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E. DAMMANN – E. HAMMERSCHMIDT – E. KÄHLER-MEYER

J. LUKAS† — J. ZWERNEMANN

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The Use of Somali in Mathematics and Science*

by B. W. Andrzejewski

In 1972 Somalia embarked on a bold experiment by deciding to make Somali the official language of the country and to introduce it gradually as the medium of instruction in the whole educational system. Till that year Somali did not have an official orthography, and foreign languages — Italian, English and Arabic — were used in all aspects of public life. Even in elementary and adult education the medium of instruction was one of these three languages, according to the region of the country and the availability of teachers¹.

There were several factors which favoured the success of the experiment. Firstly, with the exception of a few very small minorities, all the inhabitants of Somalia speak the same language. Even the dialect differentiation is not a serious obstacle, since one dialect type, Common or Standard Somali, has been used, probably for several centuries, all over the Somali-speaking territories as a means of wider communication². Secondly, even before the official orthography was introduced, Somali underwent in its oral form a far-reaching modernization of its vocabulary through broadcasting. In order to translate items of world news which came to them from foreign radio stations or news agencies, Somali broadcasters had to add many new items to the existing vocabulary of the language. Mainly by coining words rather than by borrowing them, they adapted the language to modern needs to such an extent that when newspapers and periodicals in Somali began to be published in 1972 the whole language of modern journalism was already available to the public, who knew it already through the radio³. Thirdly, some experimentation with the writing of Somali in different systems of transcription and the collecting of oral texts had been conducted between 1950 and 1972 by a number of Somali scholars and educationalists, and this certainly provided a fund of experience which could be applied when written Somali was officially introduced⁴.

The decision to make Somali the official language of the country was implemented with speed and vigour. In this connection it must be observed that this was done through highly centralized planning, and that in Somalia education at all levels, publishing and printing are entirely controlled and administered by the state. Within the first year Somali had been introduced as the language of government publi-

cations, correspondence and records and as the medium of instruction in elementary schools and adult education, and gradually the reform has come to cover almost the whole system of pre-university education in all subjects⁵.

In the educational field the greatest difficulty lay in the absence of mathematical and scientific terms. Although Somali had a very large vocabulary, this was related to the needs of a mainly pastoral and agricultural community in their daily life, social systems, traditional sciences, skills and technologies, and in their highly cultivated oral poetry. Between 1940 and 1972 this vocabulary had been supplemented with terms relating to the modern world through broadcasting, as mentioned earlier, but even this kind of modernization, valuable as it was, was not sufficient to deal with the needs of the educational system. Somali language planners, in order to succeed in their ambitious aims, had to meet the challenge of creating a whole new vocabulary for mathematics and the natural sciences, where a vast number of specialized terms is used and where semantic precision is of the utmost importance.

Within a period of seven years the Somali vocabulary has had to pass through a process of expansion which in some European languages took more than two centuries. This expansion was initiated by the Somali Language Commission in 1972-73 but was carried out by the authors of schoolbooks and teachers' manuals, who were financed and guided by the Curriculum Department of the Ministry of Education. In each subject there were working groups who developed the requisite vocabulary and discussed the method of presentation. The typescripts of the books were scrutinized by the Curriculum Department and after they had been printed by the National Printing Agency and issued to schools, inspectors gathered comments from individual teachers on their weak and strong points.

At this point it should be noted that Somalia has had for many years a cadre of highly competent mathematics and science teachers, trained either in Somalia or abroad, and that there is very close co-operation between the Curriculum Department and the College of Education (formerly the National Training Centre) at the National University.

It may be of interest not only to scholars but also to language planners concerned with practical issues in developing countries to consider in detail how the Somali educationalists set about their task of creating the new terms.

First of all, one can observe a very strong tendency to rely on the existing resources of the language, in marked preference to borrowing from foreign languages. This is very much in keeping with the tradition established by Somali broadcasters, who always prefer to coin new words or to adapt semantically the existing ones, rather than to borrow from foreign languages. There may also be a link between this practice and the general emphasis on national self-reliance characteristic of the current ideology in Somalia. The tradition established by broadcasters, it should be added, has its roots in the well-established practice of Somali poets of creating new words in order to overcome the highly demanding constraints of alliteration and scansion⁶.

In exploiting the resources of their own language for vocabulary expansion Somalis use mainly two methods: composition and semantic shift. The term composition requires some elucidation; as understood here, it consists of forming new combinations of lexical and morphological components of the language. Such combinations, though previously unknown in the language, conform to the existing patterns of derivation, and their meanings are in some way suggested by the meaning of their components. An example of this method of word-coining is the newly created term *dhexfur* 'bisector (of an angle)'. It combines the roots *dhex* and *fur*, which occur in such words as *dhex* 'the middle (of something)' and *furid* 'opening', and the order of the two roots and the absence of any affix suggest the meaning of 'something that opens the middle (of something else)', on an analogy with similarly formed compounds such as *biyaxir* 'dam', the components of which can be related to the words *biyo* 'water' and *xirid* 'shutting'.

Another example of composition is the new word *weyneeye* 'magnifying glass', whose components can be related to those of the verbs *weyn* 'being large' and *weyneyn* 'causing to be large', and to *-e*, which has the meaning of 'the performer of an action' as in such words as *gore* 'writer' (cf. *gorid* 'writing').

New terms which consist of previously unknown phrases or words are also regarded here as a form of composition, e.g. *cadaadiska ha-wada* 'atmospheric pressure' ('the pressing of the air').

The other main method for vocabulary expansion in Somali, semantic shift, is also very productive. It consists of assigning new, specialized meanings to existing ordinary words, and thus for example in mathematics the word *bar* now means 'point', while in ordinary language it means 'spot' or 'speckle'. Similarly, *tamar* as a scientific term means 'energy' (in the strict sense given to it in physics), while in

ordinary language it means 'energy', 'strength' or 'the ability to do what one sets out to do'.

This reliance on the resources of the Somali language in creating a new mathematical and scientific vocabulary is not, however, carried to the extremes of linguistic chauvinism. Quite a large number of terms have been borrowed, and English is the main source of such loans. While they are relatively rare in the vocabulary which serves the lower levels of mathematical and scientific education, their number increases at its higher levels, especially in chemistry, where for example almost all the names of elements and compounds are borrowed from scientific English. These loanwords are always adapted to Somali phonology and then written according to the rules of the official orthography, so that words like *koosayn*, *garaam* and *salfiyuurik asiidh* conceal under these shapes their etymons 'cosine,' 'gramme' and 'sulphuric acid'. The names of scientists and mathematicians also appear in disguise: Pythagoras, Newton and de Morgan become *Baytaagoros*, *Niywutan* and *Dimoorgan*. However, international symbols and formulae are exempted from this process of naturalization.

The tendency to rely on the existing resources of the language can also be seen in the methods of presentation of the materials provided in textbooks. Translation into one of the foreign languages still widely used in Somalia hardly ever finds its way into the texts, and all the explaining of new terms is done by demonstration, definition or description. Somali authors on mathematics show a strong penchant for graphic representation of mathematical operations, particularly in algebra, and of course in geometry, which by its nature lends itself to this method of explanation. Books on science are generously illustrated both by diagrams and by pictures of equipment and of experiments in progress. Definitions are clear and succinct, and again accompanied by illustrations, while in the descriptive materials a great effort is made to draw all examples from situations which would be familiar to the learner, and to take them as much as possible from both life in towns and life in the rural interior of the country. Here again, however, national self-centredness is tempered by the recognition of the international character of mathematical thought and scientific enquiry, and the textbooks make brief excursions into the history of progress in this field. An outsider reading them may find details which are rarely given in schoolbooks in Europe or America, such as the name and nationality of the inventor of the concept of irrational number, or the indebtedness of modern chemistry to the work of medieval alchemists.

The process of creating a mathematical and scientific vocabulary in Somalia is a conscious one, the result of careful planning backed and implemented by the government, who assign to it a high priority in their overall policy, and divert to it a considerable proportion of the very limited resources which are at the disposal of the Ministry of Education.

The use of Somali on such a scale does not mean that the teaching of foreign languages is neglected. Although they are not the medium of instruction in education, they are taught as subjects and intensive teaching is provided as part of the preparation for students about to enter the National University, where all the subjects except for Somali and Arabic are taught in either Italian or English. However, even at university level some degree of Somalization is taking place; new terms in the field of mathematics and science, as well as other subjects, are invented and discussed, and last year a translation of the first year mathematics university course was made, though it has not appeared in published form. University dissertations for final B.A. and B.Sc. examinations, written in Italian or English, are now sometimes accompanied by a Somali version, and this practice is encouraged as part of the envisaged introduction of Somali as the language of instruction and the relegation of foreign languages of wider communication to an auxiliary role in university education; they would obviously remain an essential tool of advanced research and international contacts. If such ambitious plans were to be fulfilled Somali would become comparable in its educational functions to the languages of the smaller countries of Europe such as Norway or Hungary.

An outside observer might well ask himself why Somalia should make such a concentrated effort in this field, while she has many other pressing problems to deal with in her path towards economic and social development. Unfortunately no authoritative answer to this question can be given since there do not appear to be any official published sources which set out the government policy in this respect. It seems that Somalis are too busy doing things to indulge in writing about language planning⁷.

In an attempt to give a tentative answer, I shall try to piece together what I have heard from Somali scholars, educators, students, schoolchildren and parents in informal conversations on the subject in which I participated during my visits to Somalia in 1973, 1975, 1977 and 1978. I must make it clear, however, that I have made no systematic enquiry, since my researches there were mainly concentrated on linguistic and literary themes.

The reasoning which I came across with particular frequency was that as Somali was introduced as the official language of the state it should be made capable of serving all the needs of modern life, including secondary and university education. As economic development features prominently in the political programme of the Somali government it follows that mathematical and scientific education must be made accessible to as many citizens as possible, including those who do not know foreign languages and who form the vast majority of the population. Some knowledge of mathematics and science, it is claimed, is needed for training technicians even at the lower and middle ranges of skills, and it is very costly to have to teach them a foreign language first, before they can attend their training courses. The ideal is to have manual workers who can read technical drawings and instructions, farmers who know something about biology and chemistry, nurses who know some anatomy and physiology, and literate pastoralists who have some knowledge of zoology and basic veterinary science in addition to their traditional skills.

There is also the aim, particularly favoured by Somali educationists, of relating modern knowledge to the home background of the pupils. Some maintain that children and young people absorb knowledge more quickly and thoroughly from the conceptual point of view if it is presented in their mother tongue, and in addition they assert that it enhances their emotional harmony. The world of modern science is then not totally separated from their home environment and earliest experiences of life. Somali children taught mathematics and science in their mother tongue can talk about them at home and may show their books and exercises to their families, some of whom can now understand these subjects to some extent as a result of widespread courses in adult literacy, numeracy and general knowledge.

All this is in keeping with the current social and political ideology in Somalia, among the aims of which is to create social harmony and to remove the divisive effects of having an élite educated in a foreign language. Cautionary examples are invoked of certain other developing countries where such élites look down on those citizens who have not had that privilege, and are almost as remote from them as the colonial officials of the past.

A less common, but passionately argued view is that it is necessary for a national and Pan-African sense of self-reliance and self-confidence vis-à-vis industrialized countries, to counteract what is sometimes termed the colonialism of the mind, by which is understood the incul-

cation by the colonial and neo-colonial systems of education, based on foreign languages and cultures, of the myth that African languages are inherently inadequate and inferior as vehicles of thought to languages of the ex-colonial powers⁸. Those who support this view claim that this myth, for which there are no scientific grounds, is perpetuated even among Africans themselves, because their languages have not been adapted to the needs of modern times by developing in them the appropriate new vocabulary and by using them in the relevant fields of education, science and technology.

Although the current educational policy has been in force in Somalia since 1972, it is difficult to assess with accuracy its impact on the social and economic life of the country. My general impression is that gradually the goals are being achieved and the long-range prospects are favourable, provided the policy continues unchanged by any outside pressures and is unhampered by adverse circumstances.

It remains to be seen whether the Somali experiment will exercise any influence on language planning in other developing countries in Africa, most of which, unlike Somalia, have immense educational problems resulting from linguistic fragmentation within their territories. The Somali experiment will certainly be of general theoretical interest to scholars in the field of linguistics⁹, sociology and political science, since it suggests that under favourable conditions and with the requisite allocation of resources and personnel, it is possible to modernize any language within a much shorter time than has ever been envisaged.

Examples¹⁰ are given below which illustrate the Somali method; they are taken from the three fields of

mathematics, physics and chemistry, indicated by the letters M, P and C respectively,

and are grouped according to the three methods of vocabulary expansion, that is composition, semantic shift and borrowing.

Composition

New terms formed by this method are explained here by reference to the roots and affixes which existed in the language prior to their appearance, and these related items are given with each example, from which they are separated by a colon. Among them two types of affixes are distinguished, the nominalizing one ('nom.aff.')

and the verbal one ('vbl.aff.'). These affixes are used in the language in the process of derivation. It should be noted that the absence of an affix sometimes

has a comparable function, and for this reason is referred to as affix zero, represented by $-\emptyset$.

When a related item is an ordinary (i.e. 'weak') verb¹¹ the citation, or lexical entry, form in which it is given is a gerund, in accordance with the current lexicographical practice in Somalia¹². It is translated in English by gerund forms ending in -ing, e.g. *barid* 'teaching'. The choice of citation forms for hybrid verbs (i.e. combinations of qualifiers with forms of the strong verb *yahay* 'to be') again follows the current practice in Somalia, and they are given in their invariable dependent present tense forms, which are translated here by corresponding qualifiers in English.

barbarroole parallelogram (M): *barbarro* sides which are aligned in parallel; *-le*, nom.aff. (masc.) denoting the possessor of something

habdhis system (M): *hab* method, way; *dhisid* building; $-\emptyset$, nom.aff. denoting a device or a type of activity

doorsoome variable (M): *doorsoomid* becoming transformed; *-e*, nom.aff. (masc.) denoting someone [or something] who performs the action or is in the state denoted by the related verb or hybrid verb

maangad irrational, as in the expression *tiro maangad ah* irrational number (M): *maan* mind; *gadid* selling, causing to get lost; $-\emptyset$, nom.aff. as in *habdhis* above

muujiye index (M): *muujin* showing, indicating; *-e*, nom.aff. as in *doorsoome* above

saamiqal proportion (M): *saami* share [especially of war booty]; *gelid* entering; $-\emptyset$, nom.aff. as in *habdhis* above

saddexagal triangle (M): *saddex* three; *xagal* bend, angle

seegmaweydo a set of simultaneous linear equations the graphs of which intersect (lit. something that fails to miss, i.e. that never misses) (M): *seegid* missing [the target]; *-ma-*, nom.aff. denoting action or state; *waayid* failing to find, failing; *-do*, nom.aff. (fem.) with the same function as *-e* in *doorsoome* above but different in gender

urur maran empty set (M): *urur* group, collection; *maran* empty

xididsane radicand (M): *xidid* root [of a plant]; *-san-*, vbl.aff. denoting the continuity of the action or state denoted by the related noun or verb; *-e*, nom.aff. as in *doorsoome* above

xarriiqda tirada number line (M): *xarriiq* line; *-da*, def.art.; *tiro* number; *-da*, def.art.

adke solid (P): *adag* hard, firm; *-e*, nom.aff. as in *doorsoome* above

- dhuljiidad* terrestrial gravity (P): *dhul* land, earth; *jiidasho* pulling towards oneself; -*ad*, nom.aff. denoting action
- heerkulbeeg* thermometer (P): *heer* level, degree; *kul* heat; *beegid* measuring the capacity of something; - \emptyset , nom.aff. as in *habdhis* above
- uumiyoobid* gasification (P): *uumi* vapour, steam; -*oob*-, vbl.aff. with the meaning of 'changing into'; -*id*, nom.aff. denoting action or state
- xoog xuddun ka jeed* centrifugal force (P): *xoog* force, strength; *xuddun* navel, centre; *ka* away from; *jeedid* facing, being directed to; - \emptyset , nom.aff. as in *habdhis* above
- barwaaqeeye* fertilizer (C): *barwaaqo*, prosperity brought about by rain, prosperity; *barwaaqeyn* [rare] bringing about prosperity; -*e*, nom.aff. as in *doorsoomo* above
- curiye* element (C): *curin* giving birth for the first time; *curad* first-born child; -*e*, nom.aff. as in *doorsoomo* above
- gubashada is bilowda* spontaneous combustion (C): *gubasho* being burnt; -*da*, def.art.; *is* self; *bilowda* which begins
- falgal* reaction (C): *falid* acting, doing; *gelid* entering; - \emptyset , nom.aff. as in *habdhis* above
- iskudhis* compound (C): *isku* together; *dhisid* building, constructing; - \emptyset , nom.aff. as in *habdhis* above
- iskujir* mixture (C): *isku* together; *jirid*, being, existing; - \emptyset , nom.aff. as in *habdhis* above
- mile* solvent (C): *milid* dissolving; -*e*, nom.aff. as in *doorsoomo* above
- milme* solute (C): *milmid* being dissolved; -*e*, nom.aff. as in *doorsoomo* above.

Semantic shift

The new terms formed by this method are explained here by reference to the meanings which they have in the ordinary language and which are given with each example, separated by a colon:

- dheelli* inequality (M): lack of balance in a burden loaded on an animal
- dhidib* axis (M): stick or pole fixed in the ground as a prop
- eber* zero (M): nothing; the state of being empty or finished
- fansaar* function (M): putting a second rider behind the first one on a riding beast; the implication is that the second rider's movements are totally dependent on those of the first
- hormo* subset (M): small group of camels taken out of the herd and

- prepared to be driven to the watering-trough [camels are watered in this way to prevent jostling]
- koor* trapezoid (M): camel bell [Somali camel bells are reminiscent of trapezoids in shape]
- saabley* quadratic, as in the expression *leeg saabley ah* quadratic equation (M): *saabley* something that has a *saab* [a basket frame used for carrying water vessels; there is a similarity between the shape of such a basket and the parabolic shape of the graph produced by a quadratic equation]; *-ley*, nom.aff. (fem.) with the same function as *-le* in *barbarroole* above but different in gender
- rug* place value (M): homestead, site of a settlement
- shakaal* hypotenuse (M): hobbling rope tied between one of the front legs and one of the back legs of a horse
- sunsun* progression (M): forward movement of a group of people or animals
- unug* origin (M): starting-point in making something, such as when weaving a mat or building a house
- waax* quadrant (M): quarter [a meat division term]
- culays* weight (P): being heavy; a heavy object
- cuf* mass (P): stuffing, bulky substance which fills enclosed space
- fidid* expansion (P): spreading
- hawl* work (P): work, labour
- hoor* liquid (P): abundant water from rain or flooding.
- karaar* acceleration (P): bolting [horsemanship term]
- kaynaan* velocity (P): travel in a particular direction; migration
- leeb* vector (P): arrow
- neef* gas (P): breath
- xawaare* speed (P): top speed of a horse
- baruur* fat (C): fat meat, animal fat
- bir* metal (C): iron, any metal other than silver or gold
- cusbo* salt (C): common salt, salt found at salt licks for animals
- dhuun hubsasho* test-tube (C): *dhuun* pipe, reed, trachea, oesophagus; *hubsasho* making certain
- kalabax* decomposition (C): parting, separating [said of milk]
- naanays* formula (C): nickname
- saxar* particle (C): speck, particle of dust
- socod* motion (P): walking, movement
- summad* symbol (such as Au, H etc.) (C): mark, owner's mark branded on the skin of a domestic animal
- weji* state (of matter) (C): face, appearance.

Borrowing

In the field of mathematics, physics and chemistry almost all loanwords have come into Somali from English, although, of course, the ultimate origin of many of them was Latin or some other language. The Latin names of elements have come into Somali in their phonetically anglicized forms. Unless otherwise stated all the examples given below come from English.

Readers unfamiliar with Somali but who would like to gauge the degree of phonetic adaptation of loanwords will find it useful to know that the pronunciation values of Somali vowel letters roughly approximate to those of Italian and that the doubling of these letters represents length. The letter *x* represents a voiceless pharyngeal fricative consonant which would normally be perceived by an English speaker as a kind of *h*.

| | |
|--------------------------------------------|------------------------------------------------------------------------------------------------------------------|
| <i>absiisa</i> abscissa (M) | <i>feeram</i> ferrum [i.e. iron, viewed as a pure element] (C) |
| <i>algebra</i> algebra (M) | <i>haydarojiin</i> hydrogen (C) |
| <i>digirii</i> degree (M) | <i>kaarboon</i> carbon (C) |
| <i>garaaf</i> graph (M) | <i>molikiyuul</i> molecule (C) |
| <i>logardam</i> logarithm (M) | <i>naytarojiin laba-oksaydh</i> nitrogen dioxide [note that <i>laba-</i> means 'two'] (C) |
| <i>taanjenti</i> tangent (M) | <i>ooram</i> aurum [i.e. gold] (C) |
| <i>atmosfeer</i> atmosphere (P) | <i>xadiid</i> iron [viewed as a substance, not necessarily as a pure element] (Arabic: <i>ḥadīd</i>) (C and P). |
| <i>atom</i> atom (P) | |
| <i>juul</i> joule [unit of energy] (P) | |
| <i>niyuutan</i> newton [unit of force] (P) | |
| <i>balaambam</i> plumbum [i.e. lead] (C) | |

Notes

* This paper was originally presented at the symposium "Somalia and the World" (Mogadishu 15–21 October 1979).

1. The situation in Somalia before the introduction of a national orthography is described in Hussein M. Adam 1968 and Laitin 1977.

2. A brief outline of the main dialect divisions is provided in Andrzejewski 1971.

3. This is discussed in Andrzejewski 1971 and 1978c.

4. An account of this work is given in Johnson 1973 and Somalia 1974c.

5. The characteristics of this orthography are described in Andrzejewski 1974 and 1978b. Detailed information about the introduction of Somali as the official language and the changes which occurred as a result can be found in Andrzejewski 1975, 1977a, 1977b, 1978a and 1978b, Omar Osman Mohamed 1975 and 1976, Saeed [1980] and Somalia 1974a, 1974b and 1974c.

6. Information on this subject can be found, in English, in Johnson [1980] and in Somali, in a series of articles by Cabdullaahi Diiriye Guuleed (Xiddigta Oktoobar, 1978: 6/126, 149, 150, 164, 165, 172, 173, 191, 247, 248, 283, and 1979: 7/71, 72) and by Maxamed Xaashi Dhamac "Gaariye" (Xiddigta Oktoobar, 1976: 3/425 and 4/2, 8, 14, 20, 55, 61, 63, 73, 86, 90, 108).

7. Some guidance on the official policy, though not specifically directed to the teaching of mathematics and science, can be found in Somalia 1974a, 1974b and 1974c.

8. This point is forcefully presented in the introductory notes to Maxamed Nuur Caalim 1978, an article on the functions of 'one' and 'zero' in mathematical operations. The author is a professor of mathematics at the College of Education of the National University, and a poet whose favourite genre consists of miniature treatises in alliterative verse on mathematical problems.

9. Two scholars, John Caney and Mohamed Hassan, are engaged at the moment in research into the process of modernization of the Somali language, and they are preparing doctoral dissertations for the Universities of London and Tübingen respectively. Caney has also been working for some time on a dictionary of modern terms in Somali.

10. The examples given in this paper are selected from six textbooks which can be regarded as typical of what has been published. Like all schoolbooks in Somalia they were published by the Curriculum Department [Xafiiska Manaahijta] of the Ministry of Education [Wasaarada Waxbarashada iyo Barbaarinta], and their dates are either 1977 or 1978 (no dates are given on the title pages). The words *xisaab*, *fisigis* and *kimistari* mean respectively 'mathematics', 'physics' and 'chemistry'; *fasalka kowaad* means 'the first school year' and *fasalka labaad* 'the second school year'; and *dugsiga sare* means 'secondary school' (which covers the last four years of a twelve-year cycle of pre-university education). The books in question were:

(a) *Xisaab: Fasalka kowaad, dugsiga sare*. The original version was in English and was jointly written by Bashiir Faarax Kaahiye, Xasan

Daahir Obsiye, Cabdiraxmaan X. Cabdalla Saciid, Cali Iid Ibraahim, Xuseen Maxamad X. Cumar, Axmad Geedi Maxamuud, Muuse Cabdi Cilmi, Axmad Saciid Diiriye and Cawil Cali Cabdi; it was co-ordinated by Cabdikariim Cashuur and checked and edited by Maxamad Cilmi Bulaale. The original version was translated into Somali by a committee consisting of Cusmaan Aadan "Badawi", Xasan Daahir Obsiye, Maxamed Cabdulle Biriir, Xuseen Maxamed Xaaji Cumar "Xanaan", Maxamad Cali Muuse "Cali Dheere", Maxamad Saciid Samatar, Maxamed Cabdiraxmaan Yuusuf "Carrabey", Ibraahim Aw Aadan, Muuse Cabdi Cilmi and Cali Maxamed Xirsi "Cali Aar". It was edited by Maxamed Cabdulle Biriir, Xasan Daahir Obsiye and Xuseen Maxamed Xaaji Cumar "Xanaan". The illustrations are by Cabdiraxmaan Cali Maxamad, Maxamad Cabdalla Cali, Maxamad Xirsi Faarax, Axmad Maxamad Cali and Cabdullaahi Rayaale Wacays.

(b) *Xisaab: Fasalka labaad, dugsiga sare*. The original version was in English and was jointly written by Bashiir Faarax Kaahiye, Xasan Daahir Obsiye, Cabdiraxmaan X. Cabdalla Saciid, Cali Iid Ibraahim, Xuseen Maxamed X. Cumar, Axmed Saciid Diiriye and Cawil Cali Cabdi; it was co-ordinated by Cabdikariim Cashuur and edited and checked by Maxamed Cilmi Bulaale. The original version was translated into Somali by a committee consisting of Cusmaan Aadan "Badawi", Xasan Daahir Obsiye, Maxamed Cabdulle Biriir, Xuseen Maxamed Xaaji Cumar "Xanaan", Maxamed Cali Muuse, Maxamed Saciid Samatar, Maxamed Cabdiraxmaan Yuusuf, Ibraahim Aw Aadan, Muuse Cabdi Cilmi and Cali Maxamed Xirsi. The illustrations are by Cabdiraxmaan Cali Maxamed, Maxamed Cabdalla Cali, Maxamed Xirsi Faarax, Axmed Maxamed Cali and Cabdullaahi Riyaale Wacays.

(c) *Fisigis: Fasalka kowaad, dugsiga sare* was written by Aadan Ciise Cali and Muuse Faarax Cilmi, except for Chapter 4, which was written by Idriis Maxamuud Cabdillaahi who also made the illustrations.

(d) *Fisigis: Fasalka labaad, dugsiga sare* was written by a committee consisting of Aadan Ciise Cali, Idriis Maxamuud Cabdillaahi, Cabdillaahi Sh. Ibraahim, Axmed Yoonis Habbane, Maxamed Siciid Gees and Muuse Faarax Cilmi.

(e) *Kimistari: Fasalka kowaad, dugsiga sare* was written by Cabdi Ibraahim Yoonis, Xasan Maxamed Gees, Axmed Xuseen Oomane and Maxamed Dubbad Dayr, and edited by Cabdi Ibraahim Yoonis. The illustrations are by Xirsi and the typescript was prepared for the printers by Ismaaciil Maxamed Sheekh.

(f) *Kimistari: Fasalka labaad, dugsiya sare* was written by Maxamed Muxamad Cabdillaahi and Maxamed Sheekh Cabdillaahi, and revised and edited by Cabdi Ibraahim Yoonis. The illustrations are by Maxamed Xirsi.

11. The classification of Somali verbs and the terms applied to them are discussed in the three articles on verbs listed in the References (pp. 68–69) attached to B.W. Andrzejewski, 'Indicator particles in Somali', *Afroasiatic Linguistics*, 1975, 1, 6.

12. The method of citation is the one used in Cabdulqaadir F. Boootaan 1976 and Yaasiin C. Keenadiid 1976.

References

It should be noted that in Somalia, as in many other Muslim countries, surnames are not normally used. The given name is followed by the name of the person's father and then by that of his grandfather, and this order of names is essential for identifying anyone. In the following list, the names of authors from Somalia are given in this way and are not inverted as is done with European and American names.

Translations of Somali titles are given in square brackets to indicate that they do not appear on the title pages of the works.

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