

SOME THOUGHTS ON TRANSLATION OF SCIENTIFIC TERMINOLOGY IN KISWAHILI

Sr. Anita MacWilliam

INTRODUCTION

This paper is primarily a result of attendance at a Biological Terminology Seminar held at the Institute of Kiswahili Research (IKR) in June 1981. This Seminar was one in a series held to coin Biological Terminology with a view to publishing a Kiswahili Biology Dictionary. The project was under the aegis of IKR and the able chairmanship and scholarliness of H. Akida, Senior Researcher and terminologist.

The point of reference in this article is precisely the terms coined at that and previous seminars. We have not examined terminology outside of those proposed.

It is an attempt to look at affixes used in scientific terminology and to give a few suggestions which may lead to some uniformity and understanding among our scientific colleagues when coining terminology. The sources used and the extent of the field have been limited in the hope that a deeper study of a few affixes will yield greater returns in the long run.

There are different types of language for use in particular circumstances and by specific groups of people. It is a truism to state that the way I speak in my home is quite different from the way I speak in a seminar on linguistics or write for a professional journal.

In this article we are examining a very specific concept and word field, i.e. the concepts and lexicon

used by biologists, botanists and zoologists. This is a restricted field. On the other hand, the people who belong to these fields, apart from being Tanzanians, are also a part of a much wider group, that is, the community of scientists throughout the world. Because of this wider group, the work they do in teaching, research and application, is of relevance to an audience which circles the globe.

The problem of Scientific and Professional Terminology is not confined to Tanzania. It is a problem which began with the beginning of invention, travel and communication among groups of people. It became more acute with the Industrial Revolution, and has been exacerbated by the explosion of technical and technological advances in all parts of the world.

An attempt to bring order out of chaos, was made as early as 1931 by Wüster. His investigation resulted in the publication of his book "Die internationale Sprachnormung in der Technik" (International Standardization of Language in Engineering). This book resulted in the formation of a 'Committee on Terminology' under the International Association of Standardization (ISA) in 1936. The Second World War interrupted this work and it was not until 1951 that ISO (International Organization for Standardization) was set up.¹ (Felber).

From the above beginnings, ISO has expanded to include National Bodies for Standardization of Terminologies, an International Network for Dissemination and work on terminologies in various technical fields. Tanzania is a member of ISO² (Akida).

ISO set up TC/37 WG (Working Groups) whose duty first of all was to formulate guidelines for use by National and International Bodies. These guidelines are a practical way of helping professionals in various technical fields to coin terminology for their own inventions, techniques etc. which can then be adapted by other language groups in the simplest and most suitable ways, leading to greater ease in communication.³

One of the principles suggested in the guidelines is "...that technical terms be taken over from other languages in their original form (or with a few modifications as possible) and definition, at any rate

with the preservation of the root of the original word."⁴
(ISO/TC 37/WG)

The foregoing has been a very brief resume of the history of terminological cooperation on an International level. Our Scientific colleagues have received their training in post-graduate (even under-graduate) levels in languages other than Kiswahili. They learned their metier and its lexicon following linguistic patterns of their learning language. This then follows them when they speak or discuss a scientific concept.

e.g. vitamin = Am.Eng/ vai'tamin/ Brit.Eng/
vit'amin/

In Kiswahili we have /vitami'ni/ which is a borrowing through British English speech patterns rather than American.

biology = Brit. and Am./baio'logy/
French/biologie/

Kiswahili bayoloji'a (following British and American).

The point we would like to stress here is that the pattern followed in both examples did not rest ultimately on the original language pattern (i.e. Greek) but rather on pronunciation received from the language of instruction. In the case of 'biology' there were two renderings which existed side-by-side for a while, i.e. bayolojia and biolojia. However, in Tafsiri Sanifu, Toleo la 4, 1980, the term has been set as bayolojia. Therefore, it seems that in this instance at least, the Standardization Committee of the National Swahili Council has come down on the side of English as the pronunciation to be adopted.

This particular topic of coining has been dealt with by others before me, e.g. Temu ('78, '80, '81) Kiingi ('81) Mdee ('81) Akida ('80), Gibbe ('81) etc. At this point I'd like to take a brief look at the suggestions of both Temu and Kiingi. Both have suggested that it is time to take a more revolutionary stand in the area of word-building. Temu's paper given in Nairobi⁵ is a follow-up of an earlier paper which he presented back in 1978.⁶ At that time he advocated the use of computers to bring forth possible forms on the internal structure of Swahili. This type of

word-building (i.e. from internal structures) has been used in other languages, e.g. Finnish. His revolution for Kiswahili at least - was the advocacy of using computers to generate new forms or new combinations. The assignment of meaning would be done by those needing Kiswahili terms. The suggestion by Temu does not seem to have borne much fruit - at least not to my knowledge. There is a reluctance, it seems, to assign arbitrary word signs to specific concepts, objection arises from newness, from the fact that most people want and need something known, as a base from which to begin.

Kiingi in his criticism of Temu's paper speaks of a 'revolutionary system of adopting Greco-Latin lexical elements which actually form the backbone of the International Scientific Vocabulary'⁷ (Kiingi, 1981). This is not a revolutionary system. It has been advocated by ISO and been used by many languages throughout the world. The revolution may lie in very deliberately and consistently forging an instrument based on these principles which would be used by East African scientists. However, this is not to say that Kiingi's ideas are not good. They are. And it might be very useful at this point to look more closely at what he says.

Kiingi suggests that scientific vocabulary be looked at as concept-fields and not as single items in the lexicon. Therefore, he questions the use of elimuuyoga for mycology and asks how does the Institute (represented in Nairobi Conference by Temu), propose to deal with the following words?

mycocriny

mycotropic

mycogenetics

mycoid

mycophyte

mycorrhiza⁸

This is a valid question and the underlying suggestion to look at groups of words rather than individual words should be a way (possibly the only way) to coin Scientific Vocabulary.

There are of course some areas where a rendering given by Kiingi does not seem to follow Kiswahili phonological rules. He suggests a consonant cluster (-zm-) plasmdezma, hidrotropizmu which is not productive in Kiswahili. It is found in the word "azmamu" (pl. of "zimamu" = "hatamu"). In all probability it could be

adopted but since it is a rare consonant cluster we should face the fact that in regular speech it will be pronounced, either /sima/ or /zima/.

However intriguing it is to study both Temu's and Kiingi's ideas we would like to look at some of the terminology proposed in the Biology dictionary. Since this paper is not meant to be a tome, we are limiting ourselves to a look at the following affixes:

- a) -phyte; -phyta
- b) endo-; ecto-; epi-; meso-; peri-
- c) iso-

The suffix -phyte has the following derivation and meaning:

fr. Greek phyton (fiton) meaning 'plant'

- 1. plant having a (specified) characteristic or habitat e.g. xerophyte, microphyte
- 2. pathological growth e.g. osteophyte

Some proposed terms in the biology dictionary are:

- d) mesophyte mesofite
- e) hydrophyte hadrofite
- f) xerophytes zerofite
- g) gametophyte gametofita
- h) tracheophyte trafiofita
- i) sporophyte genera ngazi za sporofiti
- j) sporophyte sporofita

The suffix -phyta comes from Greek phyta (fita) = pl. of phyton and has the meaning: plants - in the names of taxa e.g. bryophyta, cormophyta

Kiswahili suggestions are:

- k) pteridophyta peteridofita

l) thallophyta thalofita

m) zanthophyta zantofita

Given that the above terms are all names of plants having specified characteristics, it would seem logical to begin by designating the Kiswahili equivalent for phyte and building terms from that point. The actual suffix is variously designated as -fite; -fita and -fiti.

In k-m, only the suffix -fita has been used as equivalent to -phyta.

I would suggest that -fita be reserved for the names of taxa and that the Greek -phyton be rendered as -fito in Kiswahili. Thus our groups would be distinct and in a Biological dictionary we would have an entry for:

-phyte = fito (fr. Gr. phyton) majina ya mimea iliyo na tabia ya pekee k.m. trakiofito, mesofito n.k.

-phyta = fita (fr. Gr. phyta) ngeli ya mimea k.m. thalofita n.k.

A greater inconsistency occurs when we look at the prefix epi-. In the seminar held at Morogoro we find:

Eng. epi = Kisw. epi- (a juu ya)

This is a prefix and therefore does not stand alone. However, when the English form epi- is combined with other words, the Kiswahili renderings are all different and only epiglottis and epicarp take the prefix epi- in Kiswahili (epiglotisi, epikapi).

English

Swahili

epi-

epi- (a juu ya)

epicotyl

kikotile juu

epidermis

tabaka nje

epiglottis

epiglotisi

epicarp

epikapi

The form epi- is one of a series related to each other and forming a definite semantic pattern. These others are 'endo-; ecto-; meso-; and peri-

epi- (Gr. epi- on, upon, to) prefix meaning upon, beside, among, on the outside, above, over, anterior

ecto- (Gr. ektos = outside) a combining form denoting without, outside, external

endo- (Gr. endon) combining form meaning within

meso- (Gr. mesos = middle) a combining form meaning in the middle, an intermediate connective part

peri- (Gr. peri) a prefix meaning around, enclosing surrounding a part

Not every form occurs in every combination. But the following table will give an idea of some of the relationships. The top is the prefix and on the left are a few forms which combine with these. Forms marked with an asterisk are words used in science but not found in the list for the Biology Dictionary.

	<u>endo-</u>	<u>ecto-</u>	<u>epi-</u>	<u>meso-</u>	<u>peri-</u>
-cardium	*endo-cardium		*epi-cardium	*meso-cardium	utanda-moyo
-carp	*endocarp	*ectocarpus	epikapi	*meso-carp	perikapi
-cotyl	-	-	kikotile juu	*meso-cotyl	-
-derm(is)	tabaka ndani endodemu	uwamkiini	tabaka nje	maji ya chembe misuli	utanda koki
-parasite	*endo-parasite	kimelea nje kila mwezi nje	*epi-parasite	-	-
-plasma	uteseli-wavu	uteseli nje	*epi-plasm	-	*periplasm
-sperm	kilisha tete	-	*epi-sperm	*meso-sperm	*perisperm
-sternum	-	-	*epi-sternum	kijidari kati	-
-thorax	*endo-thoracic	-	-	kijidari kati	*peri-thoracic

It seems inconsistent to list epi- in the biological dictionary as a combinatory form without looking at and giving a rendering for the other related forms. In following through on the etymology of forms beginning with the above-named prefixes we find a very consistent pattern emerging. The prefixes peri- epi- meso- ecto- endo- combined with other forms result in a very definite pattern of coinage. Would it not be more consistent to use Kiingi's suggestion and use the original forms since, with little modification they fit into the Kiswahili pattern:

<u>peri-</u>	<u>peri-</u>	(inayozunguka)
<u>epi-</u>	<u>epi-</u>	(-a juu ya)
<u>meso-</u>	<u>meso-</u>	(katikati ya)
<u>ecto-</u>	<u>ekto-</u>	(nje ya)
<u>endo-</u>	<u>endo-</u>	(ndani ya)

Looking through the proposed terms for the Biology Dictionary we find instances of each of these prefixes being used. However, since the system does not hold true across the board it means that the semantic value of a word-field becomes watered down. e.g. we have the words:

1)	<u>epicarp</u>	epikapi
	<u>pericarp</u>	perikapi
	<u>mesocarp</u>	no rendering
	<u>endocarp</u>	no rendering
2)	<u>epiderm</u>	tabaka nje
	<u>periderm</u>	utandakoki
	<u>mesoderm</u>	maji ya chembe nguvu (chembe misuli)
	<u>endoderm</u>	tabaka ndani (endodemu)
	<u>ectoderm</u>	uwamba kiini

In 1) the two terms which have been translated share both first and second segments. Given the definitions for epi- peri- and -carp we can with two more Kiswahili forms endo- and meso- have a complete set:

epikapi
perikapi
endokapi
mesokapi

2) is a more difficult group. There is similarity only in two:

<u>epiderm</u>	tabaka nje
<u>endoderm</u>	tabaka ndani

The other three forms do not share similarity of form though they have some similarity of meaning:

mesoderm: (mesos 'middle' derma 'skin')

"the mesoblast or embryonic layer lying between ectoderm and endoderm"

ectoderm: (ektos 'outside' derma 'skin')

"The outer layer of a multicellular animal; the epidermis in higher mammals."

periderm: (peri 'around' derma 'skin')

"outer layer of bark; (foetal epidermis) opitrichium of mammals."

We have two choices only, I think. Either we use Kiswahili for each term but the elements must be consistent, or we use the Graeco-Latin forms. In either case there should be as much consistency as possible. Suggestions could be:

<u>English</u>	<u>Kiswahili</u>	<u>International</u>
<u>epidermis</u>	<u>tabaka nje</u>	<u>epidemu</u>
<u>endodermis</u>	<u>tabaka ndani</u>	<u>endodemu</u>
<u>ectoderm</u>	<u>tabaka nje</u>	<u>ektodemu</u>
<u>mesoderm</u>	<u>tabaka kati</u>	<u>mesodemu</u>
<u>periderm</u>	<u>tabaka zunguko</u>	<u>peridemu</u>

Apart from the prefixes cited above, we also have to take into consideration the second elements which, in many cases, are also combinatory forms. e.g. the form cardia/io (fr. Gk. kardia 'heart') has a series of forms with related meanings:

- a) cardiac
- b) cardialgia
- c) cardiogram

- d) cardianesthesia
- e) cardiograph
- f) cardiology
- g) carditis
- h) Cardiologist

We do have the suffixes 'gram' and 'graph' translated as 'gramu' and 'grafu'. However, for cardia and its wordfield we use 'moyo'. Therefore if we use 'moyo' then the above words would be:

- a) -a moyo
- b) maumivu ya moyo
- c) picha ya moyo
- d) usingizi wa moyo
- e) kipimamoyo
- f) elimumoyo
- g) ugonjwa wa moyo (uvimbe wa misuli ya moyo)
- h) mganga wa moyo

Two other very productive forms are plasma- plasmo- and sperma- spermato-

Kiingi suggests plasma- but does not have sperma- in his tentative list. As I have pointed out elsewhere the cluster /sm/ /zm/ is not productive. The form sperm- in the biological dictionary has only four instances as first member:

<u>spermatheca</u>	=	<u>kibweta shahawa</u>
<u>spermatid</u>	=	<u>seli shahawa tete</u>
<u>spermatozoa</u>	=	<u>seli shahawa</u>
<u>spermatozoids</u>	=	<u>mbeguume/elezi</u>

as second member we find:

<u>endosperm</u>	=	<u>kilisha tete</u>
------------------	---	---------------------

yet in a biological dictionary should we not also include:

<u>spermagglutination</u>	<u>spermatocyte</u>
<u>spermari</u>	<u>episperm</u>

spermatic

mesosperm

spermatogenic

perisperm

spermatoid

etc.

Another case which can be looked at is the prefix iso-. In the Biology dictionary we find the following words:

a) isogamy

aisogami

b) isogenic

aisojeniki

c) isogametes

gemetisawa

d) isopoda

isopoda

e) isotonic

nguvu ya toniki/isotoniki

f) isotope

isotopi

The first inconsistency is to use both (aiso-) and (iso-). If we choose to use International forms then we should choose one and in this instance iso- would be the nearer to the Greco-Latin roots.

But what do we do with a form like isogametes. It has been rendered as gemetisawa. If iso- is equivalent to 'sawa' then why not have

gametisawa

podasawa (or miguusawa) (miguu = legs/feet)

tonikisawa

topisawa

gamisawa

jenikisawa

There are myriads of instances which could be cited to prove that inconsistency though not always unavoidable seems to be very glaring in the renderings of Scientific Terminology in Kiswahili. This paper has tried to show up some of these inconsistencies.

Objection may be raised about terms which may be in the popular lexicon. This is a problem which arises in many areas but it need not cause great trouble. First of all, popular language has names for many things which are known by another more technical name.

e.g. If I as a lay person go to a doctor and after tests he tells me "Madam you have bilharzia" I know what that is, some type of bug (in popular parlance) which causes me discomfort. If, he says "Madam, you have schistosomaiasis" - I'd probably have a heart attack right there.

Therefore, it does not seem as if this is a grave problem. In a general dictionary we can use both forms. In specialized dictionaries, formal papers etc. we use the technical term. Both can exist side by side.

CONCLUSION

Since to criticize is much simpler than to construct I would like to suggest a plan of work which could be done as a step for a foundation to be used by Scientists in East Africa.

1. Scientists in each field get together (with Kiswahili experts and linguists if necessary) and draft a list of affixes used in their professional lexicon,

e.g. -itis (as a sign of inflammation in
 medicine)
 -phyte)
)
 -phyta)
) (affixes used in biology and botany)
 hypo-)
)
 hyper-)

process these and agree on forms to be used in Kiswahili.

2. These affixes then be passed by BAKITA (The National Kiswahili Council)

3. Published in the form of a small booklet and disseminated to all professionals.

In this way it would be a help and easy reference for people to generate the needed lexicon for different fields of activity.

4. The fourth and last step would be the dissemination on international level through ISO so that other scientists would benefit from work being done here in Tanzania even if written in Kiswahili. Not knowing a language is a drawback but in technical works it need not be insurmountable, given that the topic (i.e. terms used) are readily understandable.

FOOTNOTES

1. Felber in UNISIST 1972
2. Akida 1978
3. ISO/TC 37/WG
4. op. cit.
5. Temu 1981
6. Temu 1978
7. Kiingi 1981
8. op. cit.

REFERENCES

ABBR. TUKI: Taasisi ya Uchunguzi wa Kiswahili.

Akida, H. "Ukuzaji na Uendelezaji wa Msamiati wa Kiswahili"
Semina ya Kimataifa ya Waandishi wa Kiswahili TUKI
1978.

Ayers, Donald M Bioscientific Terminology Univ. of Arizona
Press, Tucson 1972.

Bailly, M.A. Dictionnaire Grec-Francais, Librairie Hachette,
1894.

Dorland's Illustrated Medical Dictionary 25th ed.W.B.
Saunders, Philadelphia, 1974.

Gibbe, A.G. "Maendeleo ya Istilahi ya Kiswahili" Makala za
Semina ya Kimataifa ya Waandishi wa Kiswahili I.
Lugha ya Kiswahili. TUKI, 1983.

----- "Fonestemia katika Nomino za Kiswahili" Kozi ya
Sarufi kwa Wanasemina TUKI 1978.

Goodwin, W.W. and C.B. Gulick (rev.) Greek Grammar Ginn
and Company, N.Y. 1930.

ISO/R 919-1969 "Guide for the Preparation of Classified
Vocabularies."

ISO Rec. R. 704 1978 "Naming Principles."

INISIST 1972 "Terminological Compatibility; a Basic
UNISIST Requirement" by H. Felber.

ISO/R 1087-1969 "Vocabulary of Terminology."

--- 1149-1969 "Layout of Multilingual Classified
Vocabularies"

ISO/TG 37/WG 1 No. 4E "Principles for Preparation and
Standardization of Scientific and Technical
Terminology."

ISO/TC 37 (UNESCO-4) 223 Rev. 1974-06 "Guidelines for the
Adoption of new Scientific and Technical Terms."

Kenneth, J.H. M.A. Ph.D. ed. A Dictionary of Biological
Terms Oliver and Boyd, Edinburgh 1963.

Kepke, J. "Technical Terminology" Studies in Linguistics
Vol. 4 no. 3-4 1946.

Khamisi A.M. "Filosofia ya Kukuza Lugha" Makala za Semina
ya Kimataifa ya Waandishi wa Kiswahili I. Lugha ya
Kiswahili TUKI, 1983.

Kiingi K.B. "The Lexical Extension of Kiswahili as
Conceived by the Institute of Kiswahili Research"
- a Response to Temu 1981."

---- "Swahilization of International Scientific Vocabulary" n.d.

Magoti, A. "Nafasi ya Tafsiri katika Ukuzaji wa Kiswahili na Athari zake" Semina ya Kimataifa ya Waandishi wa Kiswahili, TUKI UDSM 1978.

Mdee, J.S. "Matatizo ya Kuunda Istilahi/Maneno Mapya Kama Yalivyojitokeza katika Kiswahili." Semina ya ndani ya TUKI 1982.

Temu, C.W. "Swahili Phonetical Word Building Resources" Swahili Vol. 44/1 March 1974.

"Njia mpya ya Kubuni Kistilahi ya Kutunza Msamiati wa Kiswahili" Semina ya Kimataifa ya Waandishi wa Kiswahili TUKI UDSM 1978.

"Mchango wa Lahaja za Kiswahili na Lugha Zinazohusika katika Kuendeleza Kiswahili Sanifu (Kichocheo cha Mjadala)" Semina ya TUKI Mei 1980.

"Uundaji wa Maneno Mapya ya Kiswahili; Kichocheo cha Mjadala" Kenya Kiswahili Association, Nairobi 1981.

Thomas, Clayton L., M.D., M.P.H. ed. Taber's Cyclopedic Medical Dictionary F.A. Davis Co. Philadelphia 1977.

Wolman, Benjamini B. ed. Dictionary of Behavioral Science MacMillan, N.Y. 1973.