indasago zose z'iyerekanwa zihura n'isererereka riryana k'umutuku (IYIMUKA RITUKURA) cyangwa riryana k'ubururu. Birtyo isuzuma ry'iyerekanwa ritanga imiterere-ngiro y'ikimurika hamwe kandi n'umuvuduko wa cyo ugereranije na twe.

Ni cyo gikorwa cya DOPULERI-FIZO, twavuzeho muri alubomo yitwa **BIGI BANGE (BELINI)**.



basuzumye amayerekanwa aturuka
ku magalagisi ya kure, Habeli na Humasoni
bavumbuye ko zigira iserereka riryana k'umutuku,
cyangwa **IYIMUKA RITUKURA**. Izo galagisi
zaraduhungaga noneho berekana vuba ko uwo
muvuduko wo guhunga wahindukaga kimwe
n'urugendo rudutandukanya na zo.

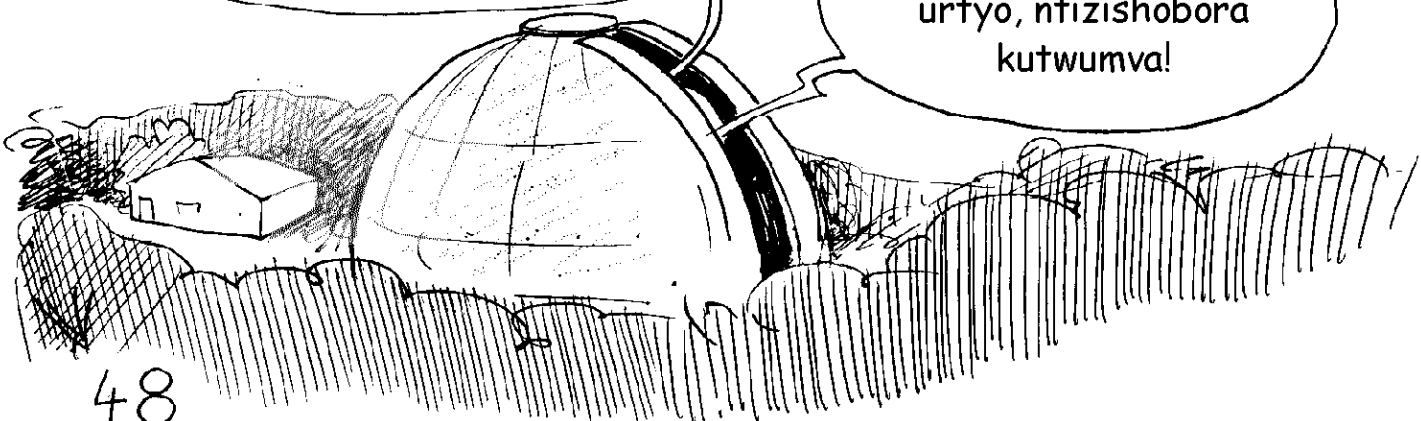
Mu by'ukuri kose,
Iniveri yaba yarabyawe
n'iturika ry'umurengera
ryabanjiriye byose.



BiGi BANGE

Ziraduhunga, Militoni,
ziraduhunga !..

Eduwine,
reka gusakuza cyane
urtyo, ntizishobora
kutwumva!





Ariko rero...
Iniveri YOSE
IRAGENDAGENDA ?

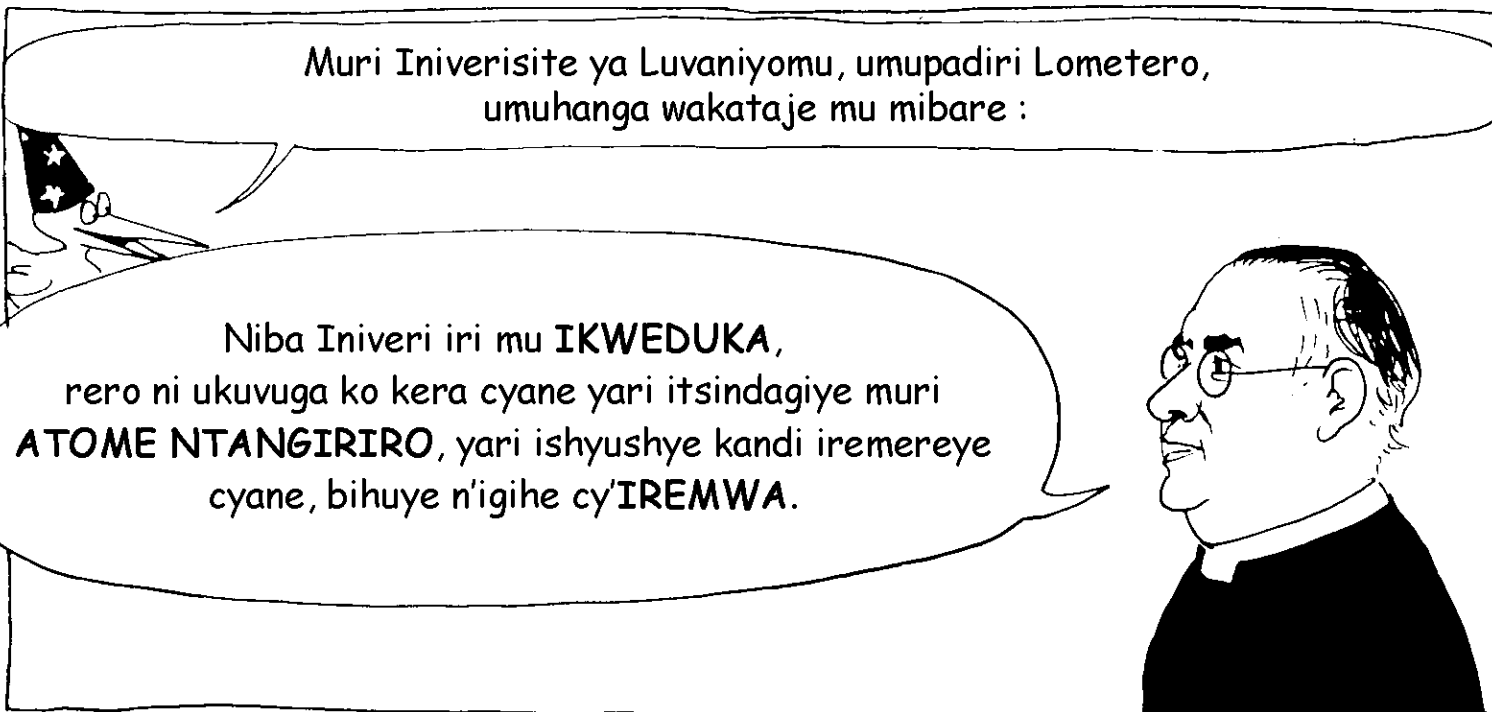
Ibyo kandi, NTA MUNTU
wari gutinyuka kubitekereza
mbere y'icyo gihe Habeli akoreye
iryo vumbura ritunguranye.


Kugeza mu 1572, nta muntu
watekerezaga ko, n'ibura n'isogonde imwe ko,
ama asiteri adahoraho.

Kugeza aho Tiko Burahe
yitegerereje SUPERINOVA, ni ukuvuga urupfu
mbaturanyambaraga rw'inyenyeri.


Mu 1810, Herisheli yajyaga yibaza
ku bubasha bwa zo bwo kubaho.

Zibyara zite urumuri rwa zo,
zikoresheje izihe mbaraga ?
Ese zikoresha itwikwa
ry'amakara ?







Ariko rero ? **BIBILIYA** isubiranye imbaraga z'umurengera !..



Hakwiye gusa gusubiramwo amatariki. Ibyo byashyira iremwa mbere y'imyaka miliyaridi cumi n'ebiyiri cyangwa cumu n'eshanu.



Hakurya ya Manshe, i Kamburi je, Furedi Hoyile arwanya yimazeyo iyo ngenekerezakuri. Kuri we Iniveri ihora buri gihe yakira atome nshyashya abyawe na fenomene y'**IREMA RIHORAHO**.



Muri make, Hoyile akora ibishoboka byose kugirango arwanye iryo garuka rikomeye ry'inyigishamana muri siyanse.



Kiliziya ihanganye n'indi....

AMA KWAZARI

Ubwitegererezwamwo bw'i Pasadena (USA) 1960

Mwalimu Jese Gerenshiteyini yakira umunyeshuli Tomasi Matayo.



Maze imyaka myinshi
nseengura amayerekanwa.
Nta kintu gicana nk'uku!

Ko byose biri mu mutuku,
aho ntibyaba ari inkurikira gikorwa
ya Dopuleri? Urugero nka idorojene
y'umuvuduko w'ihunga munini ?

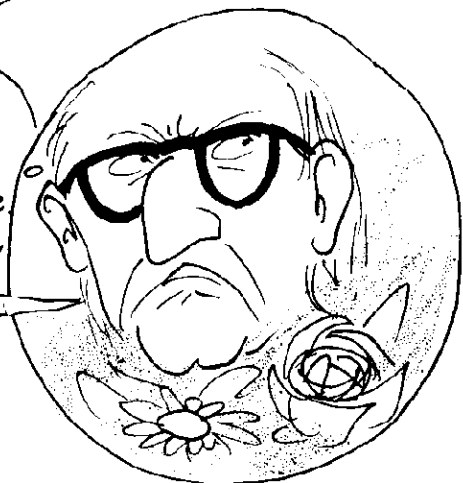
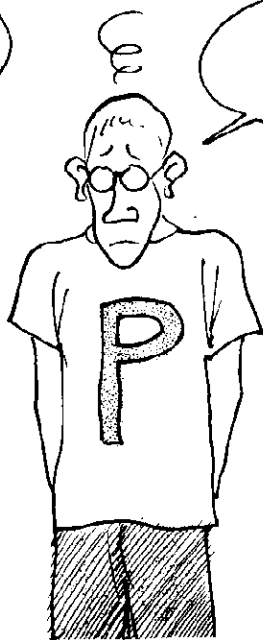


Tomasi ! iyaba yarifite umuvuduko wo guhunga nk'uwo,
yakabaye iri kure, ukurikije ihame rya Habeli, rivuga ko uwo
muvuduko uhinduka mu burtyo bumwe nk'urugendo ruyigeraho.
Iyaba ibyo byari byo, uriya mukungugu wakanzugunya
k'inshuro 50000 muto ugereraniye n'Inzira Nyamata,
wakabaye wohera ingufu nyinshi inshuro 100 kuyirusha !

Ushobora
kurekera aho...

Jyewe,
kubyo nayivugaho...

Azi iki ku
mvangururumuri?
Ni umuradiyasitorome



UMWAKA UMWE YUMA YAHO

Marteni Shimiti :

Mbega, Jese, urareba iri yerekanwa rya kimwe muri ibyo bintu by'urujiro, «bisa cyane nka nyabunyenyeri», izo KWAZARI, hashize umwaka zigaragaye.

Yego, Mariteni.

Aratuje uyu muholande...

Urareba iyi nyerekanwa ya idorojene?

Uragerekeranya noneho ugasunika werekeza ku mutuku.

Ni ZIMWE.



Jese, niwo munsu mwisa wambere uruta iyindi yose yo mu buzi bwanje.

Kiriya kintu kiri mu miliyaridi ebyiri z'urumuri-rugendo kandi kiranduhunga k'umuvuduko wa kilometro 47 000 kw'isogonde.

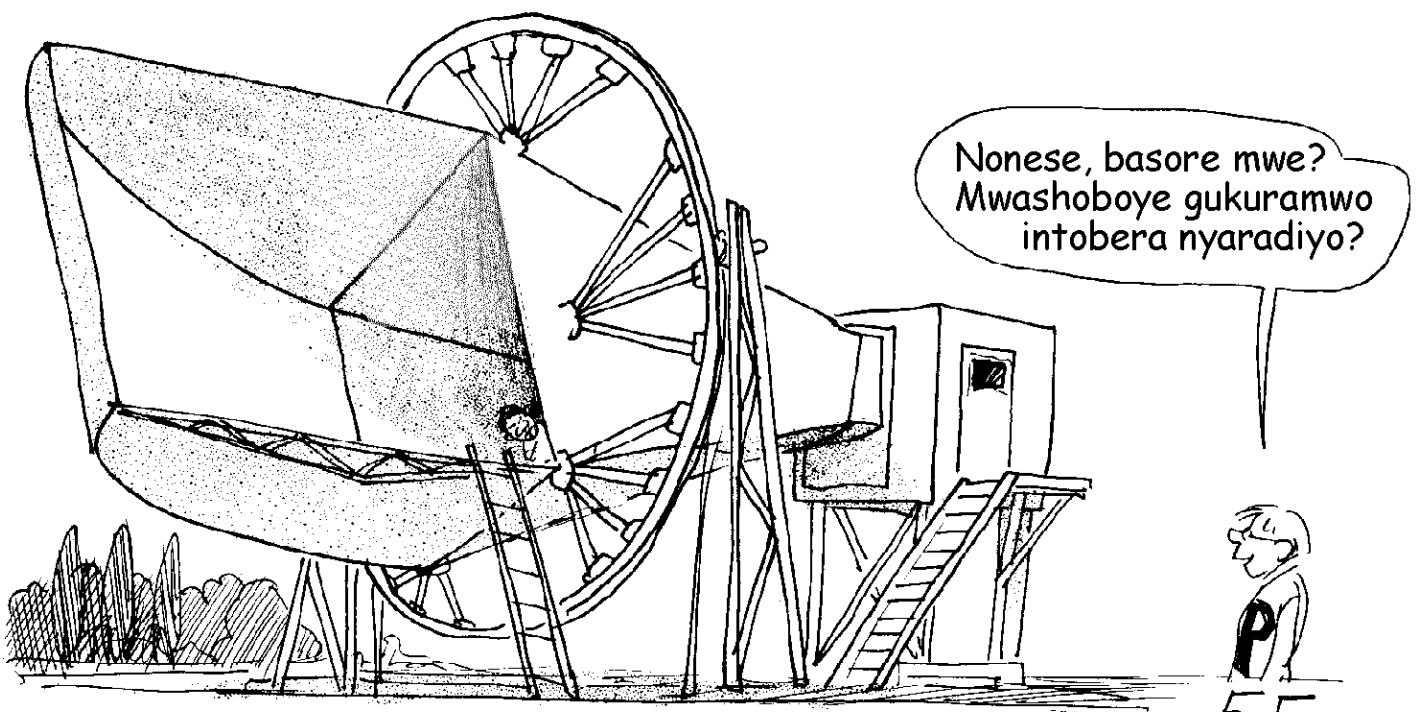
Ibyo ubizi ute ?

Kandi naho kiruta gato inyenyeri isanzwe, gisakaza imbaraga nk'izi galagisi yose.

Ohu, nta na kimwe...

UMURASIRE MUSIGAZWA

Mu 1964, muri Niyu Jerisi



Nonese, basore mwe? Mwashoboye gukuramwo intobera nyaradiyo?



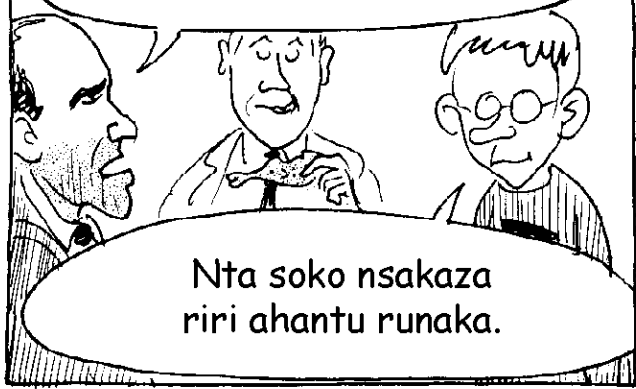
Nta kabuza! Pensiya yahomye imisadukye yose akoresheje agatambaro mfatanya.



Ntabwo byashoboka ko byaba ari.... ziriya nyagwa z'inuma?

Oya, Oya.

Wilisoni yogyeje byose. Ntacyahindutse. Turacyafite ya ntobera nyaradiyo. Kandi igiteye amatsiko ni uko ari **IZOTOROPE**: bituruka mu mpande zose za Kosimosi bingana.



Nta soko nsakaza riri ahantu runaka.

Nabazaniye uyu musore, Dike, wa Purensetoni, ufite igitekerezo ku nkomoko y'iyo ntobera.

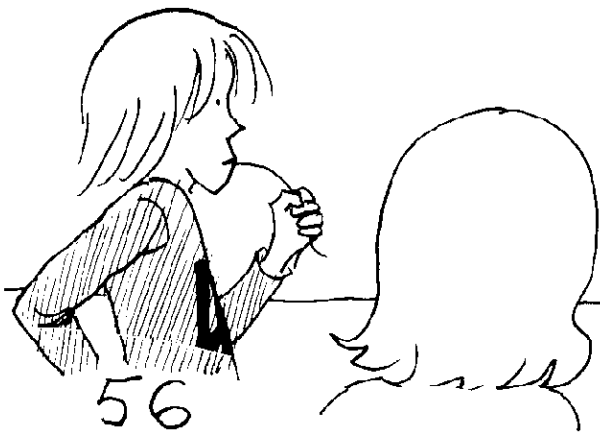


Ibyo ni byiza !..

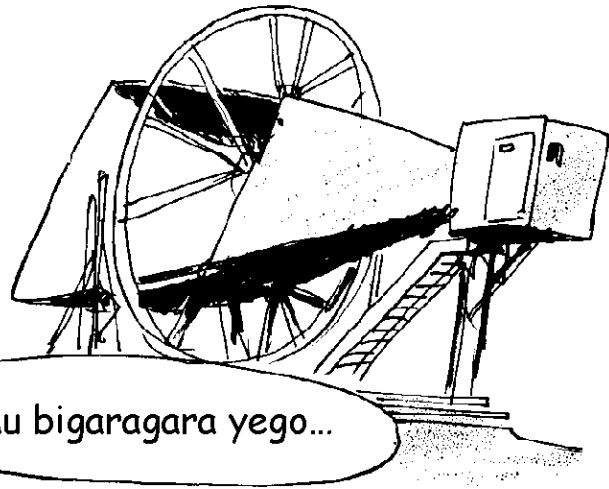
Ibyo ni byo pe, IKI ?



Ibyo mukuruye, ni «ivu» rya **BIGI BANGE**, igisigazwa sabukuru cy'urumuri gatangaza rwa mbere.



Mu bigaragara yego...

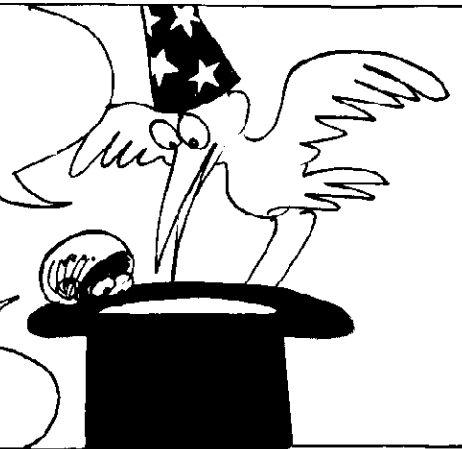


ARIKO SE ANTIMATSIYERI YAGIYE HE?



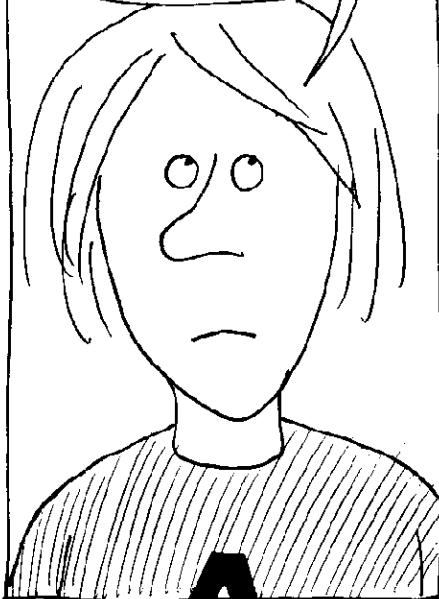
MURI IYO nzenguruko y'ishererekana yiswe **BIGI BANGE**, haracyariho inshoberabwenge nkozasoni. Uhereye k'urumuri rwa mbere, matsiyeri na ndwanyamatsiyeri birirema. Uko Iniveri igenda ikonja, habaho ihondaniro. Paritikile na ndwanyaparitikile zirarimburana. Hazasigara **IMWE KURI MILIYARIDI IMWE (*)**.

Ariko, ukurikije imibare nta n'**UBUSA** byari gusigara.

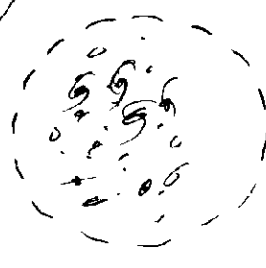


RWOSE PE NTA N'UBUSA

Nonese, **NDWANYAMATSIYERI** irihe ?



Itandukaniro ryaba ryarabereye ku rwego rw'amagalagisi ?



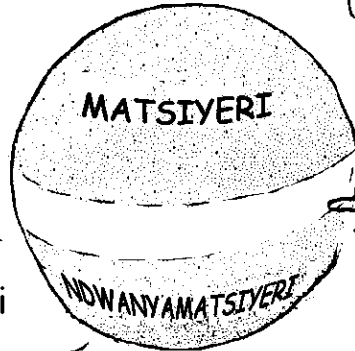
Cyangwa k'urw'**AMATSINDA Y'AMAGALAGISI** ?

(*) Reba **BIGI BANGE**, umwanditsi ni umwe.

YOHANI-MARIYA SURIYO,
mwalimu kuri kaminuza y'i Porovense,
atekereza ko Iniveri yimanyuyemwo kabiri.



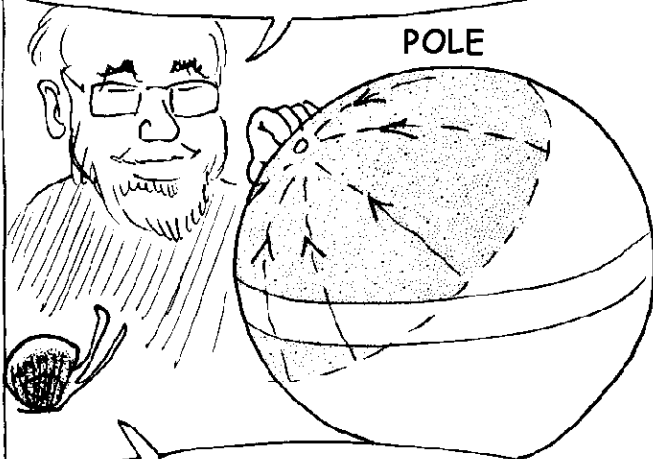
Iniveri ifite
IHEREZO, YIFUNGIYEHO.
Ubwoko bwa iperisiferi YA
DIMANSIYO ESHATU (*)
aho matsiyeri ituye mu gice
kimwe na ndwanyamatsiyeri
ikaba mu kindi.



Aha iruhande
igishushanyo muri
dimansiyo ebyiri.

K'umupaka haberayo ama RIMBURANA
MATSİYERI-NDWANYAMATSİYERI
ahahindura INTARA ITAGIRA GITURA.

Dutuye hamwe muri iki gice,
mu kimanyu cya rimwe kuri kabiri
cya Iniveri kirimwo matsiyeri.



Hanyuma se ako
kamanyu, gafite santeri kw'Isi,
kagaragaza umurima w'urwitegerezo
w'amatelesikope akomeye mu
yambere kw'isi, ariyo anavumbura
ama KWAZARI abarizwa mu
miliyaridi cumi n'eshanu
z'imyaka-rumuri.

Nonese tuhabona iki
muri ibyo birere by'aho?

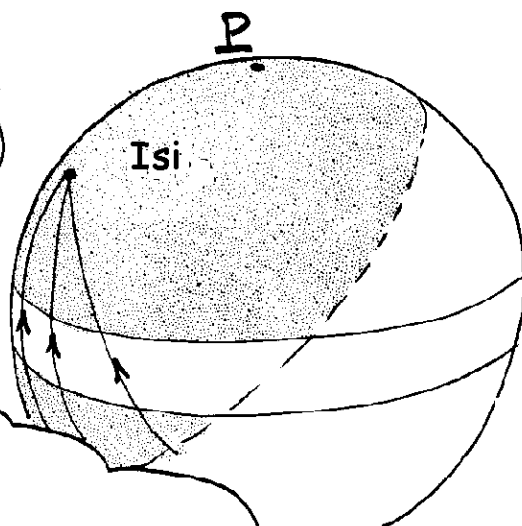


Mu bifatika ni
za KWAZARI.

Kandi, nk'uko
mushobora kubyibonera,
igihimba cy'umupaka
w'INTARA ITAGIRA
GITURA ushobora kugaragara,
kimwe na za ndwanyakwazari
zishobora kuba ziri hakurya.

(*) Reba JEWOMETIRIKONI

Nonese
ahubwo ?

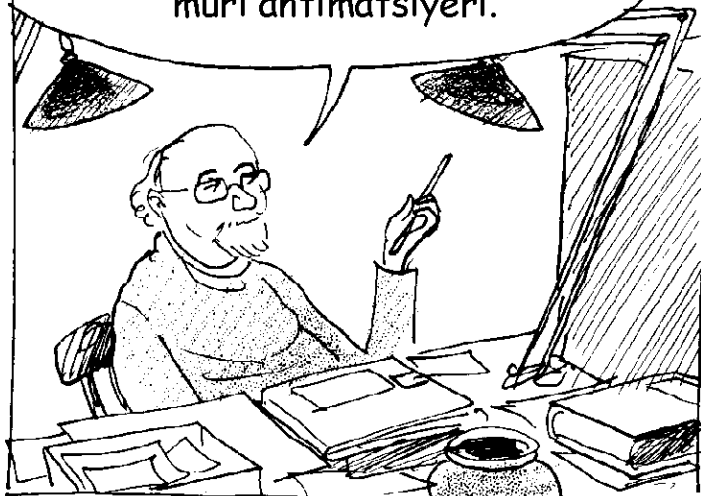


Iyo umuntu yitegereje
mu ntumbero ya **OFIYUKISI** (inzoka),
muri **SAGITERI**, ubona ko kuva kuri miliyaridi cumi
n'eshanu z'imyaka-rumuri, za kwazari zirigita, zikazongera
kugaragara imyaka-rumuri miliyoni 400 kure yaho.

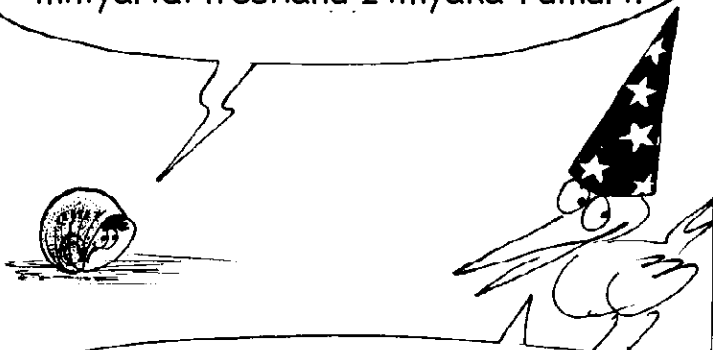


Ukurikije ubusobanuro bwa **SURIYO**, iryo bura rivuze ko iryo baho
ry'ikiryamiro nkikuzwa-ekweteri, ryahakuwe n'amahondaniryo kandi icyo
kiryamiro gifite ububimbe bw'igice kimwe cya miliyaridi y'imyaka-rumuri.

Noneho rero, hirya yaho,
ibyo twahitegerereza byaba za
NDWANYAKWAZARI, zikoze
muri antimatsiyeri.

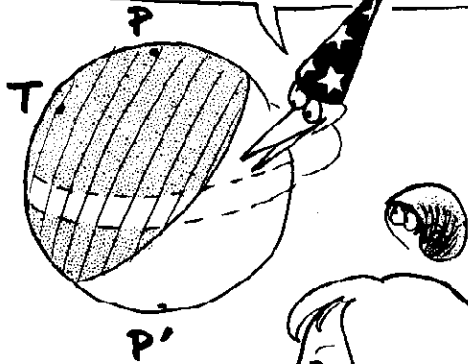


Kwazari cyangwa ndwanyakazari,
iri kure cyane kurusha izindi, imaze
kwitegerezwa ihagaze ahareshya na
miliyaridi n'eshanu z'imyaka-rumuri.



SURIYO we anganisha
umuzenguruko w'iyi iniveri n'uburebure
bwa **MILIYARIDI 60** z'imyaka-rumuri.

Bivuze y'uko iyitegereza rikorwa hifashishijwe ibikoresho dufite ubu rigaragaza gusa **KIMWE CYA KABIRI** cya Iniveri nyayo ibaho.



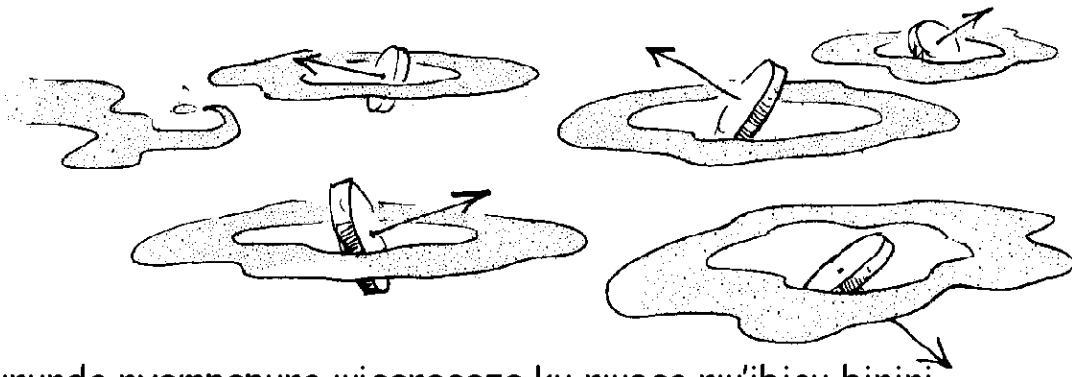
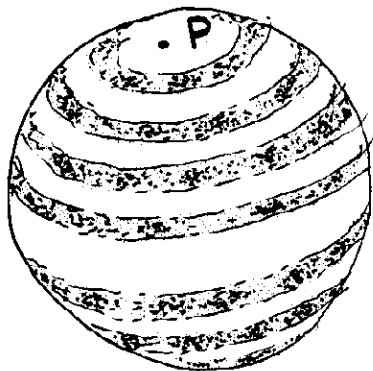
Nimba byumva neza, uwo mudeli wa Iniveri ufite **POLE EBYIRI** : imwe ya matsiyeri n'indi ya ndwanyamatsiyeri. Ni ndwanyapole. Bivuzeko, muri dimansiyo eshatu, intumbero nyazo ziteganye.

Mu ntangiriro y'iki kinyejana, twari twarambuye Iniveri, mu buryo bwemejwe, sentero iyariyo yose. Nimba uwo mudeli usobanura ukuri, ubwo dufite ebyiri. Nonese kandi, tuzabona iki muri utwo tudomo tubiri ?

Nta kindi Atari **OHIRIMAZIDI** na **ARIHIMANI** (*).

Naho bande nkikuza-ekwateri yaba ari... **MITIHARA** ?

Amaze gusoma neza inyandiko nyinshi z'asitoronomi, **SURIYO** yasanze kandi Iniveri ari **NYAMPAPURO NKA CAPATI**. Muri dimansiyo ebyiri, ibyo byatanga ikirundo cy'ibitegane. Agise za galagisi zaba zireba, nka zose, kuri agise ya pole.

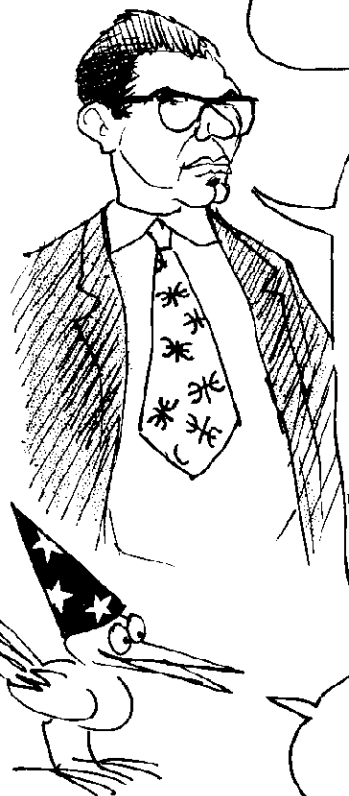


Mu by'ukuri, uwo murundo nyampapuro wigaragaza ku rwego rw'ibicu binini bibyataraye by'amagalagisi, byavumbuwe vubaha. Agisi z'ibice byo hagati zigumana ubutumbere ubwo zifite ubwaribwo bwose.



INIVERI MPANGA

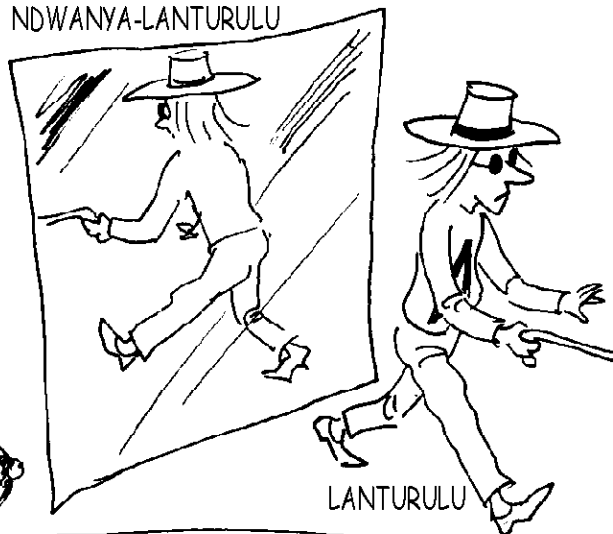
Nyuma y'ihirima ry'inshakishakuri ry'irema rihoraho, dore Furedi Hoyile atembereza igitekerezo gishyashya :



Iniveri ya matsiyeri, tuzi, igize gusa **KIMWE CYA KABIRI K'IBIRIHO**. Ikindi gice, cya Iniveri ya ndwanyamatsiyeri, ni iyo gushyira muri **INIVERI Y'IMPANGA** y'iyacu. Igihe cya **BIGI BANGE**, izo iniveri ebyiri zaritandukanyije noneho imwe yose ijya kukomeza ubuzima bwa yo ukwayo. Ariko **INDORO Y'IMYAMBI Y'IGIHE CYA ZO** Irateganye : ahazaza himwe ni kahise k'iyindi, ni nk'uko kandi urebeye ku yindi.

Imiterere nyajewometiri y'umudeli nk'uwo ugira ibyo woroshya mu kwerekana.

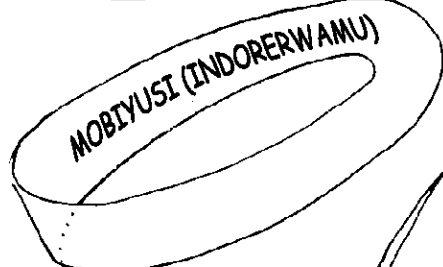
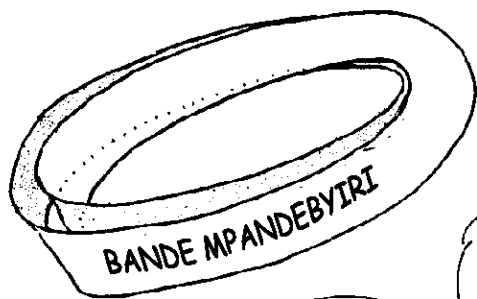
Izo iniveri zishobora kuba imwe ari ishusho y'iyindi «mu ndorerwamu» ihereye kuri esipase **NO KU GIHE**.
Ikizagaraga nk'IKINYABURYO muri iniveri imwe, kizahinduka IKINYAMOSO mu yindi.
Kandi noneho filime y'ibibaho muri imwe izaba, urebeye mu yindi, filime y'ibyabaye ugiye usubiza amaso inyuma **AHO IGIHE GITURUKA**.



Iyo bande mpandebyiri yambaye inshuro ebyiri urugori rwa Mobiyusi rusanze. Iyaba iki cyari indorerwamu, iyo bande yari kuba ... ishusho yayo ubwayo !



BIGI BANGE yaba ari iyomokora rya Iniveri, mu ntangiriro yari yometse kuri ubwo buso mu gihe gitangira cya zero, ubwo buso ntibugira icyerecyetso muri esipase no mu gihe (urugori rwa Mobiyusi rwa dimansiyo ennye). Itegana ry'izo ntara ebyiri za Iniveri ribyara iryo garagara ry'impanga.



Noneho rero ndwanyamatsiyeri yaba gusa ari matsiyeri ndwanyapole.



UBUZIMA HIRYA Y'ISI

Tireziyasi,
sinkyemera na gato
PAPA NOHELI

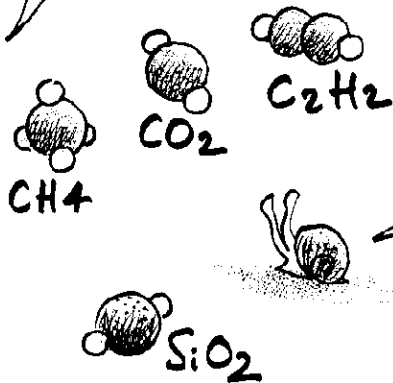
Nonese
bitewe n'iki,
Anselimi?

Nkurikira mu ntekerezo yange.
Kuva mu ntangiriro y'ikinyejana cya
shize, abantu basobanukiwe ko hariho
**UMUBARE NTARENGWA W'UDUCE
NTANGIRIRO NYASHIMI.**

Umubare urenze gato ijana w'amatome
agize **AMEZA YA MENDELEYIYEVE.**

Wifashishiye ayo amatome
ijana, ushobora gukora molekile
zinyuranye. Izishingiye kuri atome
ya **KARUBONE** ziri hariye.

Zihura na forumile **ZIRAMYE** bihagiye
k'uburyo **ZITANGA UBUZIMA**, ariko
atari cyane, k'uburyo zashobora kureka
AMAHEREREREKANE NYASHIMI
anyuranye ku rwego rukataje.
SILISIYUMU itanga nayo ibikorano
byinshi cyane. Ariko ibyo **BIRARAMYE
CYANE** k'uburyo bitaba intangiriro
y'ubuzima. Ibihingwa bikora mu buryo
bworoshye **FOTOSENTEZE** bishwanyuza
GAZE KARUBONIKE CO₂. Ariko
ntibishobora kugira icyo bikora ku
bikorano bya Silisiyumu biteganye :
SILISE SiO₂, iraramye cyane.

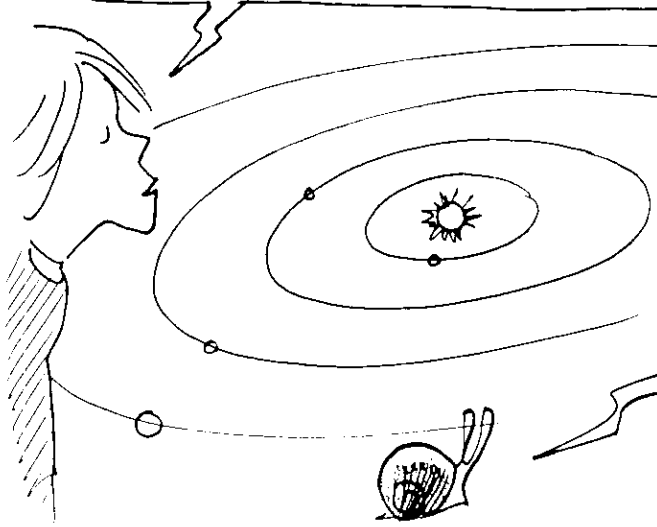


Natire ntifite intekerezo indashira. Nk'uko
ama atome ijana zihagiye kurema udutafari twa
MATSIYERI, ni nk'uko rero, kuva ku musozo kugera
ku wundi wa galagisi yacu, kandi ntagushidikanya no
mu zindi galagisi zose zo muri Iniveri, dusangayo
IBIKORANO NYABUZIMA BIMWE.

Akarorero ni nk'iyi molekile
ya alukolu etilike.

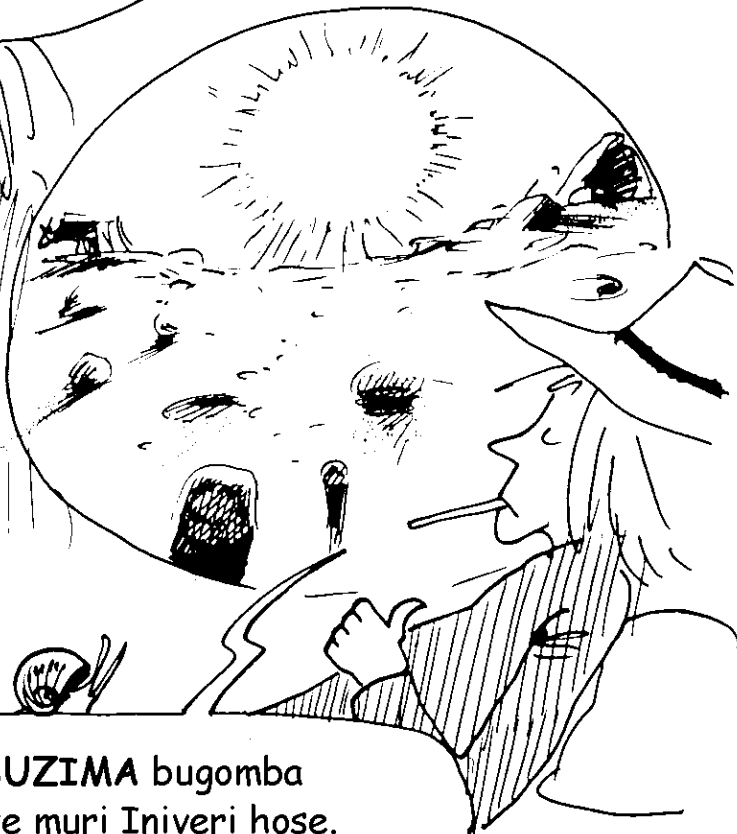
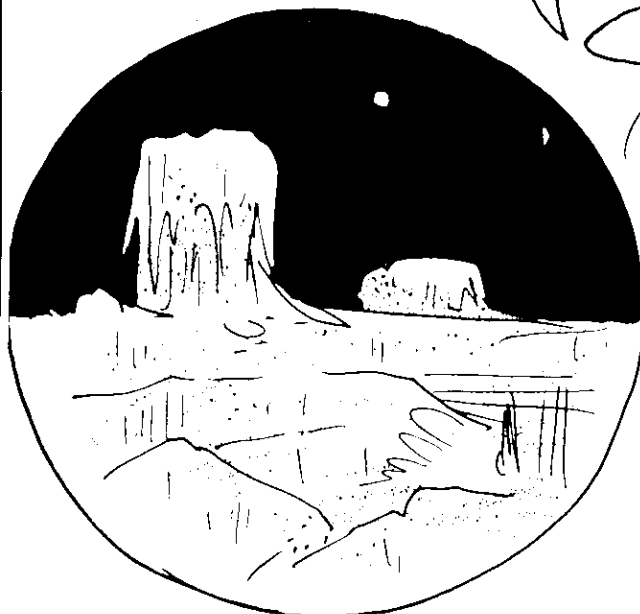


Izuba ni inyenyeri inyuranye cyane n'izindi zo muri galagisi yacu, iyo nayo ifite ayandi mazuba agera kuri miliyaridi ijana kandi ikaba nta kibuzza inafite za miliyaridi za sisiteme nyapalanete zisa n'iyacu.




Imibare yakozwe kuri zamudasobwa yerekanye ko uhereye k'imyuka n'amavu bizenguruka inyenyeri, byerekana ko sisiteme nyapalanete itangira kwiremarema, igizwe na za palanete nini ziteye bwa gikoma ku musozo, zijya kumera nka Satirine cyangwa Jiputeri, hamwe na za palanete nto zumaganye hafi y'iyonyenyeri.

Rimwe na rimwe, habonekamwo ipalanete ifite uburemere buhagiye k'uburyo yagumana umwuka nyatimosiferi kuri yo. Ikindi na cyo, ni uko igomba kuba iri mu **MUHORO** wegeranye, **W'AMAZI ATEMBA**. Hepfo yaho, amazi aba ari **UMWUKA** : kuberako **HASHYUHA CYANE** k'uburyo ubuzima buhavuka « budashirira ». Haruguru yaho, amazi ahinduka **BARAFU** noneho ibindi bintu ntibishobore kwinyagambura bihagiye.



Ariko, hakabayeho n'izo ngorane, **UBUZIMA** bugomba kuba fenomene **ISANZWE** idakanganye muri Iniveri hose.

Nkurikije imibare yanjye, hashobora kuba hariho, inyenyeri imwe ku bihumbi ijana, muri galagisi yacu, k'uburyo byibuze palanete imwe ibaho **UBUZIMA BUTEYE IMBERE** hamwe n'**IBINYABUZIMA BIZI UBWENGE**.



Biryo haba hariho **IMILIYONI Y'AMA SISITEME NYAPALANETE ATUWE MURI GALAGISI YACU!**

Biryo kandi yenda haba hariho miliyalidi igihumbi z'ibiremwa nyabuzima bizi ubwenge muri buri galagisi.

Hashobora kuba hariho amamiliyaridi y'amagalagisi muri iyi Iniveri tuzi. Biryo rero haba hariho miliyaridi imiliyaridi igihumbi z'abantu **PAPA NOWELI** yakagombye gusura mw'ijoro rimwe...



Nta mikorere y'ikoranabuhanga yatuma bigerwaho!

IEHAH!



Ni cyo gituma ntakyemera Papa Noweli.

ISHAKISHA RY'AMAHURIRO ?

Ikigendajuru **VUWAYAJA** kimaze kurenga umuzenguruko-rugendo wa Iraniyusi. Cyasohotse, nyuma y'imyaka cumi y'urugendo, muri **SISITEME NYAZUBA**.



Inyenyeri yahafi yacu kurusha izindi iri ahari **URUGENDO RURERURE INSHURO IBIHUMBI CUMI KURUSHA URWO!** ukurikije umuvuduko wa Vuwayaja, izahagera mu myaka ibihumbi ijana...

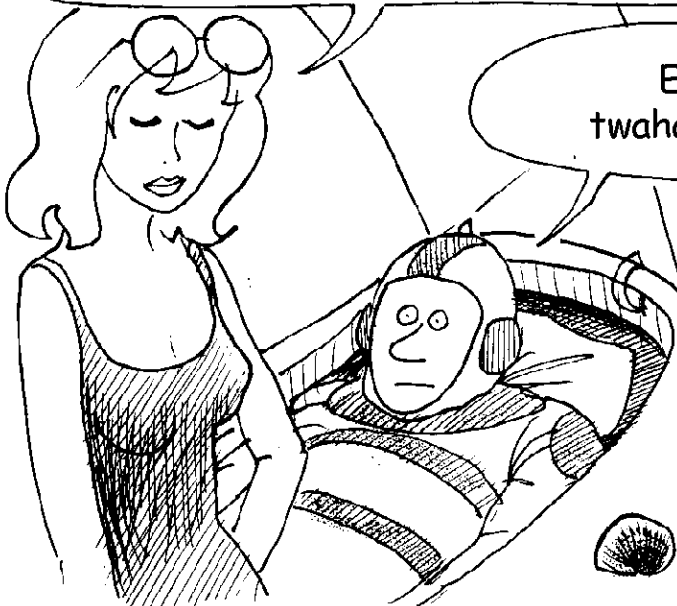
Ibidashoboka, kuva kuri **ALUBERITI EYINSHITEYINI**, ni ukurenza uriya muburagasani w'umuvuduko w'urumuri ungana na km 300 000 /s (*).



Kandi kuri uwo muvuduko, usigara ari ukwitseta wese!

Ugiye ubara inyongeramuvuduko hamwe n'ingabanyamuvuduko. Wifashishije ikigendajuru kigenda gicira za bombe za idorojene, wagomba kubara **IMYAKA 40 Y'URUGENDO** ngo ugere ku nyenyeri irihafi yacu kurusha izindi.

Ese noneho ni iki kitubwira ko twahasanga ibintu by'ingirakamaro !!?



Gukora urugendo nk'urwo k'ubusa !

(* Reba **IBINTU BYOSE BIFITANYE ISANO**, umwanditsi umwe.

UMUGORоба UMWE MURI KANAMA 1967

Antoni Herivishi na Joseline Bele, bo kuri radiyotelesikope ya Kamburi jye.

SPIRIWICI
SPIRIWICI
SPIRIWICI

Joseline, urumva iyo nkuru kuri radiyo yoroheje?

Yego, Antoni, ndayumva.

Joseline, «ba» ratuvugisha!

Yego, Antoni, ni igitangaza!

Irarika ritari ryo. Ibyo byari gusa iyoherezamajwi nyaradiyo riturutse kuri **PILIZARI** (inyenyeri igizwe na neteroni yizengurukaho n'ingoga cyane) ikora nka radiyo rutoroshi.

Kuva icyo gihe, dukomeje gutega amatwi ijuru, dutegereje ubutumwa bwatugeraho.

Isi yacu nayo yohereje ubutumwa bwinshi mw'ijoro nyakosimikye.



Hari impamvu nyinshi zishobora gusobanura iri bura ry'ubutumwa. Ubwambere, ku rwego rw'amamiliyaridi y'imyaka akyenewe ngo habeho iseruka rw'ubuzima, **INTERA Y'UBWENGE** ni **AGACE GATO K'IGIHE**. Ese twavuga iki ku gihe gishize kuva iyoherezwa radiyo-nsakara rya mbere ryashoboye guhinguranya atimosiferi y'isi (1934)!

Sivilizasiyo yacu ifite amahirwe ari hejuru yo kwisenya ubwa yo mu myaka ibarirwa muri mirongo ingahe bikabiye.



Bibaye ko abantu bo muri iniveri bose bakora gurtyo, icyo **CYANZU CYO KUVUGANIRANAMWO**, mu gihe kiri mu nsi y'ikinyejana kimwe, kitugaragarira mu buryo bwihariye nka gito cyane...



Kandi amahirwe y'uko sivilizasiyo ebyiri zo ku mapalanete **ATANDUKANYE** zabasha «**KUVUGANA**» ni macye cyane.

Ikindi gitekerezo : kwiyambaza imirari radiyo, itarenza umuvuduko w'urumuri, byakora mu gihe gito. Uburyo bubangutse kurushaho bwashobora kuyisimbura? Bishobora gusobanura ako gacerere radiyo.



Kuva amabyiruka menshi, nta muntu n'umwe wigeze asubira kubona ikimenyetso cy'umwotsi. Nta muntu uba nyuma y'iriya misozi !



INTANGIRIRAMUSOZO



Iyi nkuru yagize imidundiko myinshi. Ese kazoza kaduhishiye iki ?



Byibuze ibyaba bisigaye...

Ahereye ku byo yabonaga n'ibyo yapimaga, umuntu, buhoro buhoro, yavumbuye imisingi inyuranye ya Kosimoloji.



Ibipimo by'ingendo zidutandukanya n'inyenyeri, ubungane bw'ama asiteri, urujyendo rw'Isi. Hanyuma iri humeka rya Iniveri yose.

Hariho mu by'ukuri ibintu tutajya dutekerezaho, amasura ya Iniveri, ya Siyanse, tutarahishukirwa na gato.



Ahubwo akababaro wa, biradaturumbuza amaso !



Ohu, basore mwe... birasekeje !



Ehe, hariho disikye y'umutuku mu kirere!?

Mbega ikirori ! Ni kinini kuruta Ukwezi !



Pifuu !.. Mbega ihaguruka nk'umwambi kandi nta nduru !



Ndemeza ko asitorofizikyeye nshya igaragaza ibibazo byinshi kuruta ibyo isobanura.

Ni iki kibaye ?
Tireziyasi, ni iki kibaye ?

Murasa nk'abihinduraniye.

Nagiye nandika bimwe na bimwe uko binjemwo :
- Ndwanyamatsiyeri yavutse mu gihe cya **BIGI BANGE** yagiye he?
- Ese kwazari zikura hehe imbaraga zazo?
- Ese imyobo nyirabukara "iganisha he" ?

Nabonye imashini itangaje, nyuma yo guhagarara mu kirere hejuru y'isi, yahise isubira iriruka n'umuvuduko ungana n'ibihumbi by'ama kilometero kw'isaha **NTA NDURU NABUSA !**

Nta nduru nabusa ?
ariko noneho ni inshoberabwenge !

Ni indwanyamyumvire nyafizikyeye.

Kubera iki ?

Amajyambere ya kosmoloji yagiye buri gihe agendana n'ay'umyemvire yacu ya **JEWOMETIRI** ya Iniveri. Byadufashe ibihumbi by'imyaka kugirango duhebe igitekerezo cy'**UMWANYA NYAWO** uteye kimwe ku bantu n'ibintu byose.

Dutekereze : imodoka ndengerajwi zibyara ntakabuza **UMURARI W'ISEKURA**. Niba « mashini » yawe yari yarageze k'umuvuduko uri hejuru cyane, mwari kuba mwarumvise **BANGE (*)**

Ibiri amambo kandi, mumbwirako nta nakimwe mwumvise...

Ewuhe... ni byo !

Ubu twemeje burundu ko Iniveri ifite **DIMANSIYO ENNYE** (eshatu za esipase hamwe n'imwe y'igihe) kandi ko ari **INKOMEZA**. Ni ibintu tudasubiraho, na rimwe...



Ese ntimwaba mwarariye muri bino bihe... simbizi... isalade y'ikiyobyabwenge ?



Murabizi, uwariwe wese ashobora guca mu bihe nk'ibyo...

Nanjye ubwanjye rimwe na rimwe...

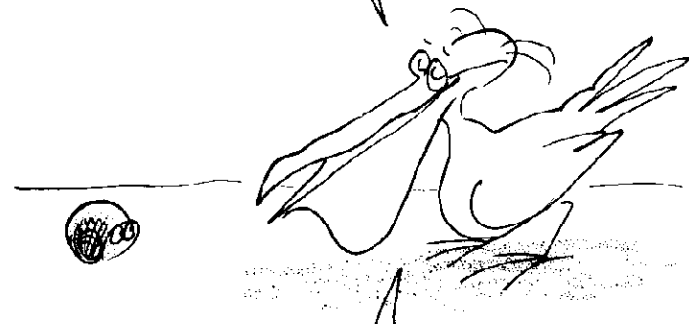


Ariko kandi, na **BONYE** neza!

Turizirika ku mideli nk'aho ari imisego irokora, twitwaje ko ngo «ifite byinshi itugezaho».

Ni byo ko rimwe na rimwe umuntu ashobora kwibaza nimba iyerekana ry'ibiriho hakoreshejwe mekanike kwantike ridasa na sisiteme y'ama serikeri ya Putoleme ?...

Indoto, Tireziyasi... mwagize **INDOTO MURI MASO**.

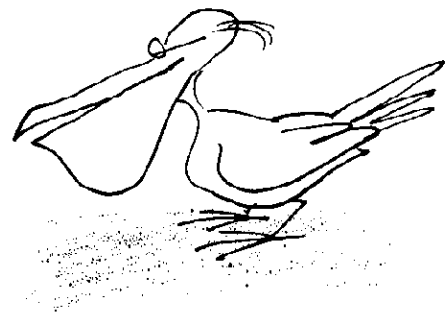


MWATEKEREZAGA ko muriho mubona !



Hera, ku mageza cumi,
fenomene cumi za mbere za
fizikye yacu uyu munsu. Usubiye inyuma
ikinyejana kimwe, abanyafizikye baba
barerekanye neza ko ibyo byose
bidashoboka gukorwa !

Mfite mugenzi wanjye witonda
cyane w'umuvuzi w'indwara zo
mu mutwe, ni mushaka...



THINDURA
ISADUKA
IGURUKA
INDENGERAMIYOBORERE
IKAMATANA
TIKYE

Niba Iniveri yaba ifite «impapuro»
nyinshi za dimansiyo ennye, aho amahame
ya relativite yaba akurikizwa... mu yandi
magambo : ntawashobora kubanguka
arengeje umuvuduko w'urumuri
MURI INIVERI TURIMWO...

Ariko se twahindagura
dute izo mpapuro za Iniveri ?

Byashobotse,
twatangiye !

UMUSOZO