
Ethiopic at the End of the 20th Century

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As globalization and modernization come to bear on Ethiopia, cultural and linguistic survival increasingly depends on the adaptation of technology to local needs. The pervasiveness of electronic communication technology is forcing societies world wide to face the challenge of cultural preservation with an immediacy never before seen. Societies that can integrate new technology with their traditions will carry their culture into the future. Ethiopia is not asleep to this and has made the first and most important step forward by digitizing Ethiopic. The framework needed to digitize language and culture is now falling into place, but will Ethiopia make it in time?

Genesis Electronica

As the twentieth century comes to a close for Ethiopia, another era, not wholly related to mankind's understanding of time, is already underway. More interesting than dates on a calendar are those less well defined periods where society shifts following the introduction of some new influence. Society may alter its course following changes in political leadership, religious campaign, economic factors, the introduction of a tool or technology, or some other basis for understanding within a society. When society assimilates the new influence and begins the shift in direction, culture follows and will not be the same afterwards. The outcome can be either beneficial or erosive upon the culture. A new influence is beneficial when it helps facilitate an existing aspect of culture such as production of literature, art, education, etc. If however the society must abandon some part of its culture that it values, then this adaptation is considered erosive.

Society is in a constant state of change with lots of little shifts occurring all the time, culture in continuously responding. Long periods of status quo and stability, where a person could be born, live a life, and die leaving behind the same culture he was born with, may be a thing of the past in the technology driven modern era. The influence of technology, much of it still looming, has never weighed heavier upon Ethiopia or any other country of the world. Society has begun its next major shift, and culture is about to respond for better or for worse. With foreign technology comes foreign culture, but what if, before the

technology was widely assimilated, it could be adapted to enhance rather than displace our culture? Traditions that might be tedious in these fast paced times, some already fading, could be revitalized if technology was adapted to make them easier. This would mean society would have to review the technology, review its culture, and consciously integrate the two.

For a little more than a decade, this has already been happening; Ethiopia has been coming to terms with its use of computers and electronic devices, their impact upon culture, and begun making decisions that will determine how its cultures should live on into the future. In this process culture has to be understood in discrete terms and a framework for the understanding must be defined and applied. Cultural resonance in electronic devices is most apparent where the device communicates with its user. For most every device this is in the form of text, groupings of letters that form words under a given language. Concepts of time, honorific acknowledgement, counting, non-numeric sequencing and physical quantization, are also apparent in devices but are themselves expressed in textual form. Aesthetic sensibilities, such as color and form preferences may also manifest in the device's physical attributes or in its graphical presentation. To capture this knowledge, a framework for recording and employing these cultural artifacts must be available, a directed process to collect the information need follow, and the results would have to be endorsed by some recognized cultural authority to help assure adoption of the work. The end of this work is then a "standard" that the computer industry would follow to support cultural conventions uniformly and interchangeably.

Since electronic devices for the most part convey culture through language, and language through text, letters then become the smallest unit of culture that need to be addressed for electronic representation. For Ethiopian culture, this means the Ge'ez alphabet (or "Ethiopic syllabary" as it is known outside of Ethiopia) must be given an electronic existence, one that could be understood by all computers everywhere thus assuring universal communication. This was not truly feasible until there was a universal, internationally recognized, standard for computer alphabets. *Unicode* is that standard and came along in 1991, albeit without Ethiopic as part of the initial version.

Ethiopic would be introduced nearly a decade later in version 3.0 of the Unicode standard which arrived in the year 2000. Ethiopic in Unicode was the collection of alphabets used by Ethiopia's three most spoken and widely known languages. The Ethiopic specification was carefully considered and was designed to meet the broadest needs that available and reliable information could allow for. Indeed it has proven itself to be a solid foundation for an electronic orthography. While devised with the best information available at the time, it was fully anticipated that, as a specification built around the requirements of only a few languages from a land with nearly ninety, it would

eventually have to be updated. No such revision could be considered, however, until information became available that was at least as reliable as that of the initial or “basic set”.

What is Ethiopic?

The international electronic alphabet encoding process requires that authoritative information come from a national standards body and be supported by documentary evidence –printed materials that utilize the proposed letters for encoding. The lengthier the lineage and larger the corpus for the letters, the higher their perceived exigency value will be. For the encoding of the 345 basic symbols in the Unicode 3.0 standard, these criteria were met with materials in the three largest languages that were available outside of Ethiopia; and with the National Standards Authority of Ireland (NSAI) as the custodial standards institute. To go further and electronically encode all of the Ethiopic letters of all of the languages would mean that Ethiopia would have to get involved and take the task upon itself.

As would certainly be the case for a unified alphabet of Europe, the average person will be familiar with only those characters required for the rendering of his or her own language and will most likely be oblivious to different needs and practices of neighboring languages and regions. It should come as no surprise then that Ethiopic letter elements in use by communities distant from Ethiopia’s capital, where the bulk of publishing and computer use occurs, could go unnoticed for an extended period, even at the level of the national government. At the local level however, there can be no such lack of awareness. In fact the local governments are an integral part of adopting new symbols.

During the 1974 -1991 communist regime, the government maintained tight control over all publishing, and no materials could be printed and distributed unless reviewed and approved by government censors. During this period, the government employed censors only for Ethiopia’s three most spoken languages: Amharic, Oromigna, and Tigrigna. Needless to say this policy had a negative impact on the development of literature for societies just beginning to modernize and encountering increasing need for mother tongue written materials. This societal pressure and momentum from efforts underway before the change of regimes, lead to clandestine literature that employed new syllables –the Sebatbeit New Testament, “ገደር ገርዳ”, being perhaps the largest such example. In later years the government was behind, and maintained control over, the development and promotion of new symbols as part of a national literacy campaign.

During the twentieth century, efforts emerged in cycles of roughly 10-15 years with the aim of reforming or extending the Ethiopic syllabary in some

way. Efforts born of government agencies or academicians have been met with the least success as their approach has been to prescribe an orthography for a particular purpose or perceived need. Ethiopic has been more accommodating when the need for revision (and only for extensions) has come from within the community it would serve.

Following the arrival of the new government in 1991, press laws were reformed and regional governments were given greater autonomy. While Amharic publications have flourished with over 150 private newspapers appearing in thirteen years, the stigma of publishing in one's own language as "a bad and forbidden thing that leads to jail" was slow to die during the '90s in the psyche of the nation's once prohibited languages. In a few cases an outright backlash has occurred in communities where they have felt Amharic was imposed upon them for nearly twenty years as a form of cultural repression. Flexing new found political might and seeking cultural identity these groups have striven to abandon most everything associated with Amharic, including Ethiopic script, and have adopted Latin script as their orthography. This transition is ongoing and has not been without internal turmoil as one basis of a society's literacy has been swept away for another.

Other groups, as the legacy of fear diminishes, have opted to put the same fervor into embracing and extending Ethiopic for the needs of their own languages. These efforts include taking stock of a language's phonemic inventory and employing the redundant symbols of Amharic orthography to carry additional phonemes. These efforts also include making use of syllabic elements introduced thirty years earlier or more while refining typeface attributes and devising new syllographs when necessary.

The Ethiopic orthographies have the invariant trait of "one letter, one sound". The practice, as with English, of combining letters to represent additional sounds (*e.g.* 'th' for 'θ'), is unknown in Ethiopic tradition. Were the practice started for one language there would be an incompatibility with the national language and two contextual conventions would have to be learnt by readers of the minority language. Inventing new symbols to maintain the "one letter, one sound" relationship has to date always been preferable. Ultimately, to be of any real use to society, new orthographies have to be adopted into school systems and government bureaus. Local government must first approve a new orthography before it can be adopted into the school system's curriculum and be used in the production of primers and other printed materials for education.

The 1990s have very much been a time of transition for Ethiopian society. In twenty years three major upheavals in government have occurred, the break away of Eritrea and the tumultuous relationship that's followed, the

ongoing modernization of rural societies, demobilization of nomadic peoples, encroaching industrialization, political turmoil, an ever changing legal system and cultural revolutions have been the backdrop for which literary practices have had to struggle to develop. Ethiopia was not in a position to participate in the definition of the Unicode standard for Ethiopic during the early '90s, a time when computers in Ethiopia could be counted in the low thousands. The arrival of the Internet in early 1997 helped bring about awareness and appreciation of character encoding problems as once isolated computers were now able to exchange data with one another readily. The availability of operating systems capable of supporting Unicode likewise aided in assessing the adequacy of Unicode for Ethiopian society through practical use.

These two factors, coupled with explosive growth in computer use in the public, private and government sectors, lead to the realization of the value and need for standards in electronic media. Outside of the comparatively small scientific community, computers and the Internet meet their greatest utilization as instruments for composing, manipulating, and exchanging textual data. The character, as the smallest component of text, becomes the atomic element upon which other standards are built - for example: input methods, collation, localization, etc. Accordingly, standardization efforts in Ethiopia began by examining this foundation level. Doing so would build as strong a basis as possible for all standards that would follow. The fundamental question that had to be answered first was: *"What is Ethiopic?"*

ES 781:2002 – “Ethiopic”

In October of 2002, Ethiopia's standards body, the Quality and Standards Authority of Ethiopia, legalized the nation's first alphabet standard. This new standard, ES 781:2002, represents the first time the national government has recognized a comprehensive standard for Ethiopic script. Primarily intended for electronic information interchange, the standard provides a national alphabet for all media and environs, electronic or otherwise.

“Ethiocode”, a colloquialism for ES 781:2002, includes letters in addition to the Unicode set required for the languages: Awngi, Me'en, Mursi, Qimant, Suri, Sebatbeit (or “Chaha”) and Xamtanga. The 115 additional symbols also provide intonation marks used by the Ethiopian Orthodox Church for their liturgy.

The road to Ethiocode goes back to 1997 and the formation of the Ethiopian Computer Standards Association (ECoSA) which was established specifically to work on definitions of standards for Ethiopic script and languages in a liaison role between the government and the private sector. ECoSA shortly came to the realization that before such standards for Ethiopic could be developed,

“Ethiopic” itself would have to be defined. In pursuit of this underlying definition the QSAE and ECoSA hosted a workshop on the subject of the syllabary on July 4, 1998 at the QSAE headquarters in Addis Ababa [10]. The workshop was well attended and valuable input was contributed that led to future meetings and informational contributions.

Shortly after the workshop, ECoSA was encouraged to provide input and a representative for an ISO¹ 10646 working group meeting to be held the following October. While members were ultimately not able to attend, the office of the prime minister did take the matter very seriously and assisted in the collection of data from the regional governments. More questions arose during this process than there was time to adequately resolve before a proposal had to be submitted for the ISO meeting. On September 11, 1998 (coincidentally New Year’s Day of 1991 in Ethiopia) the document that became ISO/IEC JTC1/SC2/WG2 N1846 was submitted, again by NCAI, for the working group’s consideration.

N1846 was never pushed from the Ethiopian side, in part from the uncertainty surrounding certain elements as well as the availability of personnel to address lingering issues. In the course of the effort, the QSAE did become a non-voting “observer” member of the WG2 working group, though the membership would not be utilized now, it would become important later. Once fast paced, alphabet definition activity cooled for a period until late 2000 when the QSAE formed the subcommittee QSAE/TC1/SC7. The subcommittee’s mandate would be to continue the national alphabet movement and arrive at a national standard. The subcommittee produced a draft proposal and held a one day meeting on March 30, 2001 to present it to the public. Feedback was incorporated into the proposal producing a second draft (CD 5214:2001) that was completed on November 30th of the same year. The document became an official Draft Ethiopian Standard (DES 5214:2002) and was widely circulated for public comment.

DES 5214:2002 was circulated amongst 55 government and non-government organizations as well as concerned professionals within Ethiopia [12]. A public announcement was made in the nation’s most widely available newspaper, “Addis Zemen”, where 11 new requests for review copies were received from professionals and organizations [12]. The draft standard is also notable in that it became the first standard proposal of Ethiopia where solicitation for comments was sought over the Internet, through the QSAE’s new homepage². Intended to serve as Ethiopia’s first standard for electronic interchange of Ethiopic text, it was somehow fitting that it be developed, at least in part, over the medium it was intended to serve. A deadline of March 6, 2002 was initially set for Internet comments. Response was so overwhelming that the deadline was extended three weeks to March 27th.

Altogether 126 pages of comments from home and abroad were compiled into a new document, QSAE/TC1/SC7/N12. The feedback was reviewed within the QSAE and amongst the committee members and on April 18, 2002 a one day meeting was held where the working group debated final points with selected commentators to arrive at the standard [11]. The first addition of ES 781:2002 was legalized October 2, 2002 [12].

With ES 781:2002, Ethiopia now had a legal document that defined for the country precisely what Ethiopic is. ES 781 is a “national alphabet” agreed upon by all sectors of society that may serve as the basis for education materials, typography references, requirements for electronic devices (such as cell phones and PDAs) and of course the basis of future standards. The Ethiocode standard also includes punctuation from Latin script that has been determined essential to the modern orthography of Ethiopian languages. The standard does not address numeric encoding nor collation directly, it is simply a character repertoire for Ethiopia. The order that the elements are presented in, however, is intended to be a reference for the canonical sort order for the syllabary as a whole. Each language may of course still elect alternative collation schemes.

As one of Ethiopia’s indigenous societies begins a literary tradition in their own language they must address the applicability of the Ethiopic syllabary to their own phonemic inventory. They may determine that new syllables should be devised for a unique consonant or vowel type found in their language. Ethiopic must be able to adapt to serve these needs which in the 21st century means computer fonts must be adapted to serve these societies. Fonts require numeric encoding of letters, and numeric encoding in turn requires standards to assure the letters written in an email on one computer can be read by a recipient on another. ES 781:2002 provide both a framework and a workflow for this process.

With the national alphabet defined in a legal standard, the QSAE was then in a position to submit an international encoding request to the ISO on its own. The ISO 10646 encoding standard is technically independent of the Unicode standard; however, both parties have the same goal, a good working relationship, and have agreed to keep their standards synchronized. The ISO works with government appointed standards bodies while the Unicode Consortium is comprised of major vendors in the software industry. The ISO 10646 working group had by this time synchronized their encoding processes and the Unicode Consortium would have to approve the request before it came to the ISO.

An opportunity would be available on June 15th of 2004 at an encoding meeting in Toronto, Canada where the next revision of the Unicode and ISO

standards would be decided. It was already late to submit a proposal at the time this news arrived to the QSAE on March 31st and the authors of the working draft of the next revision were loath to make updates at this late date and would not be expected to receive any changes favorably. Nonetheless as a non-voting observer member to the ISO/IEC/JTC1/SC2 working group, the QSAE had the right to submit a request in the guise of “comments” on the working draft, but they would have to do so in three weeks time. An intensive effort was launched to rework the ES 781:2002 into the form required by the ISO. This was no minor undertaking and was only accomplished by daily work on the comments until the time of its submission on 23rd of April where it would be assigned the ISO document number N2747.

The comments were accepted and the request for new letters would be considered at the June meeting. Should the letters be accepted into the next revision of Unicode there would be a chance that they could be included in the next revision of the Microsoft Windows system expected in 2006 (now known as “Vista” and slated for mid 2007). The significance of having the full of Ethiopic script come with a computer at the time of purchase could not be over stated. If Ethiocode could not make it into Windows at this time, the next opportunity would be in the following version of Windows projected for 2009. An Ethiocode representative would be present at the Toronto meeting to present the national alphabet and help convince the decision makers of the necessity for the encoding. Lobbying for the alphabet would occur up until the time of the meeting. Once accepted into the Unicode, it was a foregone conclusion that the ISO would rubber-stamp the encoding amendment at their working group meeting held in the same place on the following week. There was so much assurance over this point that no representative was sent for the ISO meeting.

At least this had been the way the system had worked until this point. Perhaps it was the newness of the letters and their late arrival that made the ISO working group members uncomfortable in supporting them. Participants at this meeting voted against the acceptance of Ethiocode on June 21st. Stunned, there was little that Ethiopia could do at this stage, but if there was anything possible after coming so far and with so much at stake, the QSAE was going to try it. The meeting would conclude in 24 hours and any action that was going to happen would have to happen fast. An even more imposing obstacle was that the business day had already ended in Ethiopia and the QSAE was closed. Every form of communication technology on three continents and across seven time zones was about to be employed to rescue the Ethiocode encoding.

The NCAI representative who had helped out Ethiopic twice before was in attendance at the 2nd Toronto meeting and sent an internet Instant Message (IM)

in the middle of the meeting to inform the Ethiocode representative who had been there a week earlier of the news. This undoubtedly saved invaluable time. The Irish representative indicated that the only recourse would be for the QSAE to send a fax to the workshop members with an emphatic request expressing the urgency of the need for the letters. An email was sent immediately to the director of the QSAE who fortunately was in Sweden for a conference and was able to read email at that hour. He in turn sent his mobile phone number while a draft fax was prepared and the NCAI representative obtained the conference fax number. A phone conversation followed and QSAE head approved the fax content but it would have to be sent on QSAE stationary and from Ethiopia to be received as legitimate in Toronto. A former QSAE/TC1/SC7 committee member known for working late was sent the fax information by email with a follow up phone call about the urgency of the matter. He would bring the document to the QSAE the next morning while the director phoned ahead to authorize the fax. Quite a few attempts were required to get the fax through and it was never certain that the transmission succeeded.

When the working group reconvened the next morning they found the fax from Ethiopia waiting for them. Astounded by its unexpected arrival the working group was highly impressed with Ethiopia's seriousness in the matter, a revote was held and the motion to admit the 116 new Ethiopic letters was passed. Ethiocode had now secured, finally and irrevocably, international recognition. In the computer world, this was the equivalent of winning the Olympics. It is somewhat ironic that in the era of email that a pre-internet technology was required to save the effort. There was still some process ahead for the new Unicode standard to be finalized but it would not impact the letters in the new standard. On March 31st of 2005 Unicode 4.1 was announced as an official standard.

The elements of Ethiocode new in Unicode 4.1 and not used by the primary languages of Ethiopia are the most interesting to review in detail. The following sections will examine these "new" elements in turn as per the alphabetic order of the languages employing them.

Agaw

The Agaw language is often the source of confusion and debate due, in no small part, to the fact that there is no "Agaw" language. Agaw is a family of languages and dialects, any one of which may be referred to simply as "Agaw" within Ethiopia, and increasingly as "Central Cushitic" externally. The "Agaw" family includes Awngi, Kayla, Kufal, Quara, Qimant and Xamtanga in Ethiopia and Blin in Eritrea which has been a written language since 1882. Collectively, the language family has over a half million speakers.

Agaw orthography has likewise been perplexing not just from confusion over the language it applies, but from rapidly evolving writing practices. Uncertainty over the state of Agaw orthography had an impact on N1846 where some letters were proposed that had not yet been well established. The vowel like symbols አ, ኡ, ኢ, ኣ, ኤ, ኦ and ኧ came from the Agaw region administrative bureau without explanation. They were later found to be a proposed phonetic symbology that could be used to denote the isolated vowel component of an Ethiopic syllable³. While clever and potentially useful in the future, such notation should not have been a part of an international standard for Ethiopic. Other Agaw symbols that were premature in N1846 are the three labialisations ኣ, ቶ and ቷ.

The enthusiasm in the Agaw communities to write in their own language can hardly be contained and they will surely be the juggernauts for Ethiopic in the 21st century. The lessons of caution were learned from the N1846 experience and ES 781 accepted, from dozens of proposed symbols, a handful of letters under provisional status to help the development of Agaw orthographies. These letters include the velar-fricative (IPA ɣ) and two of the labialised symbols from N1846. Table 1 presents the letters of ES 781:2002:

Table 1: Letters of ES 781:2002 for Agaw Languages

	ə	u	i	a	e	(i)	o
ɣ	ኧ	ኡ	ኢ	ኣ	ኤ	ኦ	ኧ

	^w ə	^w u	^w i	^w a	^w e	^w (i)	^w o
ɣ	ኧ		ኡ	ኣ	ኤ	ኦ	
ŋ	ኧ		ኡ	ኣ	ኤ	ኦ	
ʔ				ኣ			
ʕ				ኣ			

Since the legalization of ES 781:2002 Awngi and Xamtanga intellectuals have been exposed to Sebatbeit velar-palatal syllables, ኧ-ኧ, and found the letter forms preferable to the working glyphs for their velar-fricative syllables. Potentially then, these provisional Agaw syllables may be removed or modified in a future revision of the standard.

Bench

Kaffa, the birthplace of coffee in south-western Ethiopia, is the home region of the Bench people amongst others. The Bench have unique orthographic requirements for the rendering of retroflexed postalveolar phonemes in their language. The characters developed for Bench orthography are derived from the simple postalveolar forms in ሸ, ቸ, ቸ፣ and ጸ of the Ethiopic syllabary. The retroflex augmentation to the glyphs is denoted systematically through a stroke, (·) on the left side of the syllables as shown in Table 2:

Table 2: Letters of ES 781:2002 for the Bench Language

	ə	u	i	a	e	(i)	o
።	ሸ	ሸ·	ሸ፣	ሸ፣	ሸ፣	ሸ፣	ሸ፣
፣	ቸ	ቸ·	ቸ፣	ቸ፣	ቸ፣	ቸ፣	ቸ፣
፤	ቸ፣	ቸ፣·	ቸ፣፣	ቸ፣፣	ቸ፣፣	ቸ፣፣	ቸ፣፣
፥	ጸ	ጸ·	ጸ፣	ጸ፣	ጸ፣	ጸ፣	ጸ፣

Bench is the only Omotic language that has so far encountered special orthographic needs that had to be addressed under Ethiocode. The Bench orthography has been taught in the school system for over a decade since mother tongue education has become publicly available.

Me'en, Mursi & Suri

Neighboring the Bench in Kaffa and the Omo Valley are the Me'en, Mursi and Suri people whose respective languages are members of the Nilo-Saharan family. Only Suri can also be found spoken in Sudan. A characteristic of these languages is the open-o vowel (IPA 'ɔ') which may follow any one of twenty seven consonants in the collective phonemic inventory. Similar to the retroflex symbol used in Bench, a stroke is added to the left side of the classic seventh form syllables. The stroke itself appears more perpendicular to the syllable's body and more parallel to the horizontal than does the Bench stroke which will be sloping downwards. Table 3 presents the open-o syllographs:

Table 3: Letters of ES 781:2002 for Me'en, Mursi & Suri Languages

ከጋ	ከጋ	ጠጋ	ጠጋ	ሠጋ	ሠጋ	ከ'ጋ	ቦጋ	ጥጋ	ቸጋ	ባጋ	ጠጋ	ቸጋ	ጋ
ብጋ	ሉጋ	ግጋ	ሮጋ	ሶጋ	ሸጋ	ቆጋ	ብጋ	ቶጋ	ቸጋ	ቸጋ	ቸጋ	ቸጋ	ቸጋ
ከጋ	ወጋ	ዘጋ	ሃጋ	ደጋ	ደጋ	ጋጋ	ግጋ	ተጋ	ሮጋ	ጠጋ	ሠጋ	ጋጋ	
ብጋ	ቆጋ	ብጋ	ቆጋ	ቆጋ	ቆጋ	ቆጋ	ቆጋ	ቆጋ	ቆጋ	ቆጋ	ቆጋ	ቆጋ	

Sebatbeit

Like Agaw, “Gurage” is also a family of languages (Sebatbeit, Silte and Sodo) and dialects where any one of which may be referred to simply as “Gurage”. Sebatbeit, a collection of seven dialects, was previously more widely known by the dialect “Chaha” before the adoption of the more neutral name. Again like Agaw, Sebatbeit suffered from a bit of confusion during the N1846 effort though to a lesser degree. A feature of the Sebatbeit language is the frequent occurrence of labialisations relative to other members of the Ethiopic-Semitic language family. As Sebatbeit typography grew more sophisticated during the computer era, the subtle difference between the 2nd and 3rd (classic order) labialisations (e.g. ጥ vs ጥ) became problematic to discern. Distinguishing between the two, it was found, becomes a visual strain at small print sizes and on computer screens. The same difficulty is not incurred as much by other languages where the two letter forms, the labialised 3rd form in particular, occur at very low frequencies.

To remedy the problem a typeface design was created whereby the labialised second form was constructed from the diacritical symbol (◌) of the first labialised form and grafted onto the sixth⁴ form syllable in ቆ, ከ, ኸ and ጥ. For example ጥ + ጥ > ጥ as a replacement for ጥ. Likewise then ቆ, ከ and ኸ become the alternative typeface renderings of ቆ, ከ and ኸ. The critical piece of information that would link this complexity of phonemes, orders and typefaces together was missing in the flurry of activity leading up to N1846. These typeface variants were erroneously proposed as new encoded character elements. The error was not uncovered until January of 1999 when Sebatbeit native speakers were available to review the document.

Otherwise there is a perfect agreement between N1846 and ES 781:2002 for Sebatbeit elements. Requirements for Sebatbeit orthography are the four palatalizations in ቆ, ከ, ኸ and ጥ shown by placement of the ◌ symbol at the top of the syllables. Four additional rounded labials in ጥ, ቆ, ጥ and ጥ are also essential. Table 4 presents the additions for Sebatbeit orthography:

Table 4: Letters of ES 781:2002 for the Sebatbeit Language

	^y ə	^y u	^y i	^y a	^y e	^y (I)	^y o
k'	ቆ	ቆ	ቆ	ቆ	ቆ	ቆ	ቆ
k	ኸ	ኸ	ኸ	ኸ	ኸ	ኸ	ኸ
x	ኸ	ኸ	ኸ	ኸ	ኸ	ኸ	ኸ
g	ኸ	ኸ	ኸ	ኸ	ኸ	ኸ	ኸ

	^w ə	^w u	^w i	^w a	^w e	^w (I)	^w o
m	ጠ		ጠ		ጠ	ጠ	
b	ቡ		ቡ		ቡ	ቡ	
f	ፊ		ፊ		ፊ	ፊ	
p	ፑ		ፑ		ፑ	ፑ	

It is noteworthy that a very early form of the Bench retroflex mark was the ^y used for Sebatbeit palatization. This is the same mark mentioned earlier that the Agaw parties have taken interest in for their velar-fricative syllables since the ES 781:2002 legalization.

Ethiopic Tonal Marks

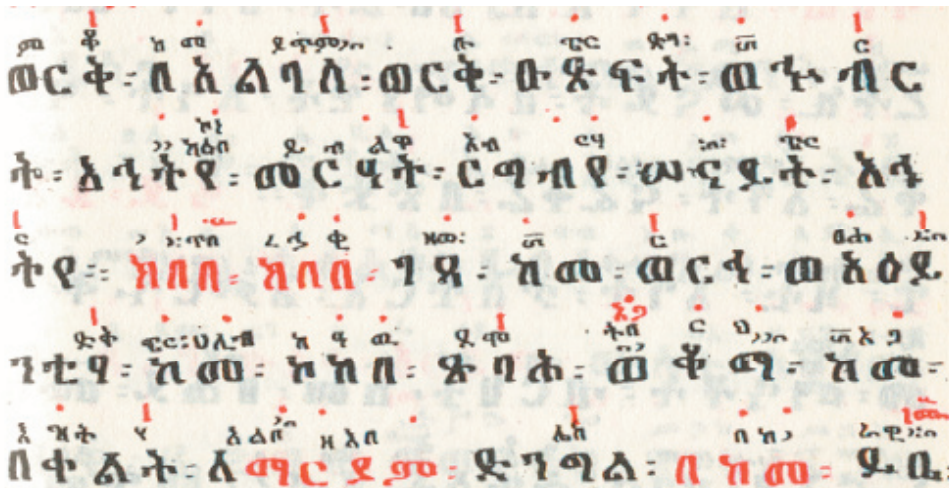
When music was first recorded in Europe in the 9th century, the Orthodox Church in Ethiopia was delivering liturgy in melodies recorded centuries earlier. Saint Yared, born Miazia 5, 505 AD (Ethiopian calendar) in the city of Axum, he was a struggling student who, thru hard work and perseverance, would later become an educator and church leader. Three angels descended from Paradise to visit Yared in the form of birds (one each in green, yellow and red) to teach him the songs of heaven as could be sung in his language, Ge'ez. The mesmerized Yared was whisked away to heaven where he bore witness to a performance by a chorus of twenty four angels [1,4].

Enlightened and with a new sense of purpose the inspired Yared went to the chief priest of Axum at nine the next morning and before The Ark of the Covenant raised his hands and sang in the first Aryam (rhythm of angels). Yared devised a system of eight notations to mark the rise, fall and intonations of the voice. While in heaven, Yared observed angels playing musical instruments

such as the Inzira (a large flute), the Masinquo (a one-stringed violin), the Tsenatsil (a type of sistrum), the Kebero (a large drum), and the Begena (great harp). Yared had these instruments made and used them to accompany his hymns, they are also an important part of secular music today. Thus was born Ethiopia’s oldest musical tradition as alive today as it was in the time of Yared who lived until Genbot 11, 571 EC [1,4].

The notation developed by St Yared is only used to guide inflections in the voice and does not serve as a means to record musical notes for instruments. In the present day the notation may experience some variation depending on where it is taught but a general agreement on the core of the notation is found. The collection of roughly 150 notations is known as “Yaredawi YeZaima Meleketoch” and contains the set of the 20 Ethiopic numerals (often sans the lower line), 121 abbreviated words and the 8 unique marks not represented by letter symbols. The notation is used on three rows above a line of text. Each row (from bottom upward formally named: Ge’ez, Ezel and Ararai) is a different mode for how the passages are to be voiced during different ceremonies. Ge’ez (the name of the language but also meaning “the first” in many contexts) is the plain chant for ordinary days; Ezel is a more measured beat for funerals, the Ezel row is often written in red ink for distinction; Ararai means a lighter, free mood for festivals. The three modes are also supposed to represent the Father, The Son and the Holy Ghost respectively [1,13]. The eight unique symbols are presented in Table 5:

Table 5: Letters of ES 781:2002 for Ethiopic Tonal Marks⁵



ይዘት Yizet	ደረት Deret	ርክርክ Rikrik	ደፋት Difat	ቅናት Kenat	ጭረት Chiret	ሒደት Hidet	ቁርጥ Kurt
.	ጋ	፫	ጋ	ጋ	ጋ	—	ጋ

Figure 1: Ethiopic tonal notation in three modes: Ge’ez (bottom), Ezel (red), Ararai (top black) [6]

Other Symbols

Following the tonal marks two symbols new in Unicode appear in the Ethiocode standard. The first is “Tebek” (፩), the Ethiopic germination mark. Ethiopic writing practices do not “double” letters to show gemination, rather it is left to the reader to determine gemination from context. A word’s meaning may in fact change depending on where these stresses occur. Tebek is employed primarily in linguistic works, dictionaries, and material aimed at language education. In less common cases a single dot might be used or the marks are put beneath letters rather than above. In these instances the variation on Tebek may have occurred due to a typographic limitation where the preferred form of Tebek was not available. Circular variants of Tebek are indeed graphically similar to “diaeresis”⁶, but the similarity ends there as semantically the two are not interchangeable.

The second additional symbol appearing in Ethiocode is a punctuation mark that is primarily used as an end of paragraph or section indicator: ‘*’. While the Unicode standard for Ethiopic does include an end of paragraph symbol already, this additional symbol was found to be important enough for historic documents (that may use both symbols) to include in the new standard. The point has also been raised that the symbol may have been used in some works for the purpose of indentation, in which case the symbol becomes semantically unique under such usage.

Ethiopic Beyond ES 781:2002

Ethiocode is meant to be an evolving standard capable of supporting Ethiopia’s diverse linguistic heritage as written language requirements evolve. What happens next for Ethiopic is nearly one and the same as asking what happens next for Ethiopian languages. It has been predicted that “the coming century will see either the death or the doom of 90% of mankind’s languages” [8]. Language is so closely tied to culture that this prediction, if only accurate in

part, would represent a terrible loss to Ethiopia's rich cultural diversity. Socio-economical and anthropological forces are very much at work as Ethiopia modernizes. Some social mechanisms clearly are working in favor of this prediction while conscious activities directly oppose it.

Ethiopia's linguists are well aware of the threat to the nation's languages and are actively working to record and preserve the lexicons and grammars for posterity. Concurrently, mother tongue education is being offered in primary schools for the first time in many societies. The international threat of diseases like HIV and AIDS has led to the production of in-language health awareness publications produced by NGOs and the health ministries. Regional self autonomy and active people's associations are all playing a role to strengthen the place of local languages in local communities.

Zemene Technica

Ethiopia at the end of the 20th century is a place bristling with consumer electronics and poised for the emergence of large scale networks. Projects underway like SchoolNet and WoredaNet promise to connect the nation's schools (over 500 sites), research institutes (32 sites) and local governments (594 sites) [2]. Other projects like the Global University System aim to provide high-speed connections for the nation's higher education institutes to help utilize E-Learning and E-Healthcare [2]. Coming late into the information age has not necessarily been a disadvantage. The outside world has incurred the cost and burden of competing protocols and technologies until one eventually rises to the top. Ethiopia gets to adopt the best of breed victors and leap-frog over the pitfalls and passing fads that bogged down more progressive societies.

In Ethiopia today "Unicode" is known even to the average computer user as the solution to email problems. Computer vendors have started to ship Unicode fonts and keyboard drivers with new computer systems. National legislation is proposed to make doing so a requirement –boldly promising that no computer could be sold in Ethiopia that did not support the capability of reading and writing in Ethiopic. Mobile phones are everywhere now and the demand is mounting to have them Ethiopic text enabled.

While Ethiopia is ripe with potential, Internet and all telecom services remain state run monopolies regulated by the Ethiopian Telecom Authority (ETA) with services provided by the Ethiopian Telecom Corporation (ETC). The ETC follows the predictable trends of a monopoly and as such sets the pace of development in the telecom sector. Mobile phones and basic Internet service are of course available but customers must pay a premium and regularly remain months on waiting lists before the service is provided.

The private sector is welcome to pursue Information and Communication Technology (ICT) sales and services that do no conflict with ETC areas. This leaves open the areas of training, maintenance, hardware sales and software sales and development. These public areas are unregulated and require only a business license to engage in. Entrepreneurs have enjoyed this freedom, within bounds, to develop their businesses without interference. There has been a reluctance to embrace the standards when, like government regulations, they are perceived as taking away freedom to operate as one pleases. Perhaps the most famous example, that has also left the most bitter and lasting taste in the mouths of IT business owners, is a regulation set by the Nation Computer and Information Center in the late 1980s. This regulation required that all computers imported into Ethiopia had to have 80386 CPUs. While this policy may have made sense at the end of the 80286 lifecycle and protected the country from “technology dumping”, it became the cause of much anguish and fury as entrepreneurs had their new and expensive 80486 computers rejected by the import authority.

In recent years Unicode, initially received with a sense of trepidation, has made inroads more from consumer demand for the standard. The increasing ease of APIs and information resources to work with the standard has at the same time made it easier for vendors to support. As newer operating systems have come to replace the old, the potential market for Unicode software has expanded while also making it increasingly difficult to maintain legacy systems that were not standards compliant.

Five years ago, the notion of electronic standards seemed as academic a discussion as optimization of satellite orbital trajectories. The critical mass of computers and the volume of electronic data exchange between them had not yet been reached where standards begin to seem relevant. Now that more and more government institutes are being networked, standardization problems have become government problems. Hence they have at last become “problems”.

The Ministry of Capacity Building in Ethiopia is the coordinating body for developing the National Information and Communication Infrastructure (NICI), a foundation framework for ICT sector and broader socio-economic development for the country [14]. The ministry has cited that the absence of standards as a primary inhibitor to local language content development, online government services and the full utilization of ICT in the country [5]. The problems can only become more pronounced as ICT use grows and as the NICI comes closer to fruition. The effective and efficient use of ICTs is seen as crucial to sustainable economic growth and poverty alleviation in Ethiopia. To this end the ICT Capacity Building Program was launched by the ministry to identify, propose and undertake initiatives to enhance the ICT infrastructure

in Ethiopia. The ICTCBP mandate goes beyond the development of physical infrastructure encompassing the creation of a favorable regulatory environment for the harmonious development of ICTs.

Early efforts by the ICTCBP have been to assess and prioritize the electronic standards that would have to be developed for the support of Ethiopic in computer systems. A comprehensive report on Ethiopic standardization was completed in May of 2003[3]. The ICT Development Authority has initiated some implementation of the findings, software standard development, with locale data addressed in 2004 and a keyboard and typography standardization effort initiated in late 2005. The authority also worked with AAU and the Ethiopian Language Research Center in 2005 to translate computer and software terminologies that will be applied in software interfaces.

An even broader effort has concluded at the end of March, 2004 that identifies standards beyond those required for Ethiopic and local language support but for ICT use in general. This second effort addresses standard requirements for hardware, software, software development, data exchange, quality of service, electronic commerce, risk management, and ICT personnel certification. The effort considers all government sectors at the national and local levels, it also develops guidelines for private sector organizations wishing to implement a standards policy and assure compatibility with government agencies.

Ethiopia, at the end of the 20th century, is very much attuned with the need for software standards in order to support Ethiopic script and Ethiopian languages. However, Ethiopia is new to the area of software standards development. The government agencies responsible for standards development and enforcement (QSAE, ICTCBP) while having the will to do so, lack the personnel resources and expertise to follow thru in "Internet Time". With 3,000 years of history to its credit, Ethiopia has, however, mastered that elusive temporal discipline of "patience". Standardization will move forward in a manor, while at a pace perhaps a step slower than "iTime", very purposefully and carefully considered. Ethiopia, home of the fastest runners, so far has kept the pace needed for cultural digitalization and thus preservation. In this race against time and advancing technological penetration we are in a marathon, not a sprint, where endurance is critical. Steps must be made every day to win this race, resting even for a moment will be losing.

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Notes

¹ International Standards Organization, ISO-10646 is a standard synchronized with Unicode.

² <http://www.qsae.org/>

³ The Alef-A consonant-less syllables, አ, ኡ, ኢ, etc. are perceived as semivowels.

⁴ The choice of the sixth form syllable initially may seem odd. The classical order is in the labialised 2nd form, the linguistic order is in the labialised 6th form, which is also the Unicode ordering.

⁵ Two additional symbols were encoded to aid typesetting: ሻጸር፡ርከርክ (Short-Rikrik), ፣, and ደረት፡ሒደት (Deret-Hidet), ፡

⁶ Two dots used above letters in European orthographies, e.g. ä, ë, ö, ü, etc.

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