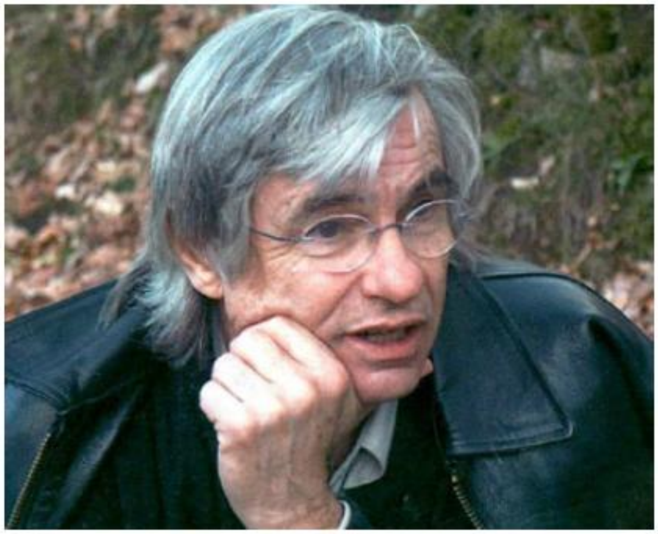
Ubumenyi butagira Imipaka

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 tekinike, ubukorikori n'ikoranabuhanga. Iri shyirahamwe ribeshejweho n'inkunga rihabwa. Izo nkunga nizo ziriha 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 munsi, 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 ububyara 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 ugeza kuri iri shyirahamwe, wajya ku rubuga rwaryo ku interinete aha hakurikira: http://www.savoir-sans-frontieres.com

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

Ikigo	Umwanya wo kwakiriramwo 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

Amategeko 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 ukoreshwa kandi mukibonera ikizere ko, muri iyo "mirimo y'ubwitange mfashamuco", inkunga yose mutanga ikoreshwa neza mu kwishyura abahindura ibitabo mu zindi ndimi.
Dushyira ku rubuga rwa interineti buri kwezi, ugereranije, nk'ibitabo cumi bihinduwe mu zindi ndimi.

UBUMENYI BUTAGIRA IMIPAKA

IBINTU BYOSE BIFITANYE ISANO

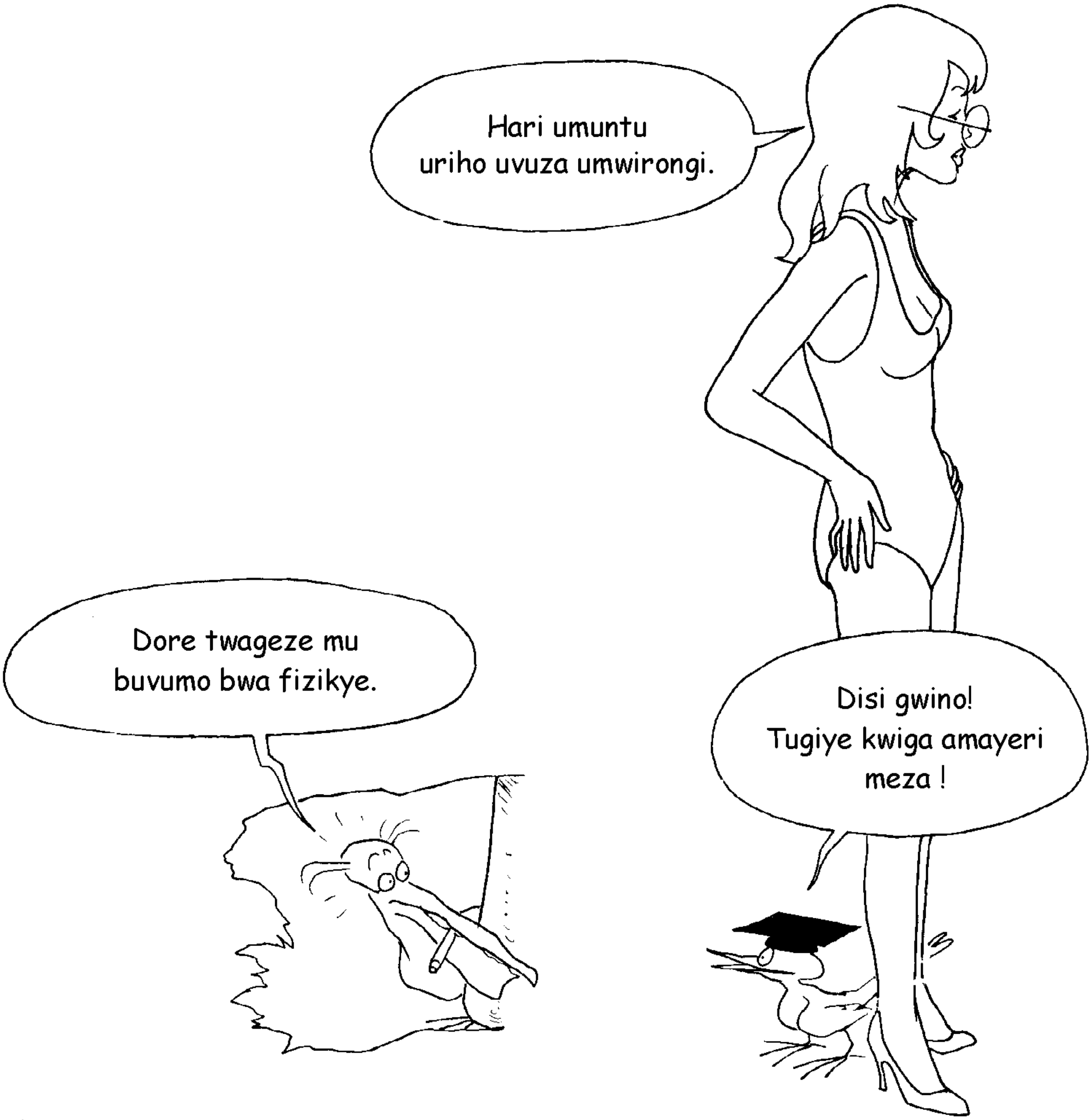
Johani-Petero Petit

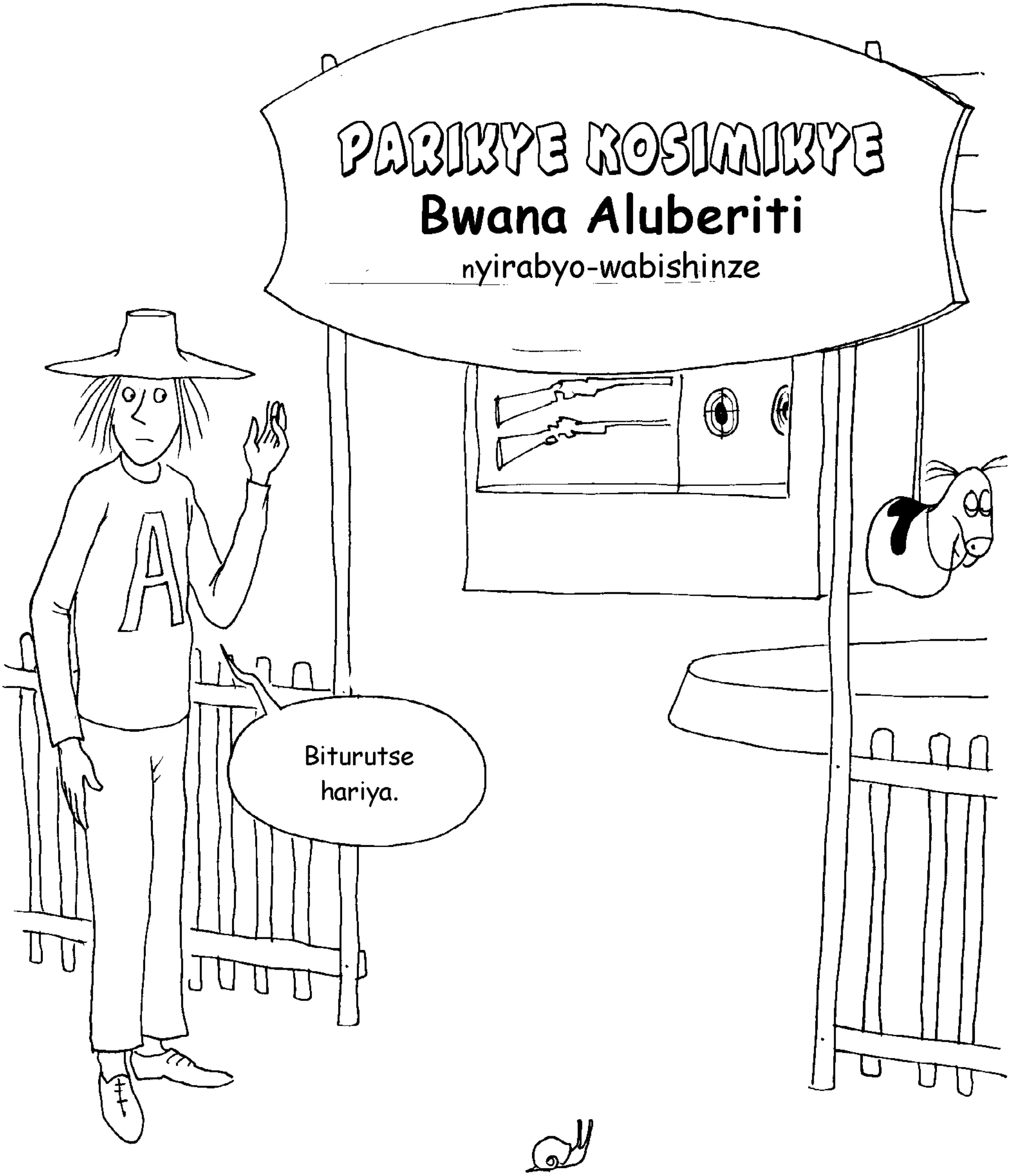
Byahinduwe na :
Mohamed Abdel aziz Kamanzi

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

kandi Ikindi,
ni ukuri

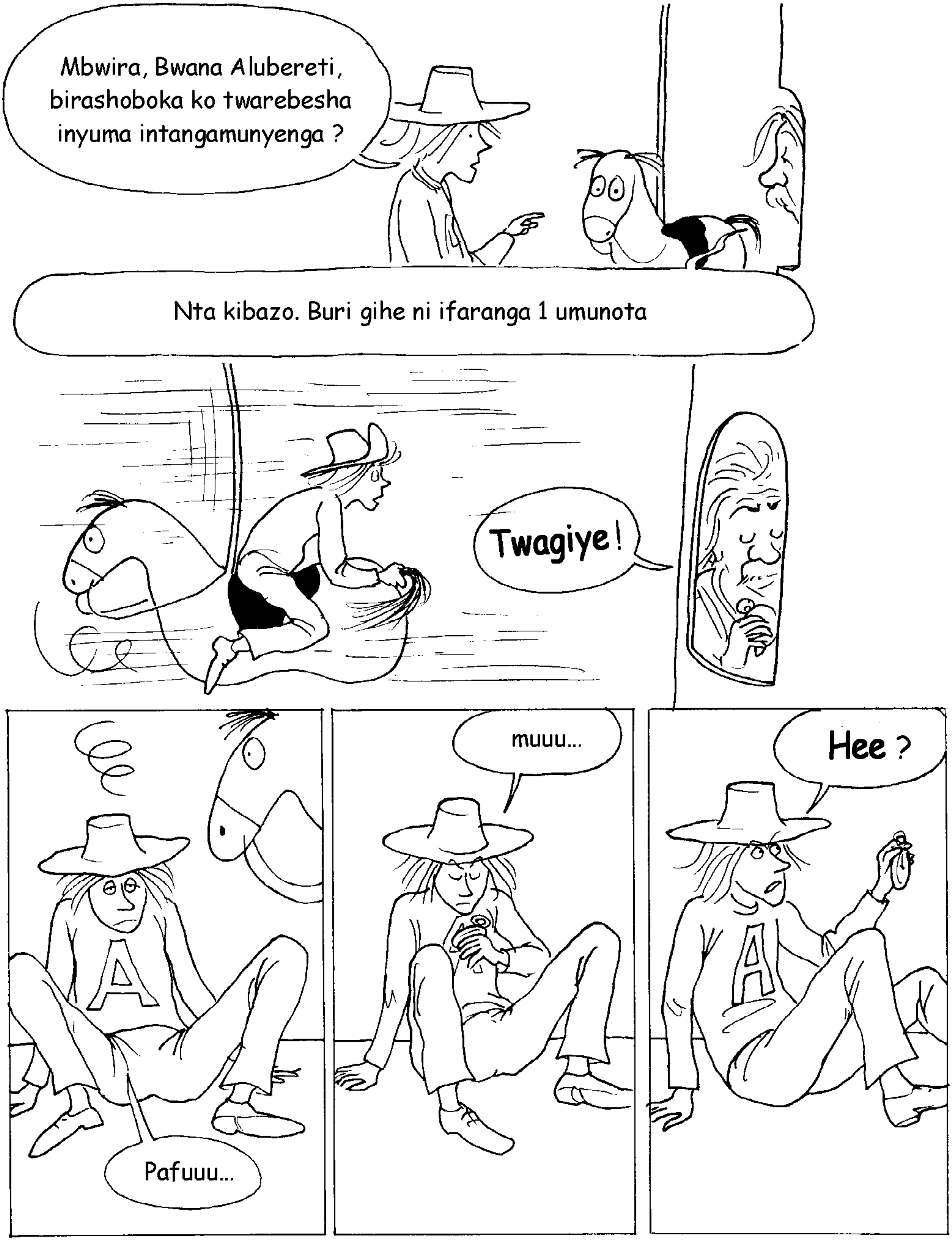
Sofi,
rimwe na rimwe
njya nibaza...
Iki, nshuti ya njye ?
... simbizi... ni mba ibintu biri
mu by'ukuri uko tubyibaza... nimba uko
ibintu byigaragaza ari koko uko bimeze...
Nimba nta
bintu biri inyuma
y'ibindi...
Ni ukwitonda ! Iniveri
imwe ishobora guhisha iyindi !
Ubishatse wajya kubyirebera.


Hari umuntu uriho uvuza umwirongi.
Dore twageze mu buvumo bwa fizikye.
Disi gwino! Tugiye kwiga amayeri meza !


PARIKYE KOSIMIKYE
Bwana Aluberiti
nyirabyo-wabishinze
Biturutse hariya.

Uburyo budasobanutse bwo kuvuza umwirongi
Kwa Bwana Aluberiti intangamunyenga yihuta kurusha izindi kw'isi F1 ku munota.
Jyenda umare umunota
Nabyumvise
Uuwu la la ! ugomba kugira aho ushikamira ! sindabona intangamunyenga yihuta cyane kuriya !

Hageze !
Nonese disi, isaha yawe, yuzuza umunota mu masegonde mirongo itanu n'icyenda.
Habe na gato, mfite umunota wuzuye neza!
kandi ni koronoperifegita, ipima igihe mu buryo bw'igaragaza riminuje.
Nanjye kandi mfite koronoperifegita. Ni amayobera... Isaha nshya!... Yenda bwaba ari ubwoko bubi...
Muri makye kandi, iracyari muri garanti.
Isaha yawe irakora neza, Anselimi. Za koronoperifegita ni indahindurwa.
Rero, biturutse ku ntagamunyenga!...


Mbwira, Bwana Alubereti, birashoboka ko twarebesha inyuma intangamunyenga ?
Nta kibazo. Buri gihe ni ifaranga 1 umunota
Twagiye!
Pafuuu...
muuu...
Hee ?

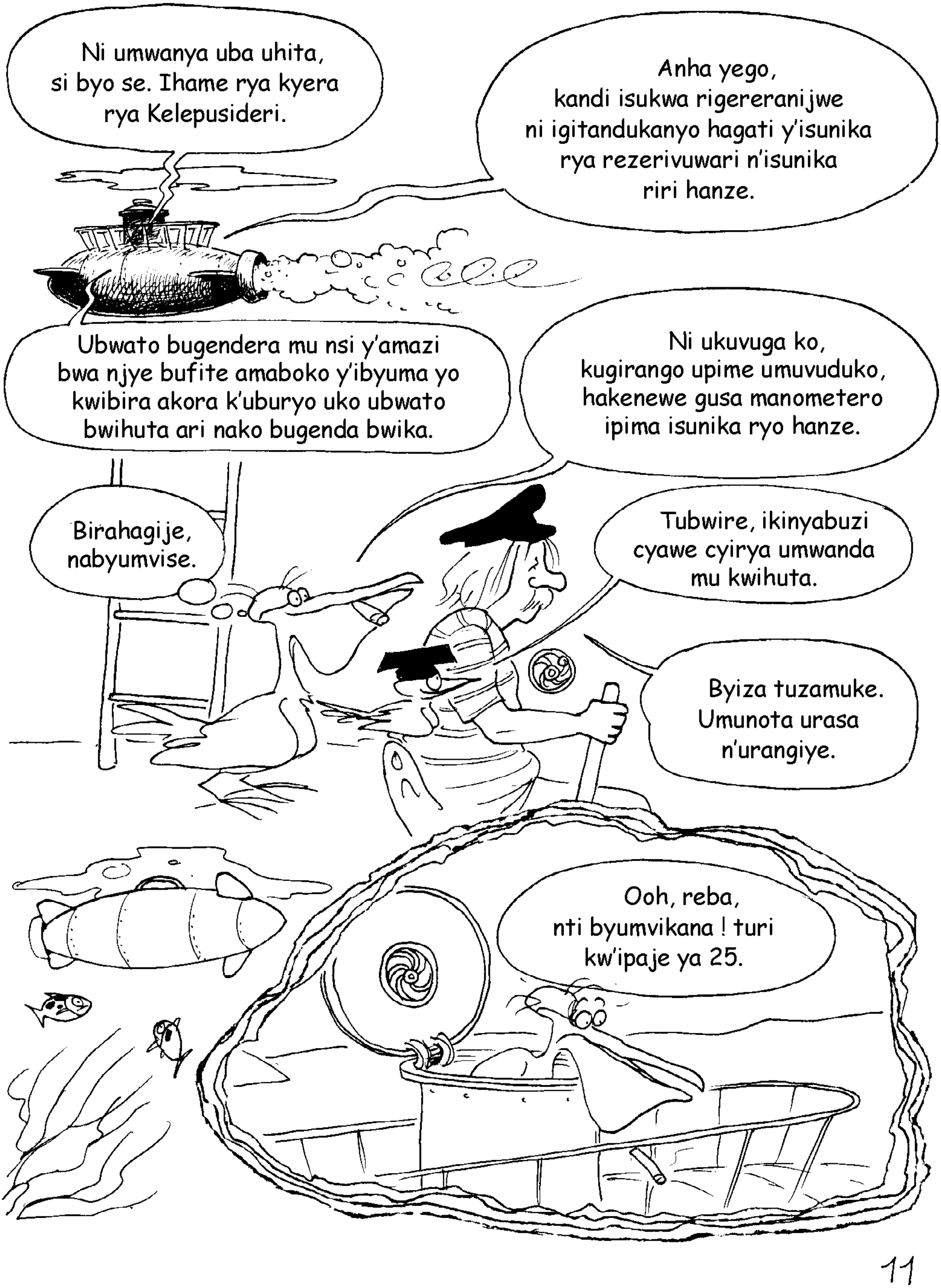
Mwongeye mutwara kandi isegonda !
Bite se ?!??
Nta na busa !
Yego, bwana we !
Oya , bwana we !
Bite se ?!?
Iyo utazi fizikye, ntugendera ku ntangamunyenga, uguma iwawe !
Birashyushye !
Rwose ! umwanya ni umwanya, sibyo se ?
Itonde, Anselimi.
Buri saha itanga igihe nya cyo.
Igihe, iki ?!?...
mu by'ukuri,
igihe ni iki ?
Ntimubonako uno muhungu yihutira kubaza ibibazo by'amafuti ?

HAGATI AHO

Muraza ? Tugiye gutembera n'ubwato bugendera munsi y'amazi.
UBUSAZI BWA BWANA ALUBERITI KUJYA MU NDIBA YIBINTU F1 UMUNOTA

Icyo ni igiki ?
Ni isaha ikoreshwa n'amazi. Igitemba, kiri muri rezerivuwari, kirengejweho umwuka w'isunika Pr. Uwo mwuka usunika icyo gitemba ukiganisha hanze y'ubwato bugendera mu nsi y'amazi; ugicishije mu gipimo cy'urusuko.

Umwuka uri kw'isunika Pr
igitemba
igipimo cy'isuka
iyirukanwa riciye muri koke.
Vuga, kuki igipimo cy'isuka giciyeho uturongo tw'ipimwa mu masogonde?


Ni umwanya uba uhita, si byo se. Ihame rya kyera rya Kelepusideri.
Anha yego, kandi isukwa rigereranijwe ni igitandukanyo hagati y'isunika rya rezerivuwari n'isunika riri hanze.
Ubwato bugendera mu nsi y'amazi bwa njye bufite amaboko y'ibyuma yo kwibira akora k'uburyo uko ubwato bwihuta ari nako bugenda bwika.
Ni ukuvuga ko, kugirango upime umuvuduko, hakenewe gusa manometero ipima isunika ryo hanze.
Birahagije, nabyumvise.
Tubwire, ikinyabuzi cyawe cyirya umwanda mu kwihuta.
Byiza tuzamuke. Umunota urasa n'urangiye.
Ooh, reba, nti byumvikana ! turi kw'ipaje ya 25.

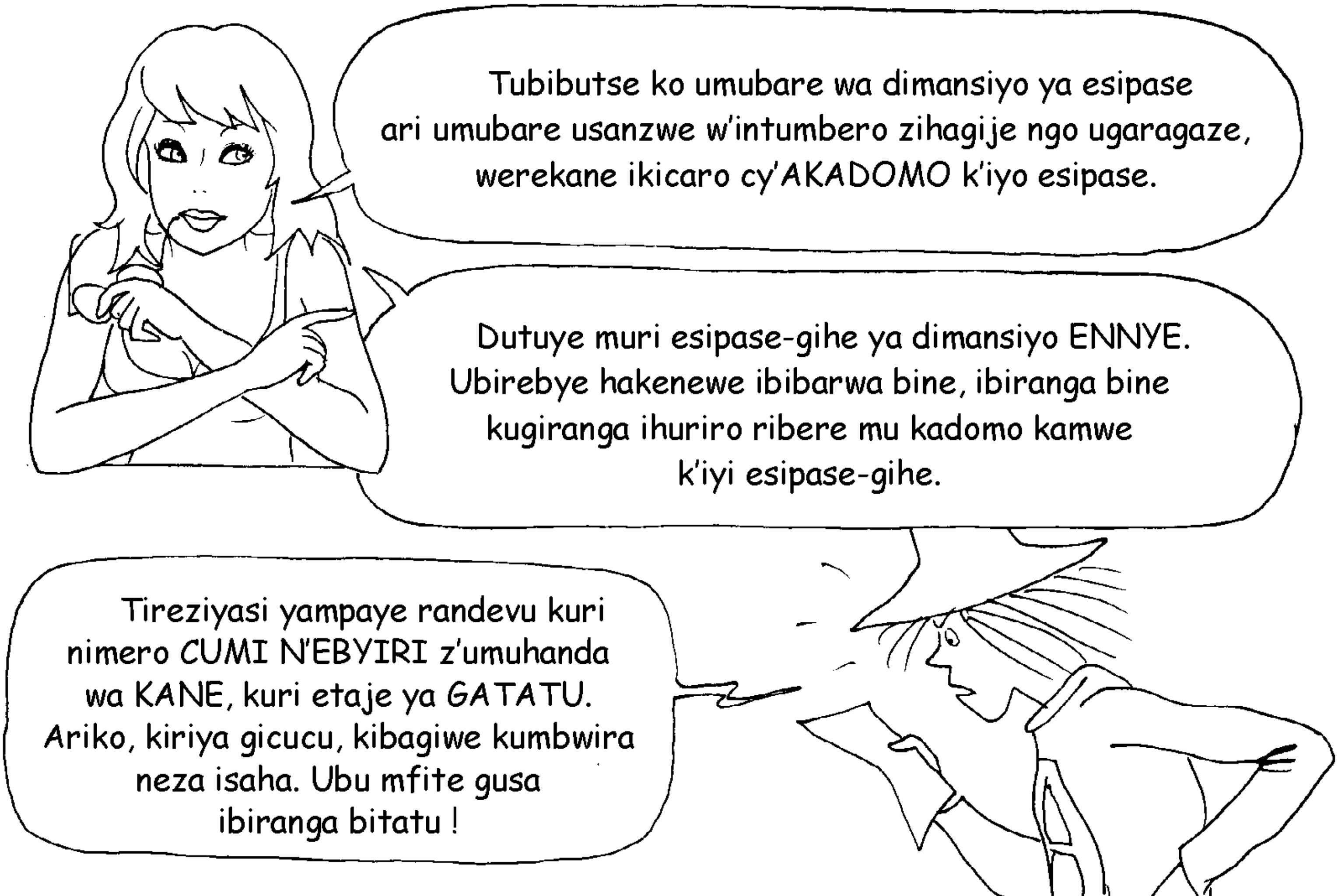
TUREKE MAGISI NA LEWO BIREBERE INGARUKA Z'URUJYENDO NSHAKISHA RWO MUNSI Y'AMAZI RWABO, NONEHO TUGARUKE KURI ANSELIMI
Ni amayobera iyo umuntu abitekereje. Muri esipase intumbero yose watoranya, bisa n'ibigaragara ko buri gihe ushobora kugaruka aho wahoze; ushobora gufata intumbero ibusanye n'iyambere.
Nshobora kwihuta cyane kurusha tireziyasi, cya gishorobwa kandi nka nagisiga.
Ukwitingisa by'ubusa.
cyangwa se rero nga hagarara, nkakireka kikansiga.
Ariko iyo bigeze ku gihe, byose bisa n'ibitandukanye.

MURI UYU MWANYA W'UBU
Mu bigaragara, birabujijwe kuhahagarara.
Kurenga kuri iryo bwiriza byatuma uhaburira ubuzima.
Bwana tireziyasi ? ngufitiye ubutumwa bw'umwihariko.
PTT
Bwana cyangwa madamu ?
Nta gaciro na gato bifite.
19
Huume... Ni kalendari.
Urareba Anselimi, buri gihe uko ukuyemwo urupapuro, umunsi urarenga.

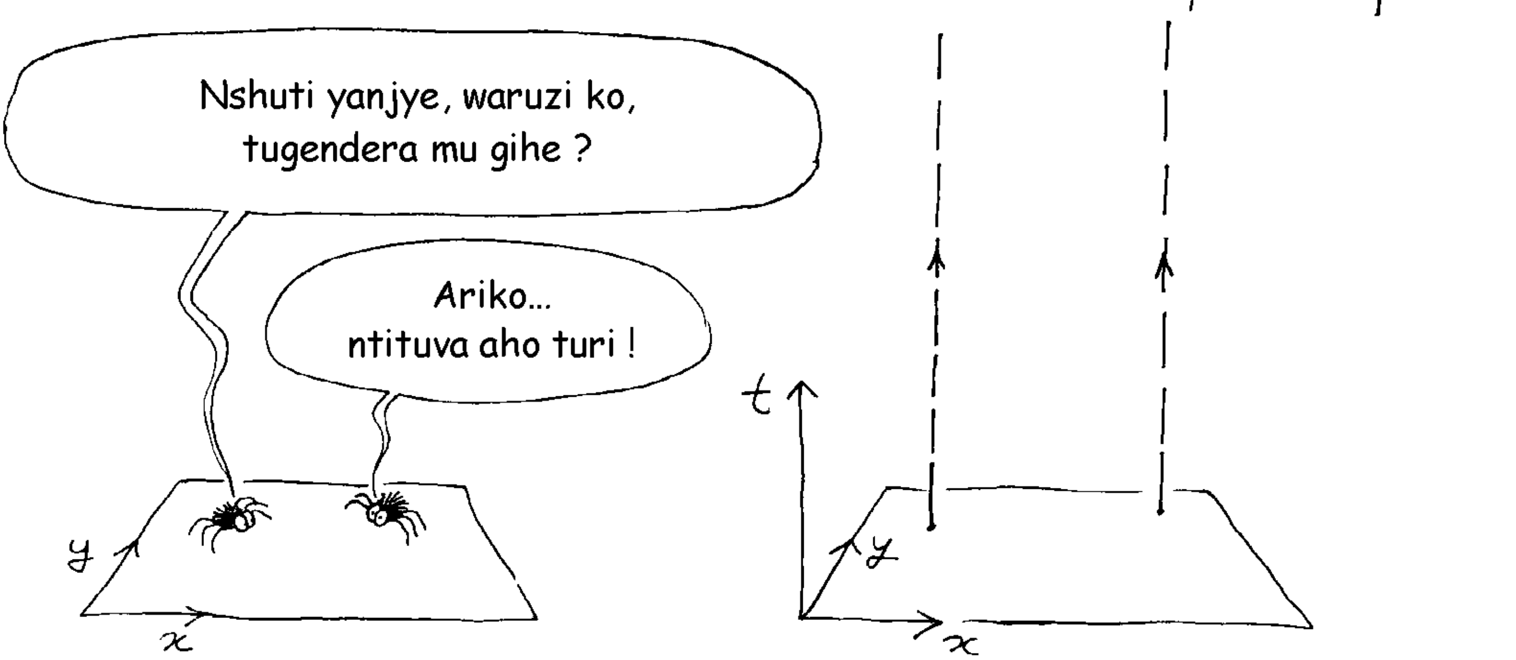
ESiPASE GiHE

Urareba, nk'urugero, kuki igihe kigana imbere gusa kandi ariko ntikigane inyuma ?
Ba uretse, ngufilime.
None se ?
Mpereza imikasi.

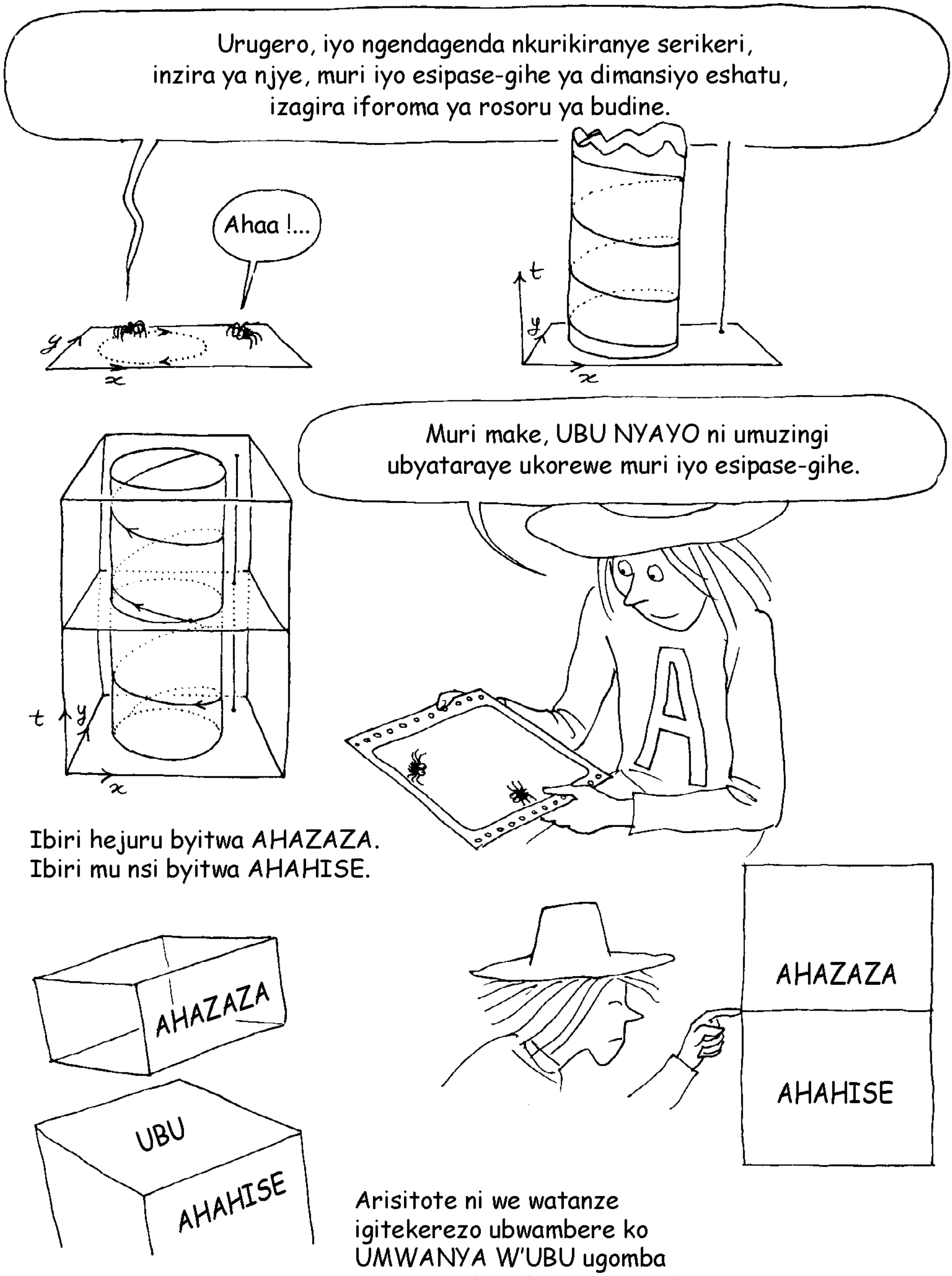
By'ukuri afite amaso abengerana.
Buri shusho y'iyi filime ni igicapo gisa n'igihagaritse UMWANYA WAKO KANYA. Buri segonde y'iyi filime igizwe n'amashusho 24. Biboneka ko igizwe n'urukurikirane rw'ibyabaye bidafatanye.
Ubu ngiye kukwereka ikintu kimwe: rundarunda urwo rukurikirane rw'amashusho, rw'ibyabaye.
Ubonye esipase-gihe.
t
y
x
Esipase-gihe ?
Iyaba nari nongereye umubare w'amashusho kugera ibudahera, nari kubona esipase gihe ifatanye ya dimansiyo eshatu.
t
y
0
x
Ebyiri za esipase n'imwe y'igihe.



Ariko, kugirango dushobore gushushanya neza, tugaruke kuri za esipase-gihe za dimansiyo eshatu (ebyiri za esipase, imwe y'igihe)



Urugendo rw'ibitagangurirwa bibiri muri esipase-gihe yerekanwe ku gishushanyo k'iburyo.


Urugero, iyo ngendagenda nkurikiranye serikeri, inzira ya njye, muri iyo esipase-gihe ya dimansiyo eshatu, izagira iforoma ya rosoru ya budine.
Ahaa !...
y
x
t
y
x
Muri make, UBU NYAYO ni umuzingi ubyataraye ukorewe muri iyo esipase-gihe.
t
y
x
Ibiri hejuru byitwa AHAZAZA.
Ibiri mu nsi byitwa AHAHISE.
AHAZAZA
UBU
AHAHISE
AHAZAZA
AHAHISE
Arisitote ni we watanze igitekerezo ubwambere ko UMWANYA W'UBU ugomba kugira umubyimba ungana n'ubusa.

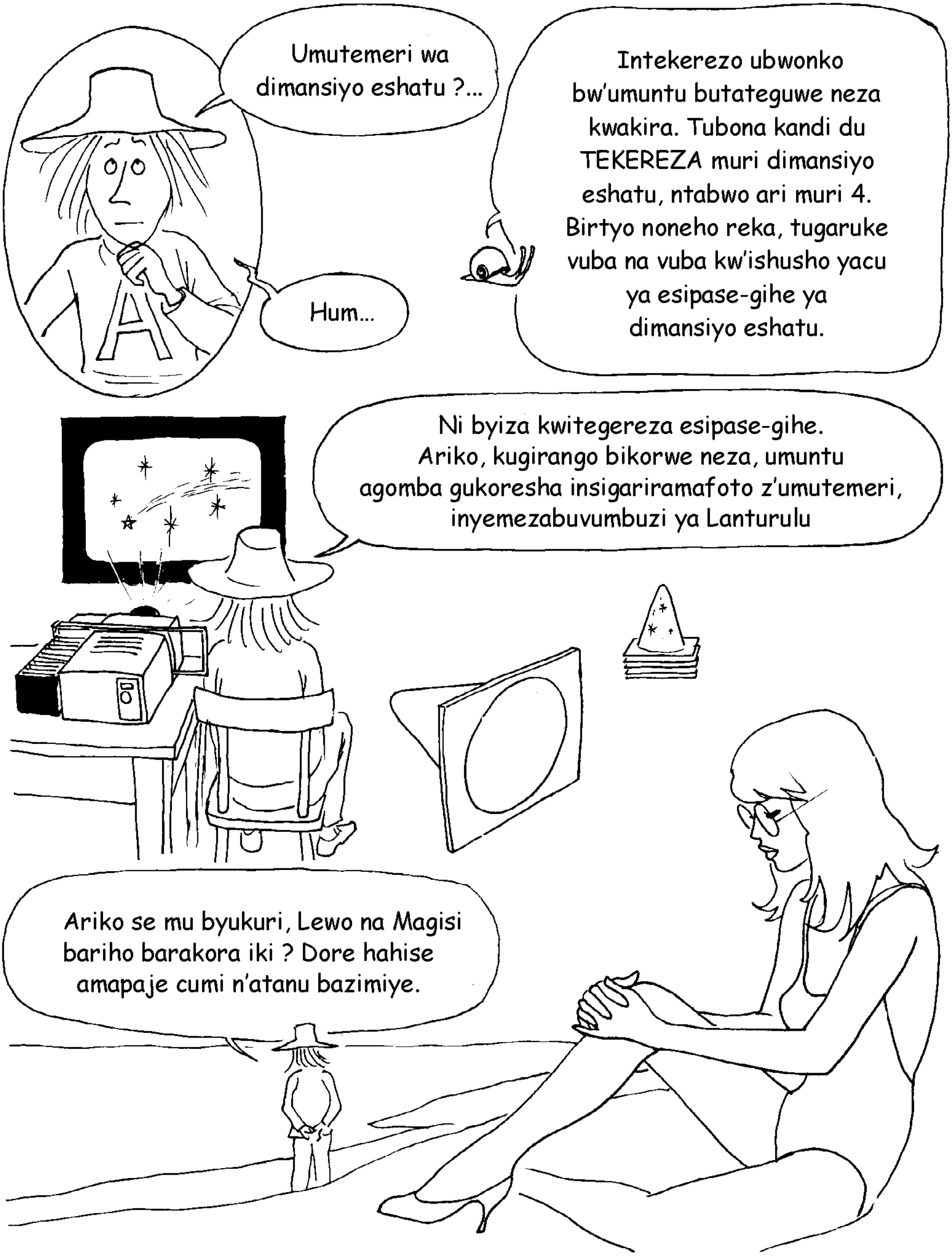
Mu by'ukuri, ni uku twagombye kwerekana igitagangurirwa muri ya esipase-gihe ya dimansiyo eshatu.
t
y
x
Kubaho kw'igitagangurirwa gushingiye mu kutagira ihuriro, muri esipase-gihe, y'inzira ya cyo n'iy'igikeri.
t
y
x
!..
Ihuriro ry'igihe gito muri esipase-gihe
AHAZAZA
UBU
AHAHISE
Ariko se kuki tutabona ayo mahuriro y'izo nzira muri esipase-gihe ?
Kuko gusa tubona UMWANYA W'UBU.

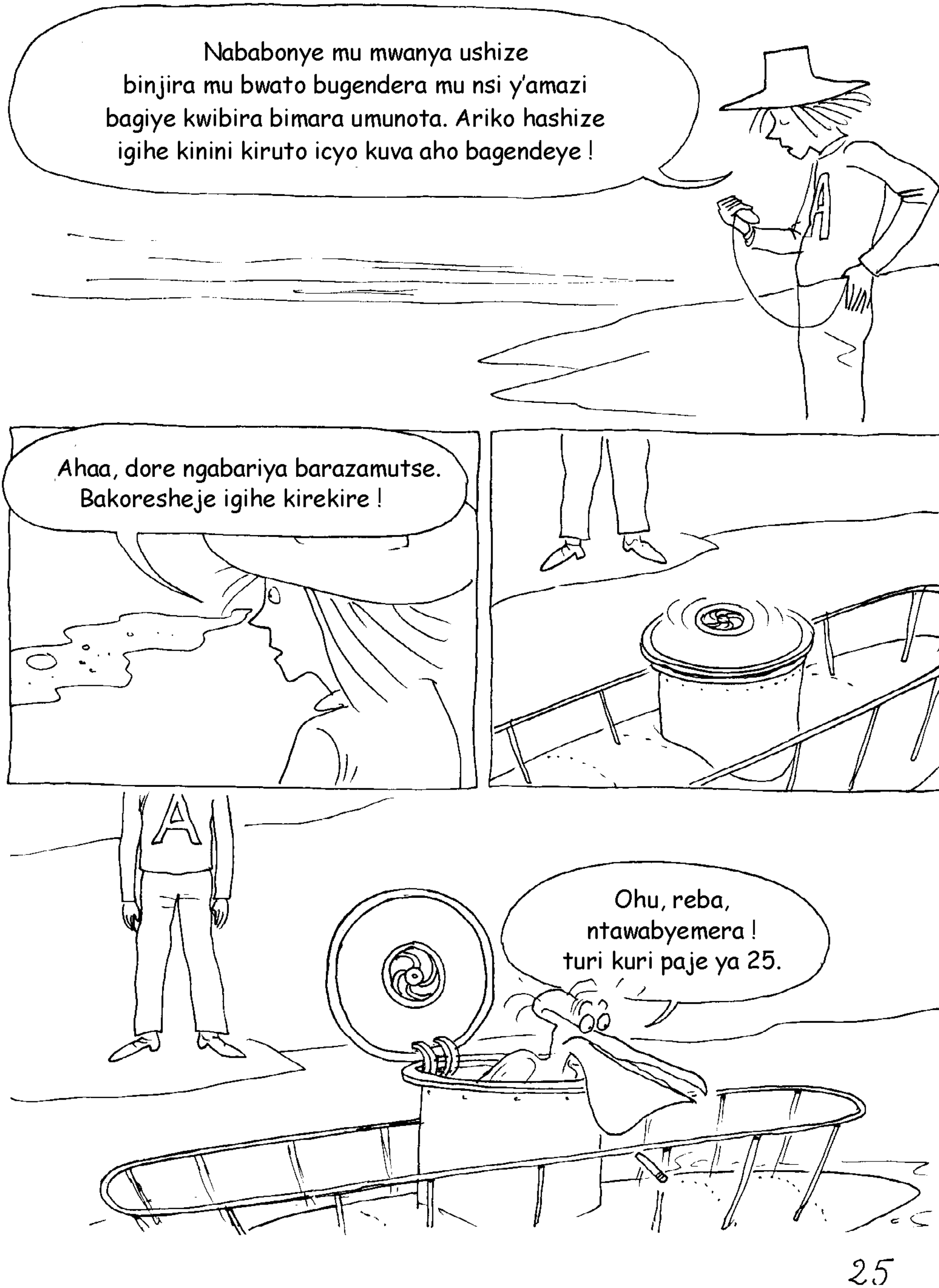
Mu nzamura y'igihe, twese ntakabuza tuyirimwo.
Ntihagarara cyangwa ngo imanuke.
t
y
x
Ku wambere - Ku wakabiri - Ku wagatatu - Ku wakane - Ku wagatanu - Ku wagatandatu - Ku cyumweru
Inzamura itagira urugi...
... itagira aho ukanda... mbega agahinda...
Ibya amahirwe hari Sofiya
Sofiya, reba, nakase impetame muri esipase-gihe !
Ndaje.

Ako ni akantu gakunzwe gukoreshwa mu bishushanyo ntizwabuzima.
y
x
UMUTEMERi W'URUMURi
Mu by'ukuri tureba bihetamye ku biriho
Aho ushatse kuvuga iki ?
ALKORI MIZARI 1901
1780
ALIKAYIDE
ALIYOT 1920
MEGEREZE 1901
DUBUNE 1861
FEDIKA 1897
MEREKE 1905
Urumuri rukoresha umwanya ngo rutugereho ruturutse ku bindi bintu. Aha ngaha, twerekanye igihe rwoherererejwe ruturutse kuri buri nyenyeri ituye mw'ikoraniro ryitwa Uruse Nini.

ISAHA YA NYUMA
ANTOROPI YONGEYE KUZAMUKA !!
AMAKURU YO MURI KOSIMOSI
ITURIKA RYA SUPARANOVA MURI GALAGISI ANDOROMEDE
AMAKURU YOSE
Muri make, inyenyeri duturanye zishobora kuba rwose zarayonze kandi nkazabimenya hashize imyaka !
Ntabwo amakuru yose atugeraho vuba
Twakira ku masahane ya za telesikope ishusho y'Andoromede nk'uko yarimeze mbere y'imyaka miliyoni ebyiri.
Tubona izuba nk'uko ryari rimeze mbere y'iminota munani
Kandi ibirenge byanjye birashaje kurusha izuru ryanjye !
Muri macye, ntakiruhije kubona nk'UBU. Yenda nk'ikintu cyo cyugarije imbone ?...
Oya, Anselimi, dushobora kubona gusa ibyo mu gihe cyahise. Iryo bona ryitwa UBU BUGERERANIJWE; mu kanya gashize twavugaga UBU HIHARIYE. Ubu ni ikintu kijyanye gusa na nyiracyo, ntigisangirwa.

Imiraba yikwirakwiza ku mazi n'umuvuduko udahinduka. Hano, twerekanye igitagangurirwa cyaguye mu mazi cyiriho cyohereza imiraba ihuje santeri.
Muri esipase-gihe, ubwo butumwa busakara bukurikije umutemeri.
y
x
t
x
Ni cyo kimwe neza nk'urumuri, rukwiragira n'umuvuduko udahinduka wa km 300 000 km/s.
Dukurikije inzira icuritse, ibishashi by'urumuri byakirwa buri kanya n' INDOREREZI, bituruka k'utudomo dutuye ku MUTEMERI wa esipase-gihe:
UMUTEMERI W'URUMURI
t
y
x
Uwo mutemeri niwo MWANYA W'UBU UGERERANIJWE w'iyo NDOREREZI.
Ni ukuvuga ko .... Ijuru ari umutemeri ?
Yego, Anselimi, ni igice cya kone cya dimansiyo eshatu, cyakaswe muri espase-gihe ya dimansiyo ennye.


Umutemeri wa dimansiyo eshatu ?...
Intekerezo ubwonko bw'umuntu butateguwe neza kwakira. Tubona kandi du TEKEREZA muri dimansiyo eshatu, ntabwo ari muri 4. Birtyo noneho reka, tugaruke vuba na vuba kw'ishusho yacu ya esipase-gihe ya dimansiyo eshatu.
Hum...
Ni byiza kwitegereza esipase-gihe. Ariko, kugirango bikorwe neza, umuntu agomba gukoresha insigariramafoto z'umutemeri, inyemezabuvumbuzi ya Lanturulu
Ariko se mu byukuri, Lewo na Magisi bariho barakora iki ? Dore hahise amapaje cumi n'atanu bazimiye.


Nababonye mu mwanya ushize binjira mu bwato bugendera mu nsi y'amazi bagiye kwibira bimara umunota. Ariko hashize igihe kinini kiruto icyo kuva aho bagendeye !
Ahaa, dore ngabariya barazamutse. Bakoresheje igihe kirekire !
Ohu, reba, ntawabyemera ! turi kuri paje ya 25.

Kandi noneho reba, umunota umwe utarenga !
IBIKI !?!
Ni nko mukanya kuri ya ntangamunyenga.
Igihe, Anselimi, ntabwo ari ikintu KIMINUJE.
Dore ikindi kintu !?!
Anselimi, uriya mwana w'umukobwa afite ukuri. Uko wihuta cyane, niko usaza gacye.
Abantu bavuga ngo: kugenda ni ugupfa buhoro buhoro. Noneho rero byaba bicuritse ?!?

Mube muretse, kelebuside ya Bwana Aluberiti, cya kinyagwa cyo mu mazi, cyatangaga RWOSE igihe cyahise muri mu bwato bugendera munsi y'amazi ?
Urtyo ! nk'uko nabibabwiye, iriya kelebusideri igaburirwa na reserivuwari y'isunika ridahiduka Pr. Itangirira hanze y'ubwato bugendera munsi y'amazi ahari isunika Pe. Isukwa rihinduka mu buryo bumwe n'igitandukanyo k'isunika (Pr-Pe)
Uko ubwato bugendera munsi y'amazi bwihuse ni nako isunika Pe ryiyongera, ni nako kelebusideri irekura amazi make. Birtyo rero, uko wihuta cyane ni nako igihe kigenda kigabanya kwirekura.

Mube muretse ! izo nkuru ni nyabaki ?
Ese igihe cyirekura gite iyo umuntu agumwe hamwe ?
Kuguma hamwe ugereranije n'iki !?!
Ni itangiriro rya kelepusideri mutangabuhamya yashyizwe mu bwato bugendera munsi y'amazi, bwo ahubwo, buguma ku nkombe, buhagaze aho, bityo buguma hejuru y'amazi.
Ngiye kubigaragaza neza !
Kuguma ahuri utanyeganyega bivuze iki ?
Sofiya, urafata nimero ya 2, jyewe nimero ya 1. Nimero ya 3 iraguma mu nzu, hanyuma twese tuzagendera mu mazi ku muvuduko umwe V
Noneho se kugenda byo !?!

Bagendera hamwe: umuvuduko umwe V, intumbero imwe n'uburebure bw'epfo mu mazi bumwe.
Iyo ukora amageza, ni uko uba utizeye neza ibyo uhagazeho.
Cyo nyibwirira neza, Bwana Aluberiti, urugendo ni iki ?
BULEBE
BULEBE
BULEBE
Tireziyasi, icyo ni ikibazo cyiza. Ikiriho ni IMIVUDUKO NJYERERANYI y'ibintu utangiriye ku bindi. Noneho rero iyo twemeje ko ikintu, cyangwa agatsiko k'ibintu : jyewe, wowe, inzu, turi hamwe tutanyeganyega, ni imvugo idafite ishingiro. Urugendo rwose ni NGYERERANYI.

Dore turahari twagarutse aho twatangiriye, kandi kelepusideri zacu zarekuye igipimo cy'amazi amwe, zitanga igihe kimwe t'.
Sisiteme ebyiri ziri hamwe zitanyeganyega imwe igereranijwe n'indi ziba ari SENKORONE.
Ariko si kimwe na kelepusideri ntangabuhamya, yayindi ya nimero ya 3, yasigaye hamwe, itanyeganyega, ni ukuvuga hejuru y'amazi. Yo, yerekana igice cy'igihe t kirekire gusumbaho.
Humu....
Mutegereze, Bwana Aluberiti, hari ikintu kitagenda neza mu bintu byanyu.
Iki , mwana wa ?
Muhereye hejuru y'amazi, mwashoboye gupima urugendo rwacu D, hamwe n'igihe twamaze twibize t ukoresheje kelepusideri y'ubwato bugendera munsi y'amazi nimero 3.Ibyo byatumye tubona umuvuduko V = D/t.
Ni ibipimo byakozwe n'ingenzuzi iri hamwe.

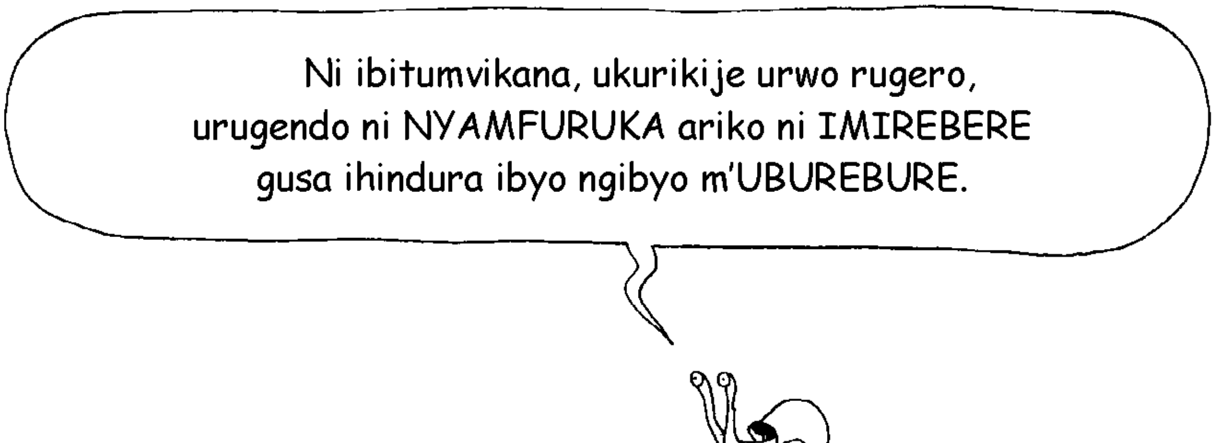
(*) LOSHE ni igikoresho cyo kugendera mu mazi kiguha igipimo cy'urugendo wakoze.

UKWIYEGERANYA K'UBUREBURE

Ubwato bugendera munsi y'amanzi bwa Anselimi, butwawe n'umuvuduko V, bugenda bwibize, kandi bugendera ku gice cy'umuzingi $\overset{\frown}{A'B'}$ = D' mu GIHE NYACYO, gipimiwe ku nkombe, ungana na t'.

Ku ndorerezi yashyizwe hanze, ku mazi, urwo rugendo rugaragaye nk'igice cy'umuzingi $\overset{\frown}{AB}$ = D, muri icyo gihe t. Noneho dufite:

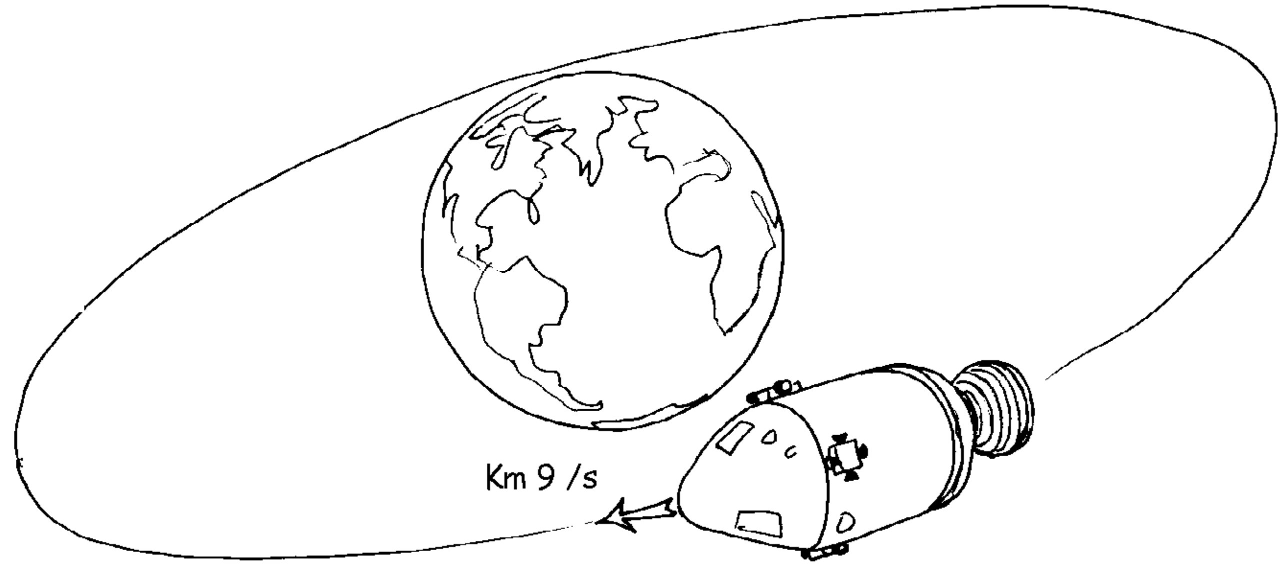
$$D'/t' = D/t = V$$



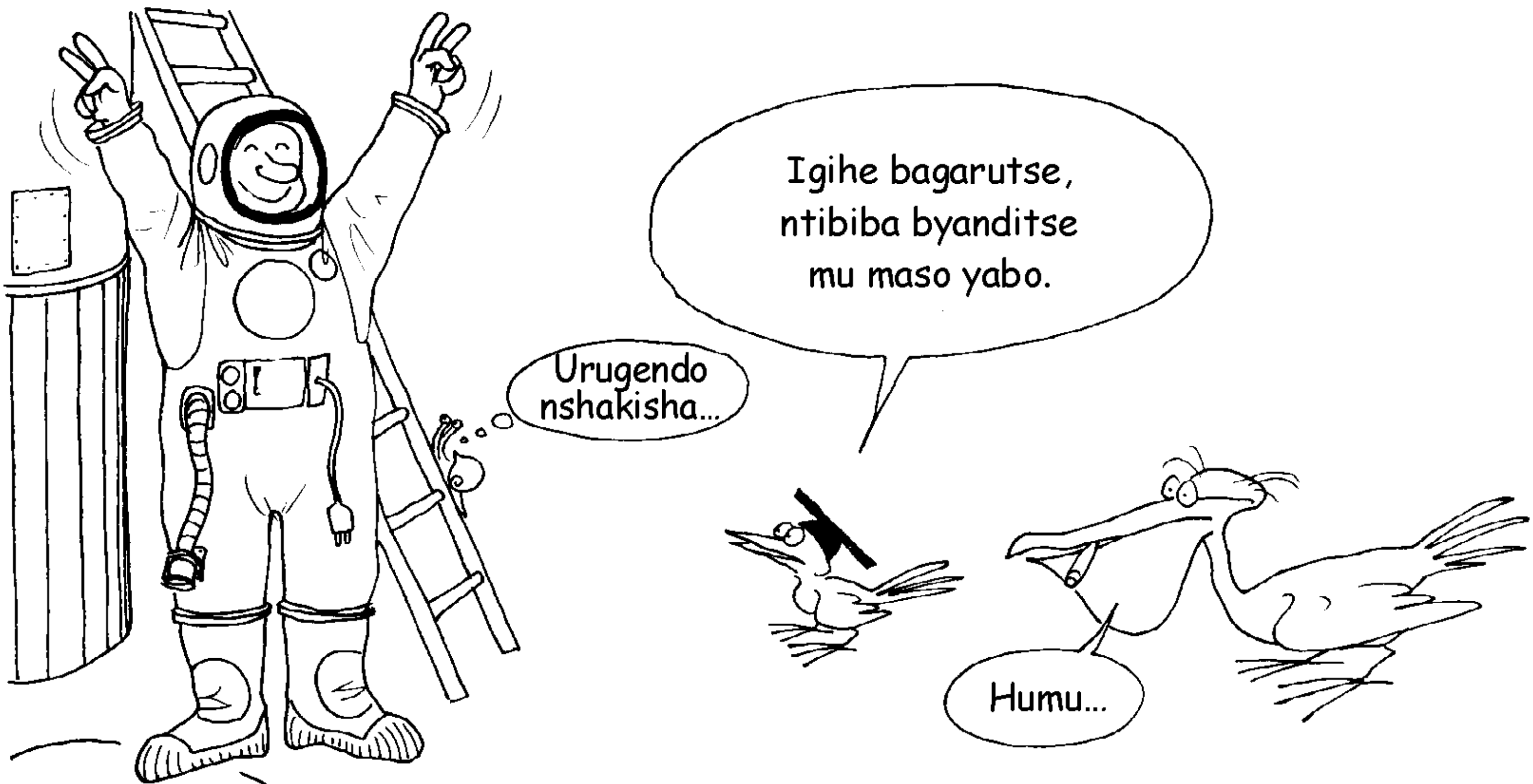
Ariko se kuki mwatekereje ikintu gikomeye kuriya ? ibi bihe biruhanya, uburebure bwiyegeranya !!!
Ni ukubera umuvuduko w'urumuri, muhungu wanjye. Uzareba kure cyane.
Ndibaza ko rero ibintu byose bizahinduka...urumuri ?
Byiza, ibyo byose ni byiza pe, izo nkuru z'igitonyanga cy'amazi, z'ubwato bugendera munsi y'amazi, ry'iyegeranya ry'uburebure. Ariko se mu buryo bufatika, byigaragaza bite ?
Subira kuri kiriya kintu, mushakashatsi mu njyendo zo mu mutima wanjye !
?..
Ndi teguye...
Ugiye kubona icyo ugiye kubona

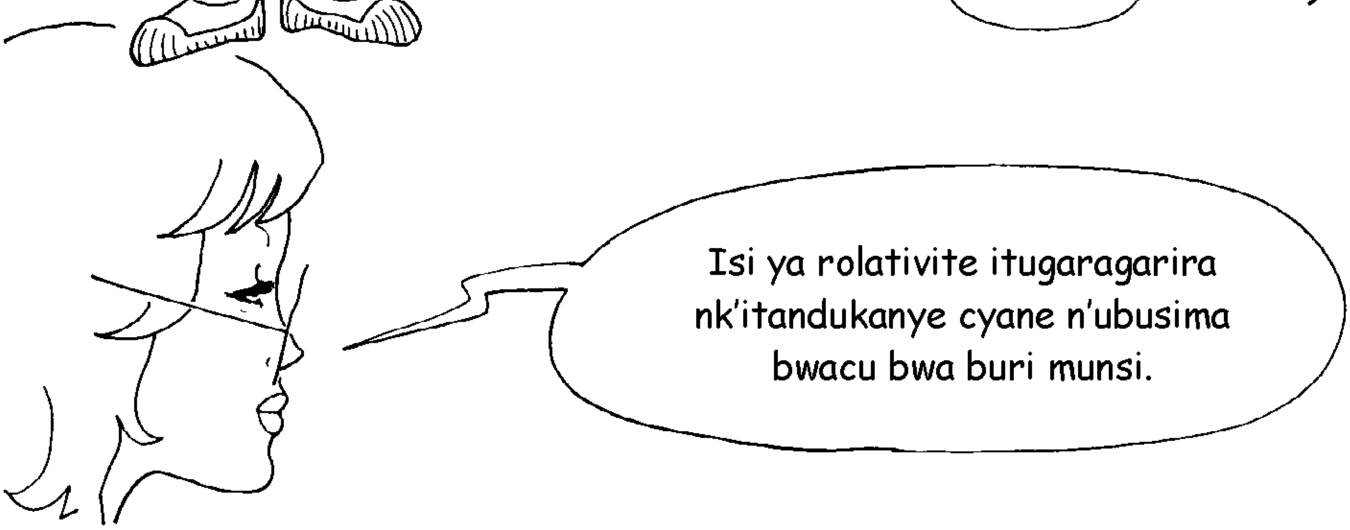
Sofiya !
Mbega amakuba !
Nshuti yanjye, tujyende, humura, subiza umutima hamwe, byarangiye...
Fisikye ni igitangaza.
Amahirwe yacu ni uko ziriya fenomene ziza iyo umuvuduko w'umuntu cyangwa w'ikintu ujya kungana n'umuvuduko w'urumuri wo ungana na km 300 000/s
Iyaba uwo muvuduko w'urumuri wanganaga n'imetero nka zingahe mw'isegonde, ubuzima bwaba butagishobotse n'agato... He he he !...

Iyo abakosimonote bagumye amezi atandatu ku murongo w'umuzingi w'urujyendo rwabo, ni ukuvuga amasegonde miliyoni cumi n'eshanu...



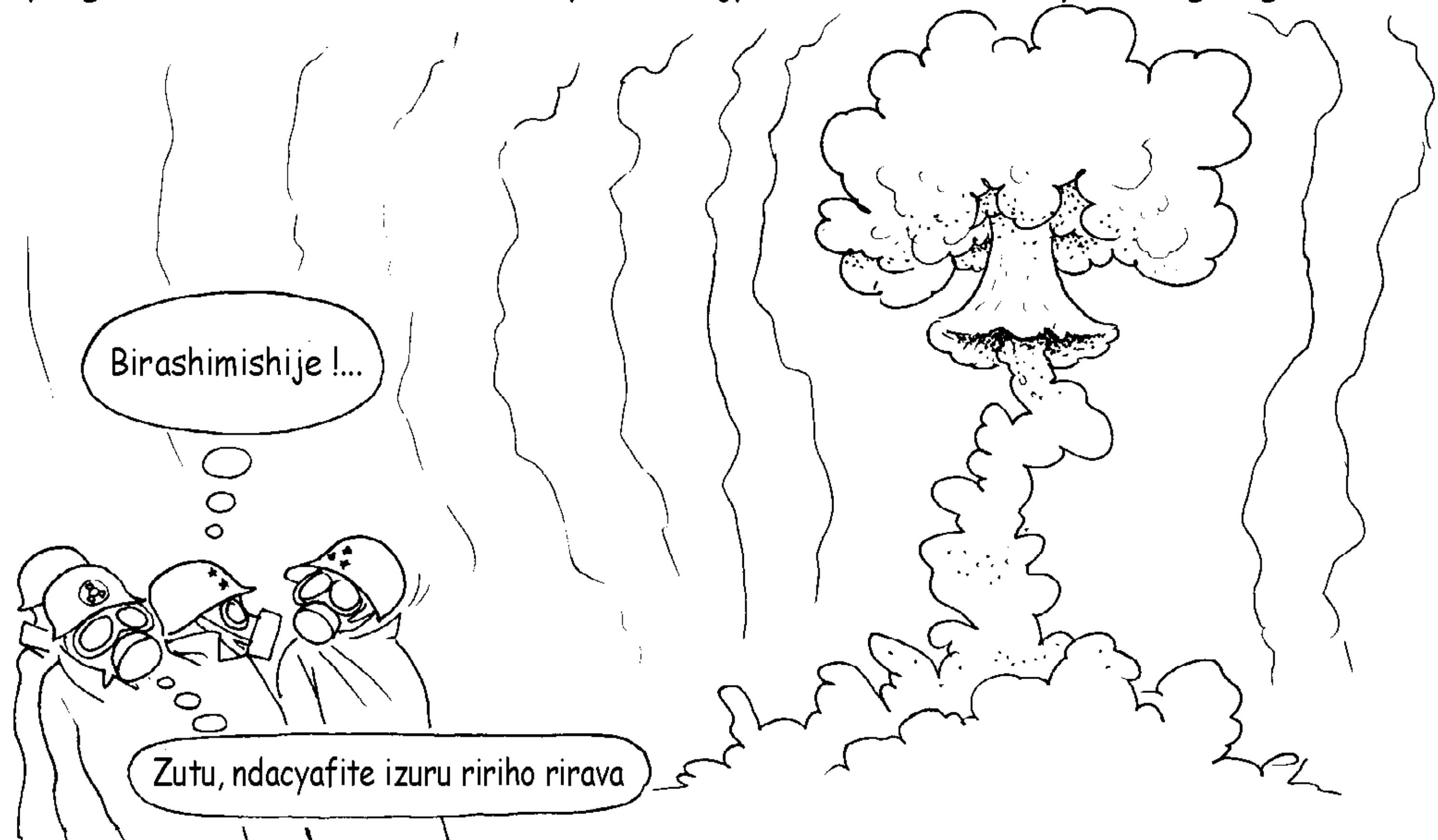
gusaza kwa bo kugabanuka 1,4 kw'ijana by'isegonde.



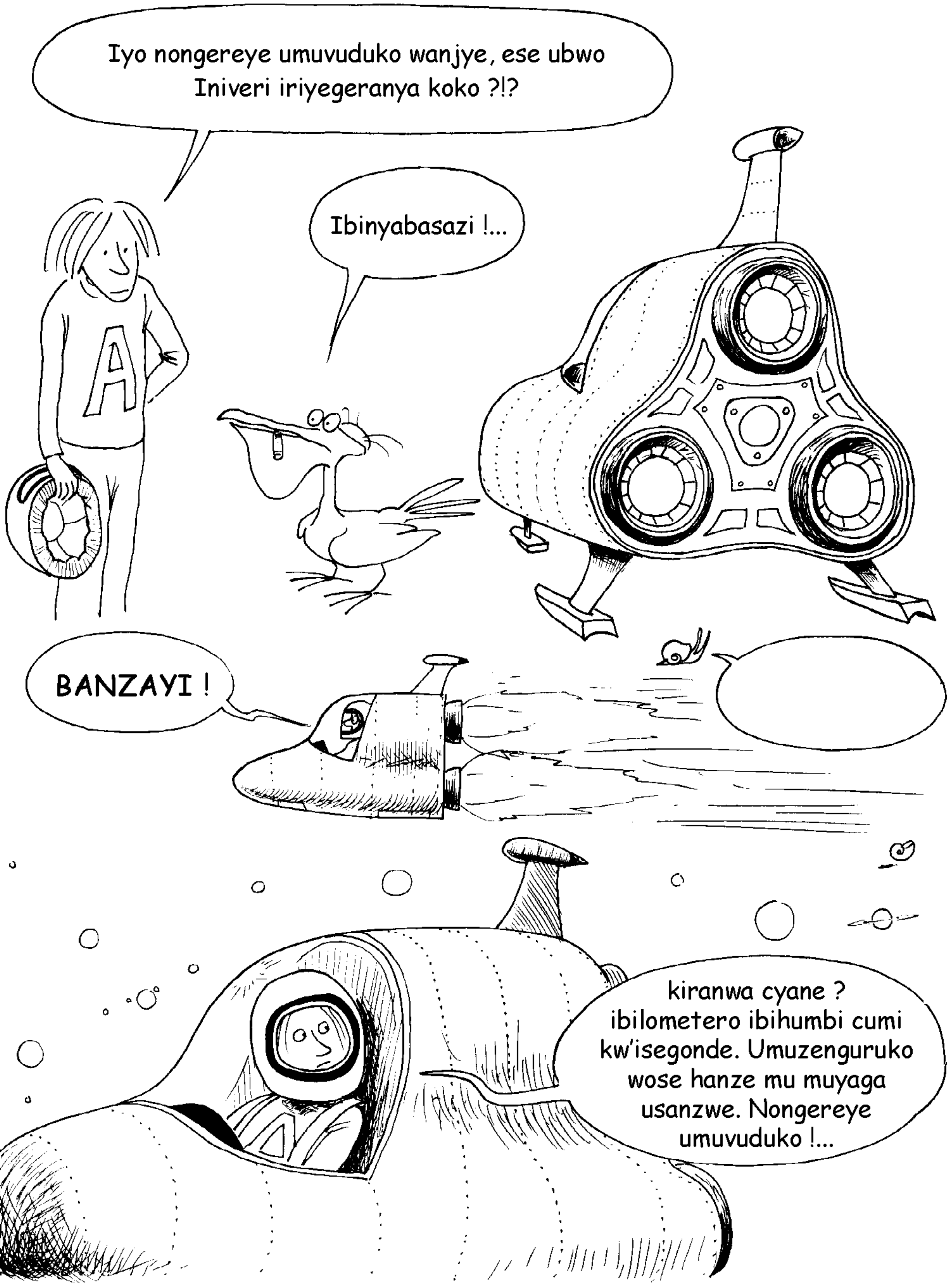


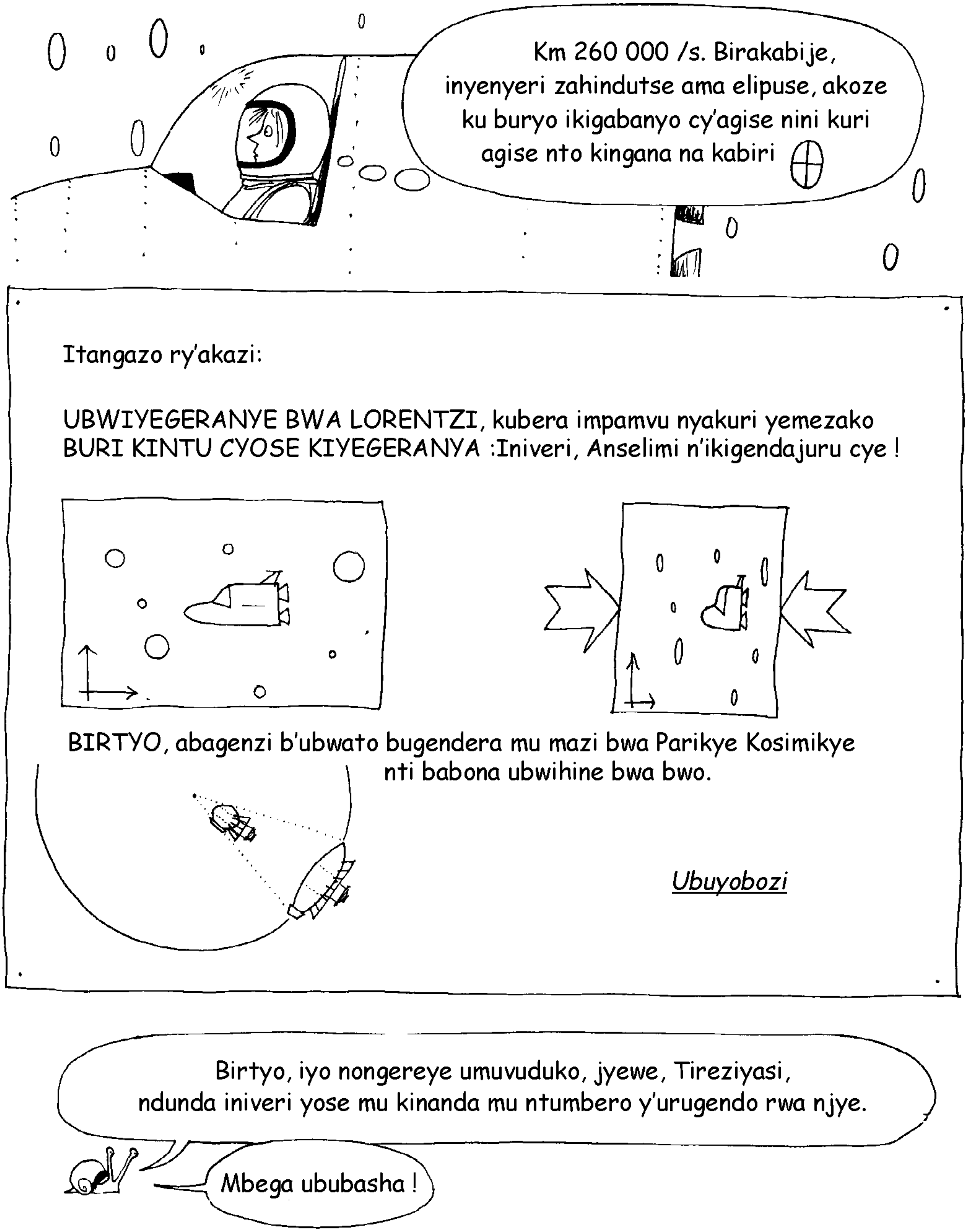
Muri iki gihe yitaweho n'inzobere za fizikye y'ingufu nyinshi zo mu rwego rwo hejuru (*)

Cyangwa abantu bamwe bakunda cyane amajyeza akorerwa hanze ku mugaragaro.



(*) yitwa kandi PULUTOFIZIKYE kuko ari fizikye ihenze...


Iyo nongereye umuvuduko wanjye, ese ubwo Iniveri iriyegeranya koko ?!?
Ibinyabasazi !...
BANZAYI !
kiranwa cyane ? ibilometero ibihumbi cumi kw'isegonde. Umuzenguruko wose hanze mu muyaga usanzwe. Nongereye umuvuduko !...


Km 260 000 /s. Birakabije, inyenyeri zahindutse ama elipuse, akoze ku buryo ikigabanyo cy'agise nini kuri agise nto kingana na kabiri
Itangazo ry'akazi:
UBWIYEGERANYE BWA LORENTZI, kubera impamvu nyakuri yemezako BURI KINTU CYOSE KIYEGERANYA :Iniveri, Anselimi n'ikigendajuru cye !
BIRTYO, abagenzi b'ubwato bugendera mu mazi bwa Parikye Kosimikye nti babona ubwihine bwa bwo.
Ubuyobozi
Birtyo, iyo nongereye umuvuduko, jyewe, Tireziyasi, ndunda iniveri yose mu kinanda mu ntumbero y'urugendo rwa njye.
Mbega ububasha !

Ni amayobera ! igishorobwa ntigishobora kwegeranya iniveri !
Mi !
Ntabwo ari ibijyanye no kwegeranya iniveri, cyangwa kugabanya umuvuduko w'isukwa ry'igihe. Ingendo n'ibihe ni ingaragazi gusa. Byose ni mpitabitekerezo. Iyo ni isi ya **ROLATIVITE**.
Arikose? Iniveri, isa n'iki ?
Byose bitandukanywa n'umuvuduko w'indorerezi.
Umuvuduko ujyereranije n'IKI?
Igitekerezo nyamukuru ni uko abantu babiri bagenda k'umuvuduko ungana V berekeza hamwe, babona kandi batura muri Iniveri mu buryo bumwe.
Ariko tugaruke ku mudeli wa Parikye Kosimikye. Uzabonako ku binyabuzima bimwe, Iniveri ishobora gufata intera yihariye.

IYO IGIHE GIHAGARIKA ISHIBUKA RYA CYO

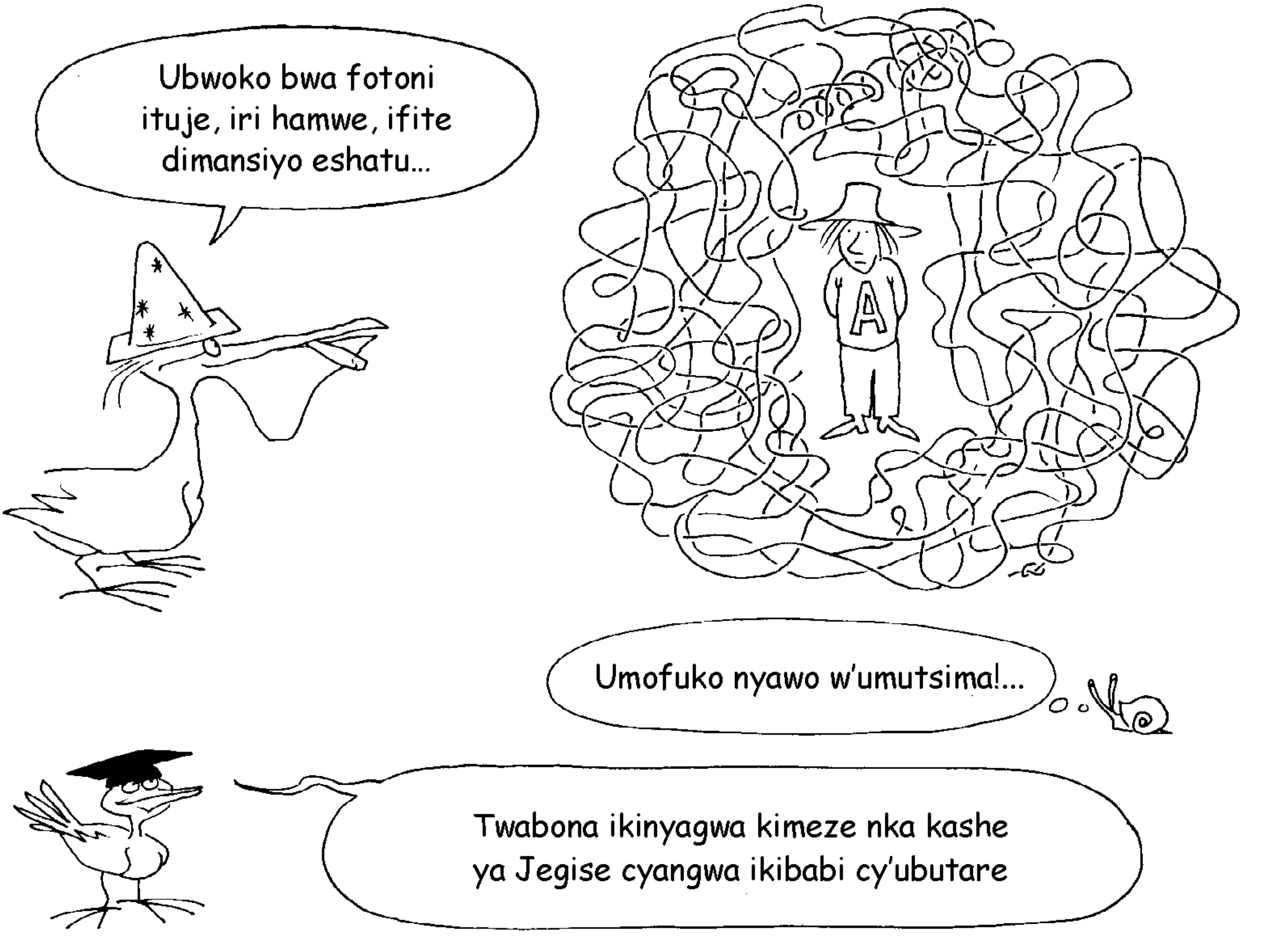
CYANGWA IMITERERE YA ROHO YA FOTONI

Ariko se ni nde utuye kuri iyo ndiba ya Koronosi, hagati na hagati y'ibintu byose, ahaba ya zero yihariye y'igihe ?...
Igihe ni ikibazo kireba abandi
ZAFOTONI
Kuri twe, ntabwo ari ubuzima !
Aribwo bumanyu buto bugize urumuri.
Ariko se ubundi, izo fotoni, nshobora gupima umuvuduko wazo. Zijyenda ahantu h'uburebure bungana na D, mu gihe kingana na t, kandi umuvuduko wa zo ni D/t = km 300 000 /s
Izo nyagwa, ziravuka, zikanapfa !
BULEBE BULEBE
Ariko, Anselimi, urabizi neza ko igihe, gifata amajwi y'ubwinshi.

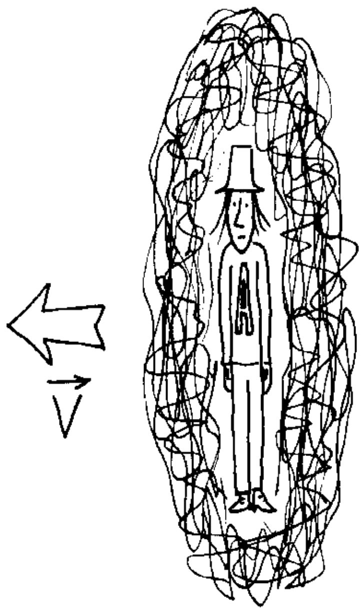
Ubwo ni Uburyo BWAWE bwo kubaho igihe kiriho. Kuri fotoni, ibyo biratandukanye cyane. Muri sisiteme yayo bwite, ivuka n'urupfu ni ibiza byomekanye, kimwe cyometse ku kindi.
Urashaka kuvuga ko kuri yo igihe kitagira IGISOBANURO CY'IHAME ?
IGIHE NYAKURI cya fotoni gisobanurwa muri make n'agahe gato cyane k'ubu, kari hagati y'igihe cy'ivuko ryayo n'igihe cy'urupfu rwa yo. Fata esipase-gihe ya dimansiyo 3, (x,y,t). Uyibyataraje ukurikije intumbero y'igihe hasigara ikibyatarare gifite iyuma n'imbere. Ni iryo tandukaniro hagati y'uruhande rw'imbere n'urwinyuma ryerekana intumbero y'igihe cya fotoni.
Ibyago...
t
y
x
URUPFU
IVUKA
URUPFU
IVUKA

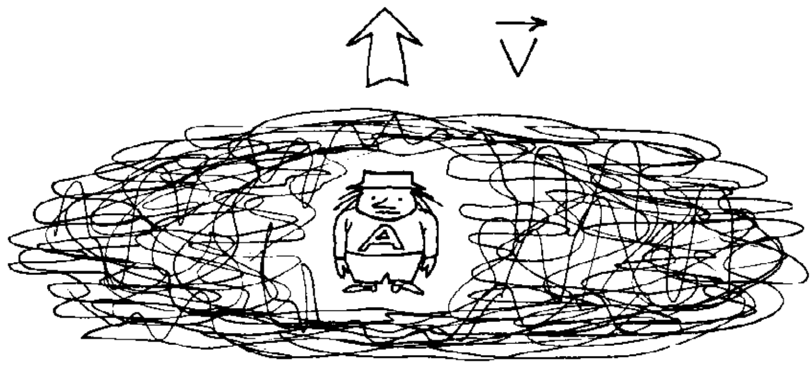
Urabona, Anselimi, Ibintu byose bifitanye isano. Urebye ibintu bimwe byiruka, wagirango bigira ubuzima. Ariko kandi nta buzima bifite !
Jyewe, ndifuza neza umuntu wambwira umunsi umwe kuki igihe kigenda giturutse muri kahise kigana mu bizaza kandi ntikibe cyashobora gukora urugendo rusubira inyuma !
BULEBE BULEBE
Ese bifite akamaro ? Muri gariyamoshi y'igihe, Twese twicara buri gihe tureba aho tugana.
Ese nimumbwire, mwahindutse abasazi, cyangwa hari ibindi byabashyikiye ?
Nigeze kuvugako iyaba intumbero y'igihe yarihindukijwe mu kanya gato, nta n'umuntu n'umwe wabimenya !

Ntabwo bishoboka gushushanya esipase-gihe ya dimansiyo ennye. Ariko dushobora, muri esipase ya dimansiyo eshatu, gushyiramwo ingendo zinyuranyemwo z'ibintu byose byo muri Iniveri, z'uduce twose, nk'uko indorerezi iri ahantu hamwe (byiswe ko) itanyeganyega, yaba ibibona, mu gihe cy'ubuzima bwe bwose.



Ufatiye ku bijyanye n'UBUREBURE, iyi iniveri irakweduka.
Niba indi ndorerezi igenda n'umuvuduko V itumbereye ahariho hose, byose biba nk'aho habaye itsindagira rya Iniveri (hamwe n'iry'indorerezi) ukurikije iyo ntumbero.

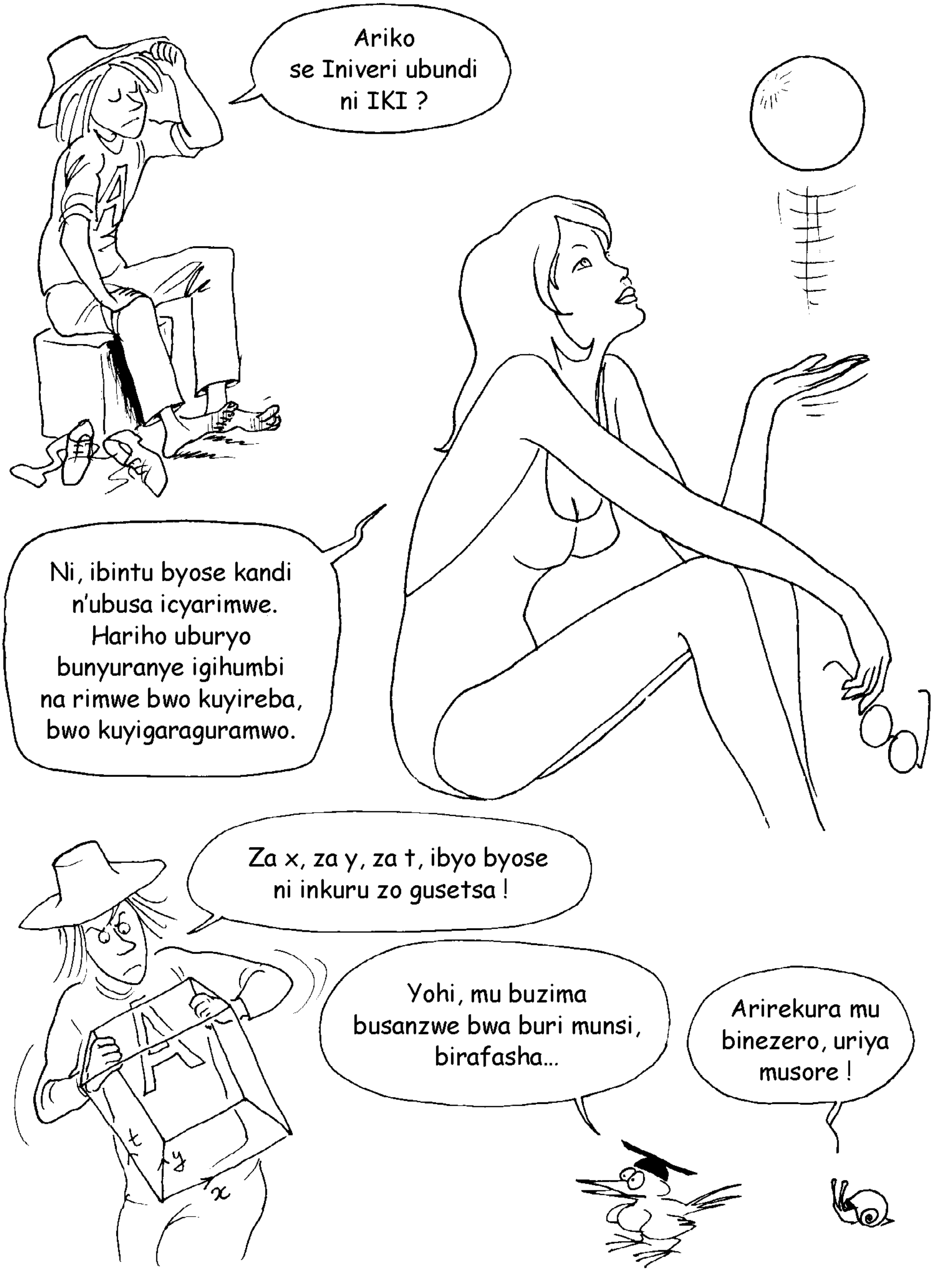




Fotoni yongera cyane icyo gikorwa cyo kwiyegeranya mu buryo buminuje. Twabonyeko IGIHE CYAYO NYACYO cyabyatarajwe byuzuye neza. Iyaba fotoni yashoboraga kureba igishushanyo cya Iniveri yose, yari kubona ko iyo iniveri ibyataraye cyane hakurikijwe intumbero y'urugendo rw'iyo fotoni. Birtyo biragaragara ko isi ya fotoni ni INYADIMANSIYO-EBYIRI. Kandi nayo ubwayo yaba yibera muri iyo si iteye amatsiko nk'agafungwa gato, kabyataraye.

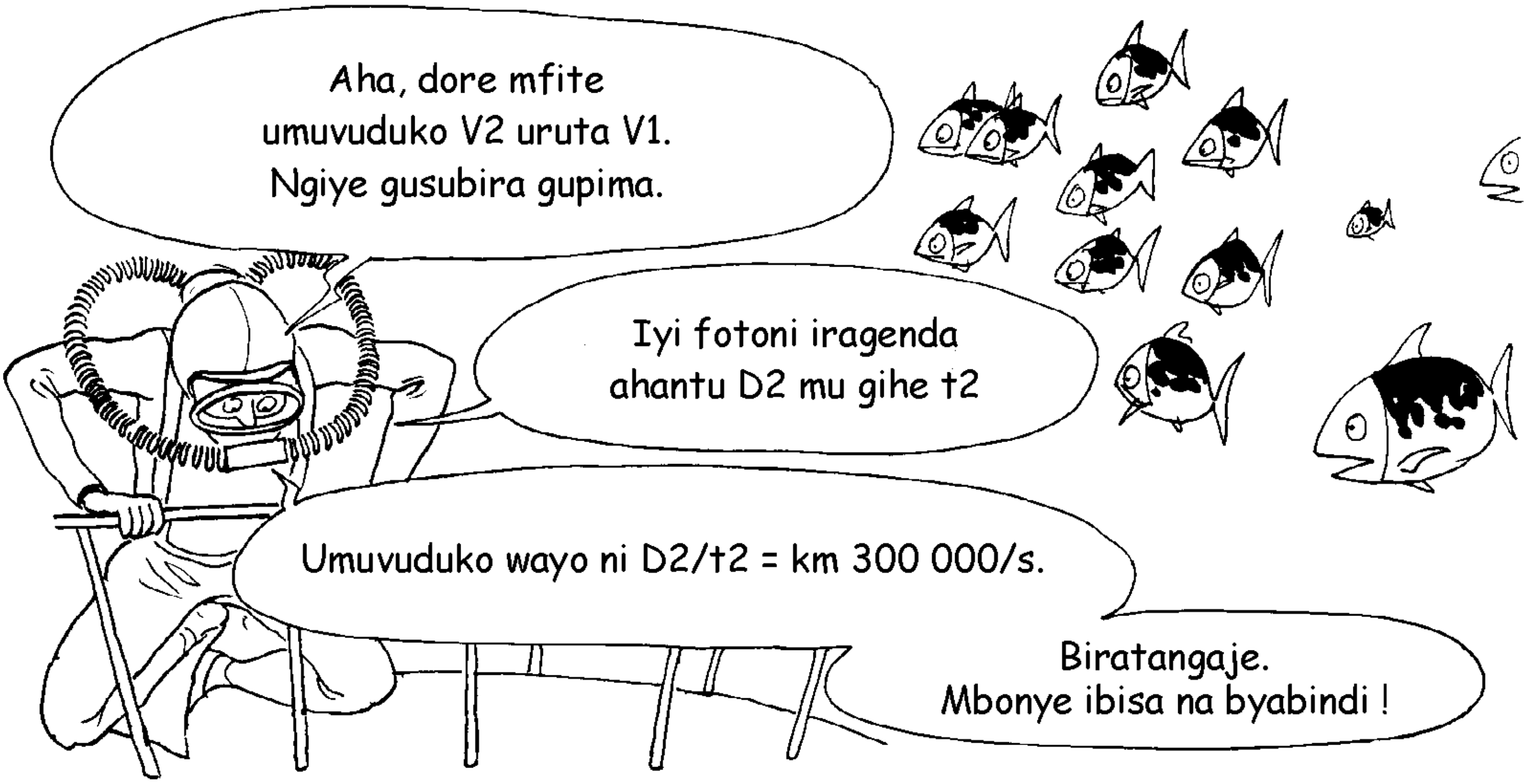
Birasa n'ibyo umuntu yabona yohereje, kuri ekara, ishusho ya kashe Jegisi (indorerezi iri hamwe itanyeganyega) akoresheje itara rimurika mu nzira y'intumbero y'urugendo rwa fotoni.

YO
Kugirango usobanukirwe imibereho ya fotoni, wakagombye kuyifilima k'uburyo utunga kamera mu ntumbero y'urugendo rwayo kandi ugerekeranya amashusho yose y'iyo filime.
Mu bigaragajwe ubwambere: isi ya fotoni
Nk'uku nguku.
t
y
x
Rubyataraye hakurikijwe intumbero y'igihe, urugendo rw'igitagangurirwa rwahinduka iserikyeri !
ISI YA FOTONI A
ISI YA FOTONI B
Isi irebwe n'indorerezi iruhutse.
Fotoni ebyiri zifite intumbero zitandukanye z'ubusakare zagira "ibitekerezo by'isi" binyuranye.
Ficitiri !


Ariko se Iniveri ubundi ni IKI ?
Ni, ibintu byose kandi n'ubusa icyarimwe. Hariho uburyo bunyuranye igihumbi na rimwe bwo kuyireba, bwo kuyigaraguramwo.
Za x, za y, za t, ibyo byose ni inkuru zo gusetsa !
t
y
x
Yohi, mu buzima busanzwe bwa buri munsi, birafasha...
Arirekura mu binezero, uriya musore !

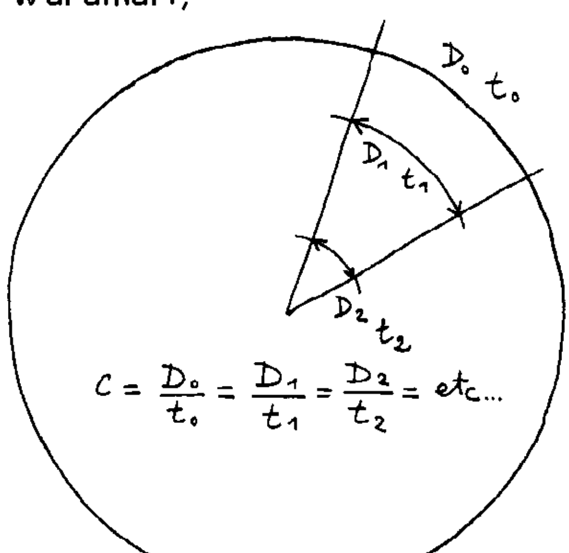
UBUDAHINDUKA BW'UMUVUDUKO W'URUMURI IHINDUKA RYA MASE

Za fotoni ! ndazibona !
Mbega ukuntu KORONOSI ifite ubujyakuzimu burebure !
Imbarabujyakuzimu yanjye irerekana umuvuduko V1
Iyo fotoni igyenda urujyendo D1 mu gihe t1
Ndagabanya D1 na t1, mbonye km 300 000 /s
Ongyera umuvuduko, bwana Aluberiti, ongyera umuvuduko !



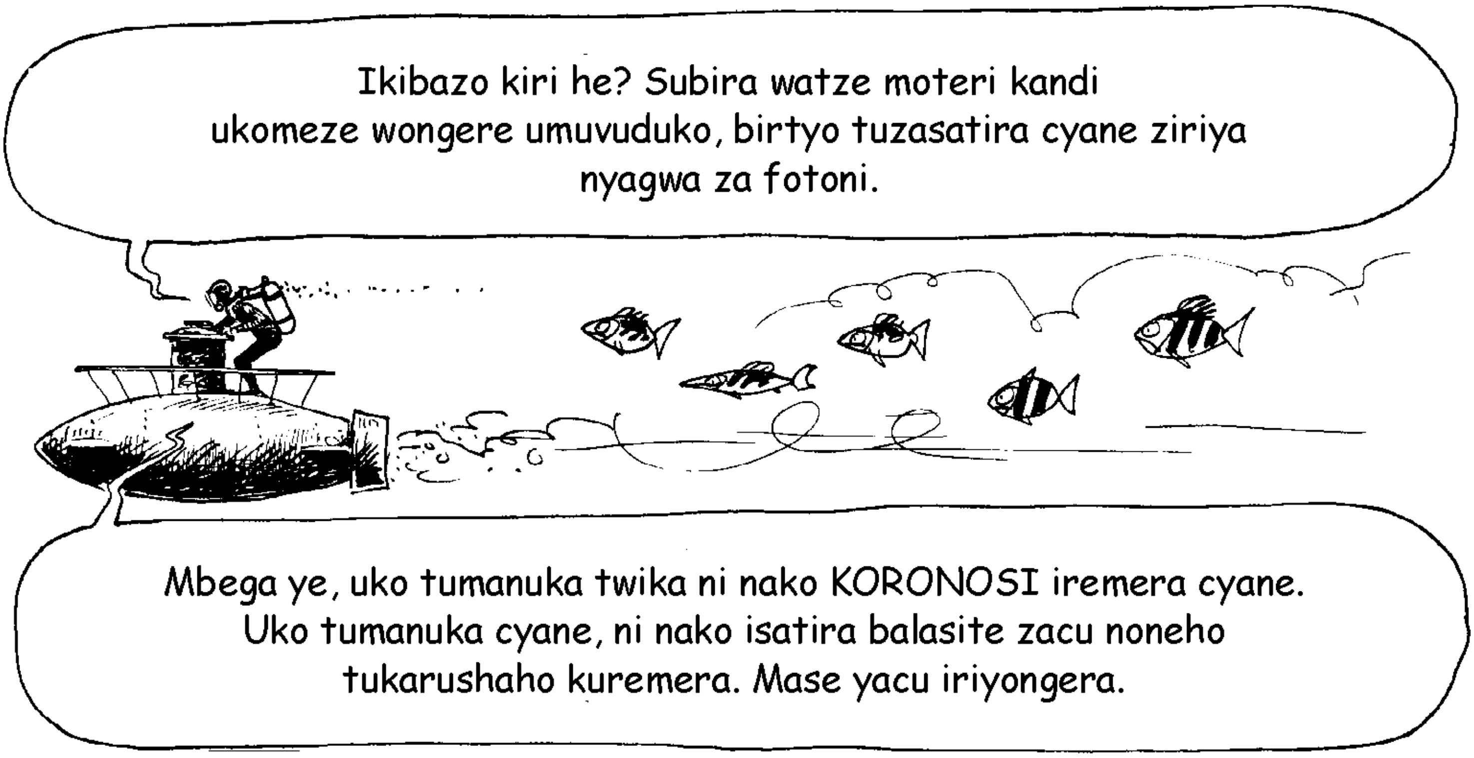
Indorerezi zose, utitaye k'umuvuduko wazo, zibona mu bipimo byazo umuvuduko umwe c wa za fotoni, utwo tumanyu tugize urumuri. Zifite rwose imiterere yihariye muri Parikye Kosimikye. Ibintu bigaragara nk'aho zijyenza nk'udutara duto dufite "reyo" izenguruka n'umuvuduko-nyanguni udahinduka, birtyo ukohereza ishusho yazo kuri za siferi zisangiye santeri zigize Koronosi. Hakurikijwe umukino nshuro-ebyiri w'ubuhinduke bw'urugendo n'igihe nyacyo, indorerezi zibona ntampindukirane ko c = D/t = km 300 000/s.

Ubwo budahinduka bw'umwihariko bw'umuvuduko w'urumuri, bw'umuvuduko wa za fotoni, bwashyizwe ahabona mu buryo bw'amajyeza, mu 1881 na Mishelisoni na Moruleyi.



Imyaka mirongo itatu n'ine nyuma ya ho, mu 1915, Eyinshiteyini yerekana ku mugaragaro, umudeli usobanutse wa esipase-gihe, udashobora kwerekana neza ubwo budahinduka bw'umuvuduko w'urumuri, kandi anatangira kubaka esipase-gihe nshyashya kuburyo inshusho-gitekerezo cyayo kigaragazwa na Parikye Kosimikye: esipase-gihe ya ROLATIVITE.

(*) Ni ukuvuga JEWODEZIKYE imwe y'iyo siferi. Murebe muri JEWOMETIRIKONI.



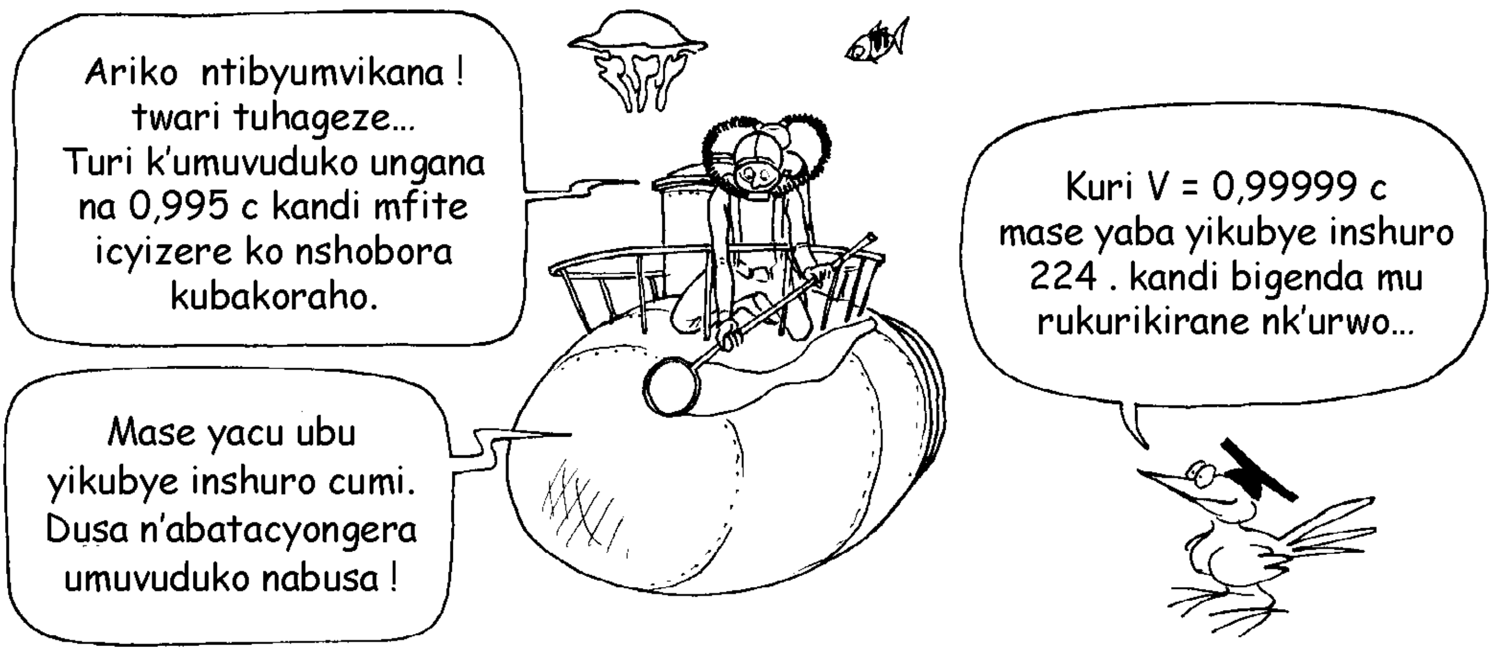
Inyandiko y'akazi:

Turashaka kurwanya igitekerezo kitari cyo: abantu bavugako kujyenda binanura. Mu by'ukuri, biranyuranye ! igikorwa gisanzwe cyo kuva mu miterere y'uburuhukye (mase m_o) byongera mase mu njyereranya ya:

$$m = \frac{m_o}{\sqrt{1-\frac{V^2}{C^2}}}$$

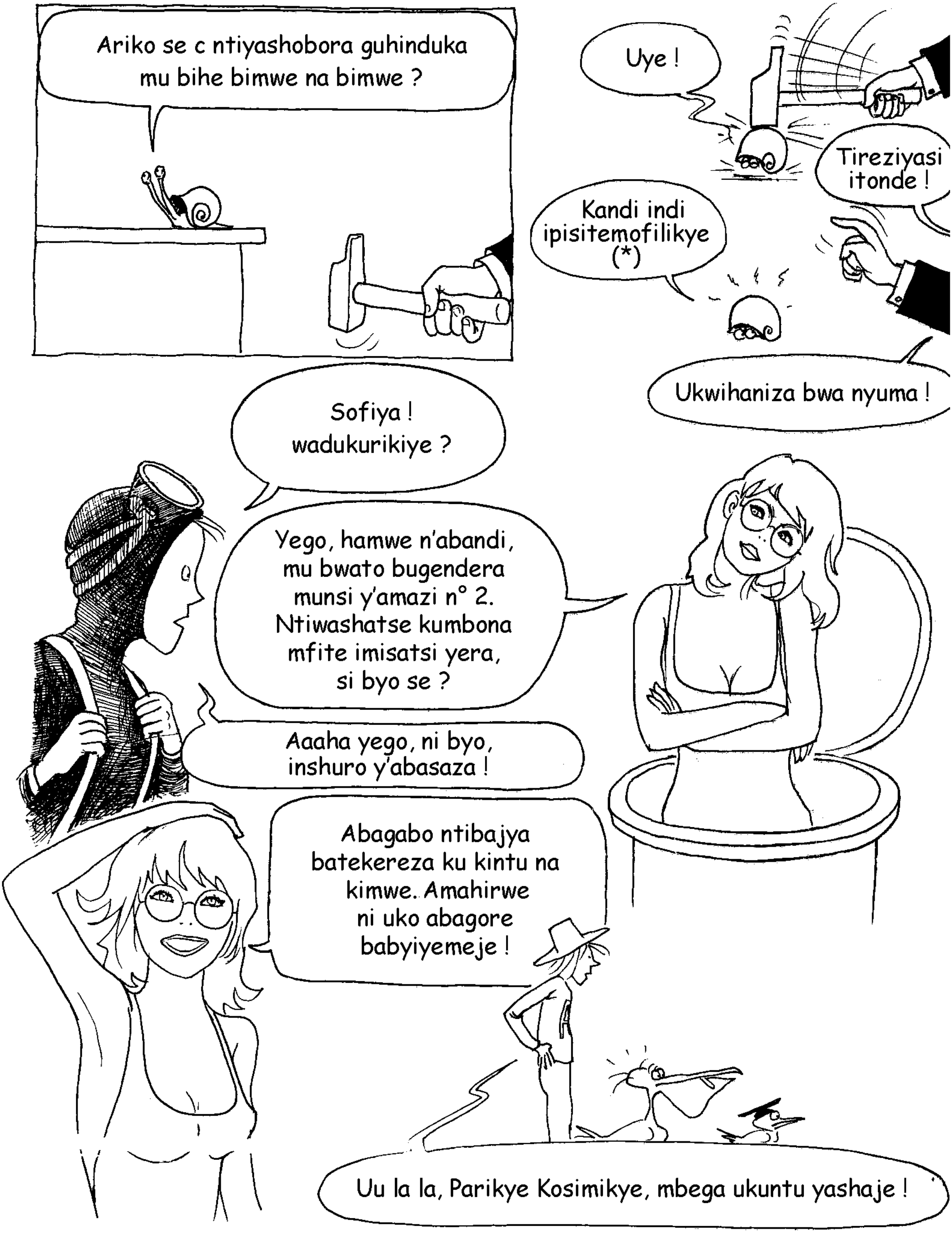
Ariko kandi, iyo upfuye guhagarara usubirana mase yawe y'intangiriro m_o.

<u>Ubuyobozi</u>

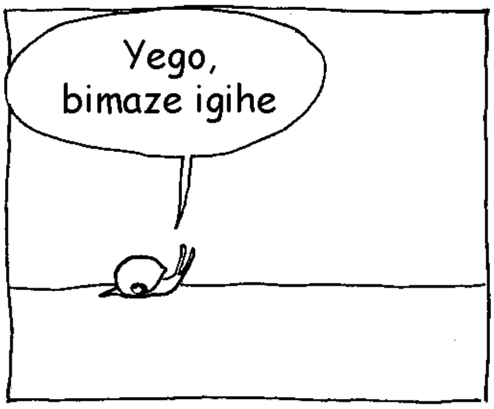


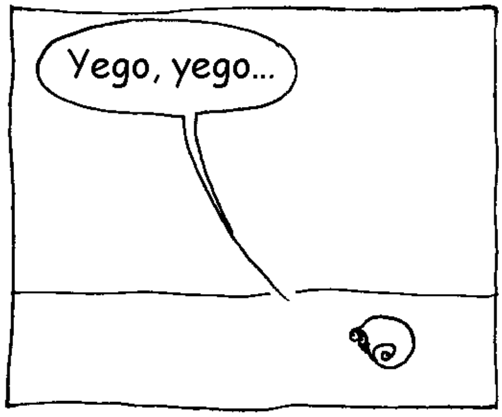
Ntacyo bimaze gukomeza ubigarukaho. Twakoresha ingufu z'umurengera uhebuje dushatse gushyikira ziriya fotoni. Ndagabanyije umuvuduko, itonde !
He la !
VOROROOO!
Pifi !... Mbega urujyendo nshakishiriza.
Nimba mbyumva neza, uko uha ingufu ikintu ni nako wongera mase yacyo.
Birumvikana kuko imbaraga na mase, ni kimwe: E = m

By'ukuri, bitandukanijwe n'umubare umwe udahinduka... ari wo kare ya c. Muri icyo gihe tuzandika: E=mc2. Humuu... ni ikibazo gitoya cy'ibipimo mfatizo. Niba igipimo mfatizo cy'uburebure cyanganaga na miliyoni Magana atatu za metero, byazakwandikwa :
Ariko se kariya gaciro ka miliyoni magana atatu za metero kw'isogonde gaturutse he ?
Mu mwanya wawe, nacurika ikibazo: ese i metero kw'isonde biturutse he ?
Nda...eehi... yego ?
Ni igipimo cy'umuvuduko kinogeye bihebuje, ni urugero kosimikye, muri iniveri yose. Naho I metero kw'isegonde ni agapimo k'utunusu k'aho ngaho.

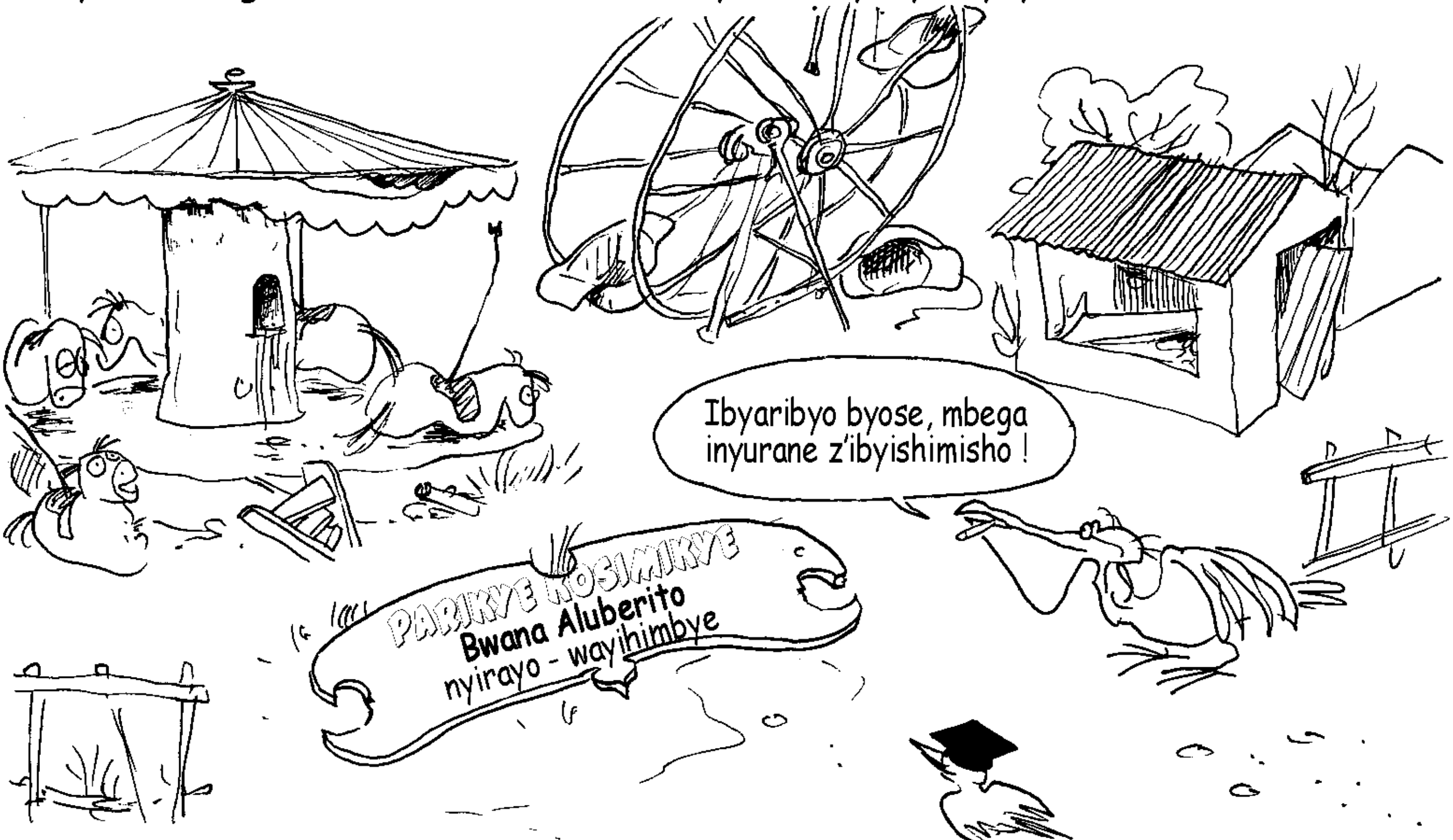


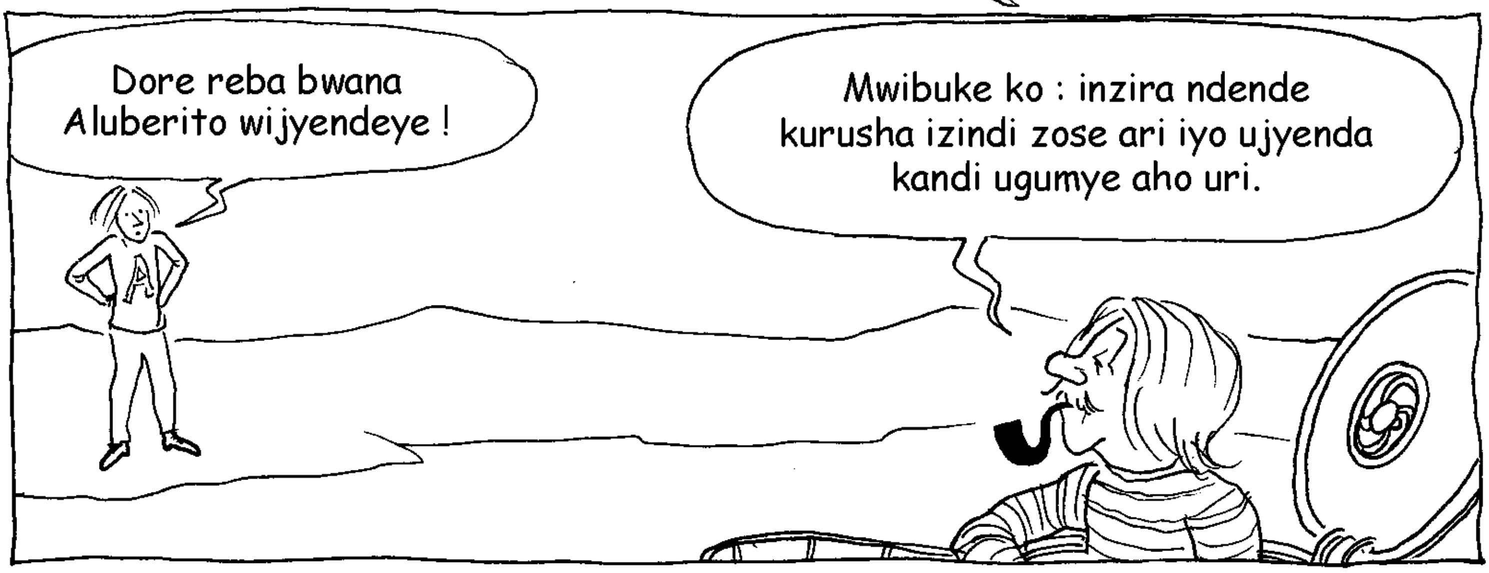
(*) Riturutse kuri EPISITEME (inyigo inononsoye k'ubumenyi) :ubumenyi no ku UMUCUNZI: umucunzi Bishatse kuvuga ngo "umucunzi w'ubumenyi".

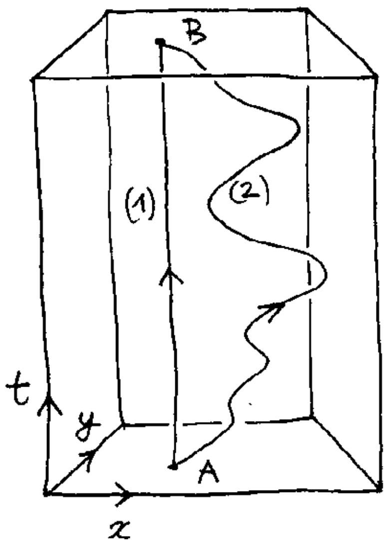




Episitemoyedere ni Inyubako y'Ubumenyi. Buri gihe irasadagurika, igakonkoboka, hanyuma ikongera ikavuka iturutse muri bya bisenyukye byayo.







Urugero, urugendo rugororotse AB ni urwo ujyenda ugumye, uhagaze aho uri. Urugendo ruhetamye (2) rugendwa n'ufite cyangwa n'igifite umuvuduko. Tuzi KO, muri iyo mibereho, IGIHE NYACYO, icy'umugenzi (ugereranije n'ubuhangane bw'icy'indorerezi igumye hamwe), kizahita gacye.

Urugendo nyarwo, muri esipase-gihe yacu, ni igihe nyacyo cyahise. Muri iyo ndoro y'ibintu, urujyendo ruhetamye rwaba "rugufi cyane" kurusha urugendo rugororotse.

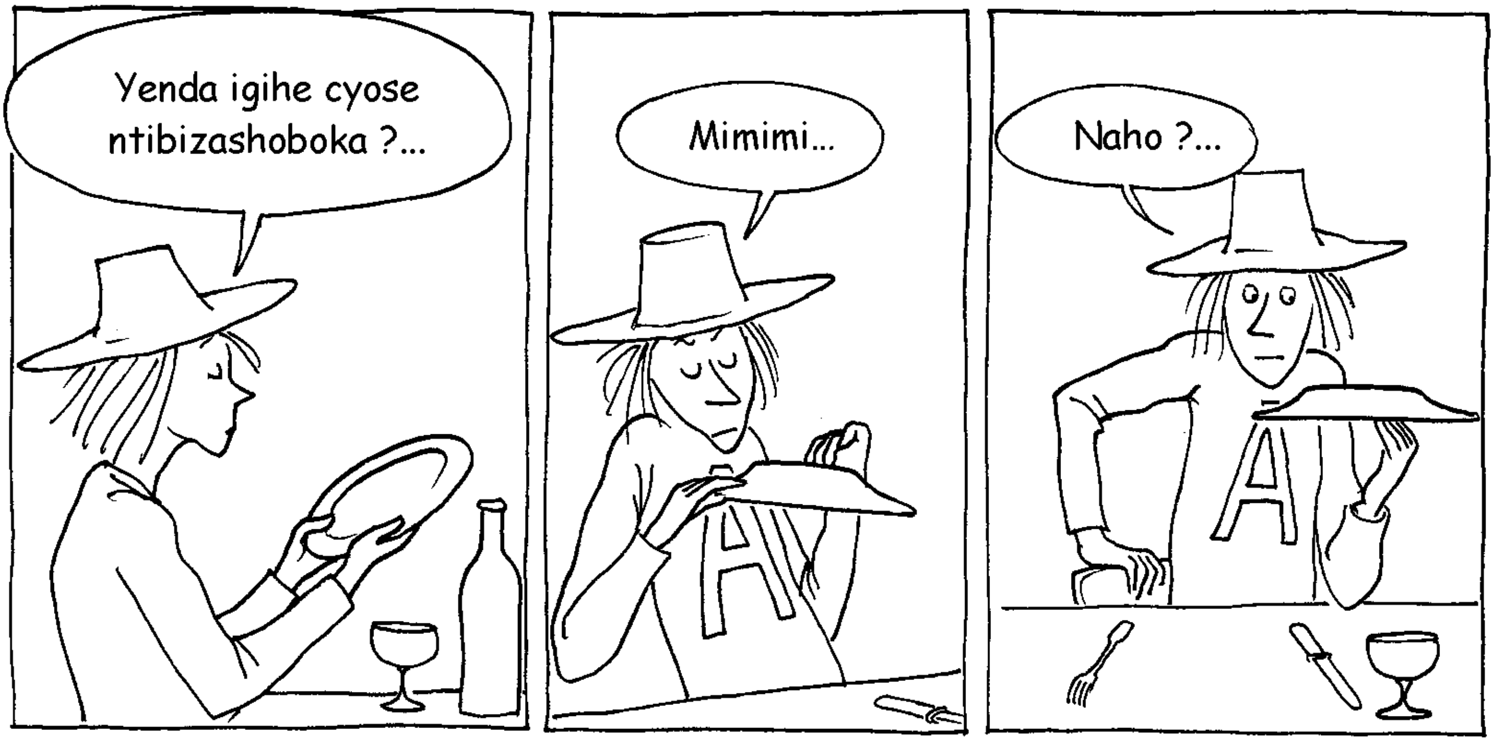
URUGENDO RUDASHOBOKA

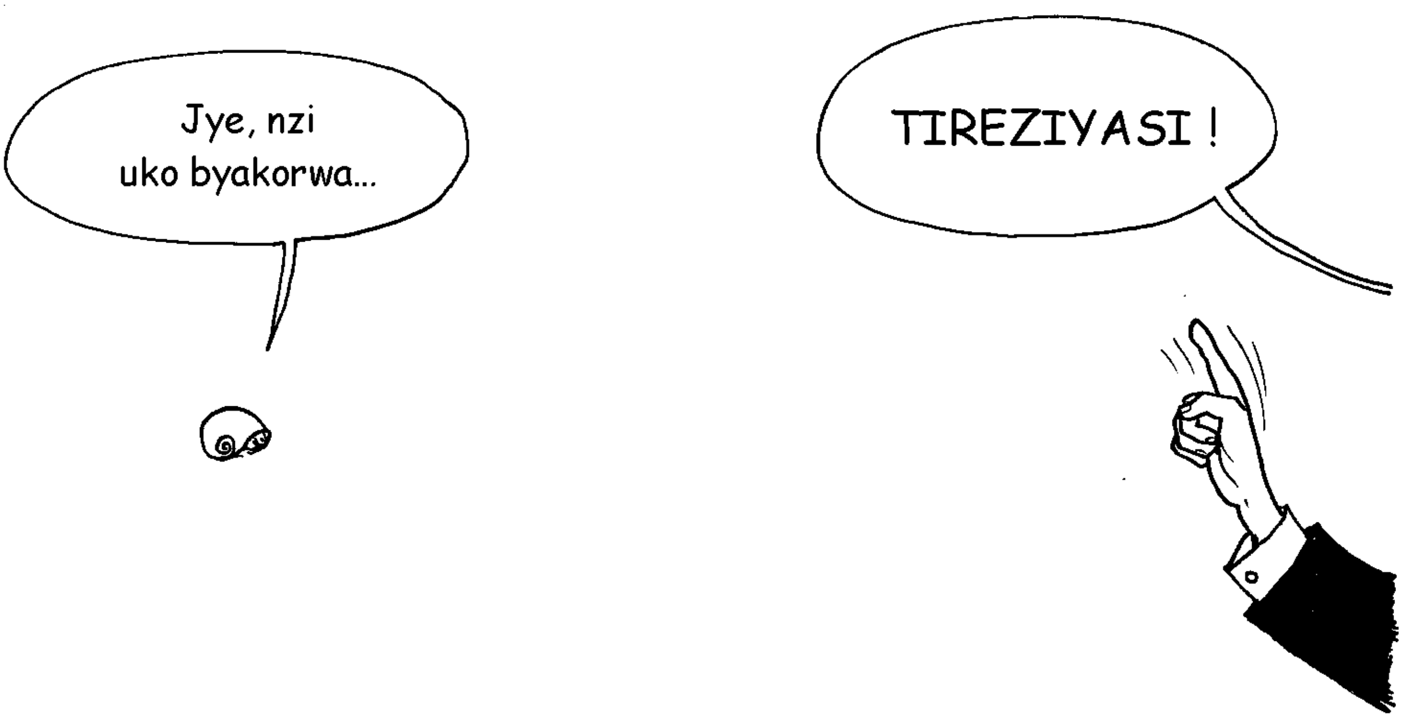
Kandi inyenyeri itwegereye kurusha izindi iri kuri... ?
Urumuri rukoresha imyaka ine ngo rutugereho ruturutse ku inyenyeri iri bugufi yacu cyane ari yo yitwa Alufa do Santore.
Ni ukuvuga ko iri ku birometero bingana n'ibihumbi mirongo ine by'ama miliyari uturutse kw'isi yacu.
Ariko kandi Pulutoni yo, iri ku mipaka ya sisiteme y'izuba, iri ku birometero miliyari eshanu uturutse kw'isi yacu, ni ukuvuga ahajya kungana n'amasaha-rumuri atanu.
Ni ukuvuga ko ari hafi inshuro ibihumbi cumi.

Bwana Aluberiti yansobanuriye ko hakenewe imisozi n'imisozi itagira umubare by'ingufu kugirango ugire umuvuduko ujya kwegera uw'urumuri. Twavugako, kugirango ujye hejuru y'umuvuduko wa km 100 000/s
Dufate ko mfite imoteri njyendajuru iha imodoka yanjye inyongeramuvuduko ya "g" imwe, ni ukuvuga ko umuvuduko wanjye wiyongera ho imetero cumi buri sogonda.
DETERIYUMU
FIZIYO IGENZUWE
DETERIYUMU
Aha hari ibyumba bibiri, igikoni n'ubwiyuhagiriro bwa Lanturulu.
INYONGERAMUVUDUKO
Inkurura igaragara ihwanye n'uburemere bwa njye, kandi birtyo nshobora ku yihanganira mu gihe kirekire gishoboka nk'uko mbishaka.
Muri ubwo buryo, nkeneye amezi ane kugirango nshobore kugera k'umuvuduko w'ubunyaruke bwa km 100 000/s. kandi muri icyo gihe, nzaba naragenze igice kimwe kw'ijana cy'urugendo.
2012
Mut
1°
Nzaba nsigaje rero imyaka cumi n'ibiri y'urugendo, tudashyizeho ayandi mezi ane yo kugabanya umuvuduko.

N'uwundi mwanya ungana n'uwo wokuvuga ibyo nabonye yo.
Hari amahidwe makye ko twaba turi abanyabuzima twenyine muri Iniveri. Ariko kandi, nimba hariho andi mapalanete atuwe, iyambere itwegereye yaba iri mu myaka-rumuri iruta cyane iyo ine !
Mu yandi magambo, gukora urwo rugendo ukurikije ayo mahame ya Parikye Kosimikye, byasaba ko umuntu abiharira ubuzima bwe bwose !
Nonese dukore iki ?
Ese urwo rugendo nti rushoboka ?
Ndabona uyu muhungu adahagarara na gato ?

Kugenda k'umuvuduko uruta uw'urumuri ntibyumvikana, ntashingiro bifite. Ni nko gushaka kujya kure ugana ikuzimu harenze santere ya Parikye Kosimikye !
Yenda Parikye Kosimikye si umudeli uhebuje
Ntabwo ari ibyo ! Ibyo ntabwo bimbwira uko nakora urujyendo rungana ku zindi nyenyeri mu mwanya usobanutse.


Yenda igihe cyose ntibizashoboka ?...
Mimimi...
Naho ?...


Jye, nzi uko byakorwa...
TIREZIYASI !

UMUSOZO