Ethiopic – A Unicode Success story – Transforming Ethiopic/Amharic from an endangered script to a thriving dynamic user of digitization

Presented by

Fesseha Atlaw

Internationalization & Unicode Conference

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Santa Clara, California

Ethiopia – Ethiopic
the Languages/ Script Heritage-
& Modern Technology

- Ethiopian Documented Reading Cultural Heritage

- Why use the name "Ethiopic"

- How Ethiopian Languages benefited by Computerization of Ethiopic

- What does the Future hold for Ethiopic Computerization

የኢትዮጵያ ፤የቁንቁ/የፊደል ቅርስ እና ዘመናዊ ቴክኖሎጂ

- የኢትዮጵያ ቋንቋዎችና የኢትዮጵያውያን የማንበብ ባህል

* የኢትዮጵያ ፊደላት መቸና ፤ እንዴት ከኮምፒውተር ተዛመዱ ? የገጠሙስ የቴክኒካልና ሌሎች ችግሮች ምን ነበሩ ?

- የፊደላቱ አጠራር "ኢትዮጵክ" የተባለበት ምክንያትና ሁኔታ ?
-
- ቋንቋችን ከኮሚውተር በመዛመዱ ምን ተጠቅሟል ?

* ወደፊትስ በፊደላችን ምን ምን ሥራዎችን ማኪያሄድ ይቻላል ?

ና ቅ ል ፉ አቡጊዳ
ኢትዮጵያ
ቅ ፚ ጬ ሥ ቋንቋዎች
ዒ ም ዼ ጬ ድ ፚ አማርኛ
ጠ ቫ ሮ ፚ ፚ ዩኒኮድ
ፉ ቇ ፍ
ፊደል
ት ዝ ሁዎ ፟ ግዕዝ

Ethiopic & the Unicode

- The history , the background, the Credit

Unicode Institutional Members

Full Members (Voting)

Institutional Members (Voting)

Ethiopic/Ethiopian Quiz

As Presented to the Unicode Conference participants

Fesseha Atlaw

- Q 1- In which century was the reading tradition of Ethiopian documented ?   In which book was it documented

- Q 2- Which world famous book was discovered written only in Ethiopic

- Q 3 What is Ethiopia's population

- Q 4 What is Ethiopia's ranking in terms of world economic growth ?

- Q 5 How was Ethiopic ranked among the most significant languages to computerize

Q1 Answer….

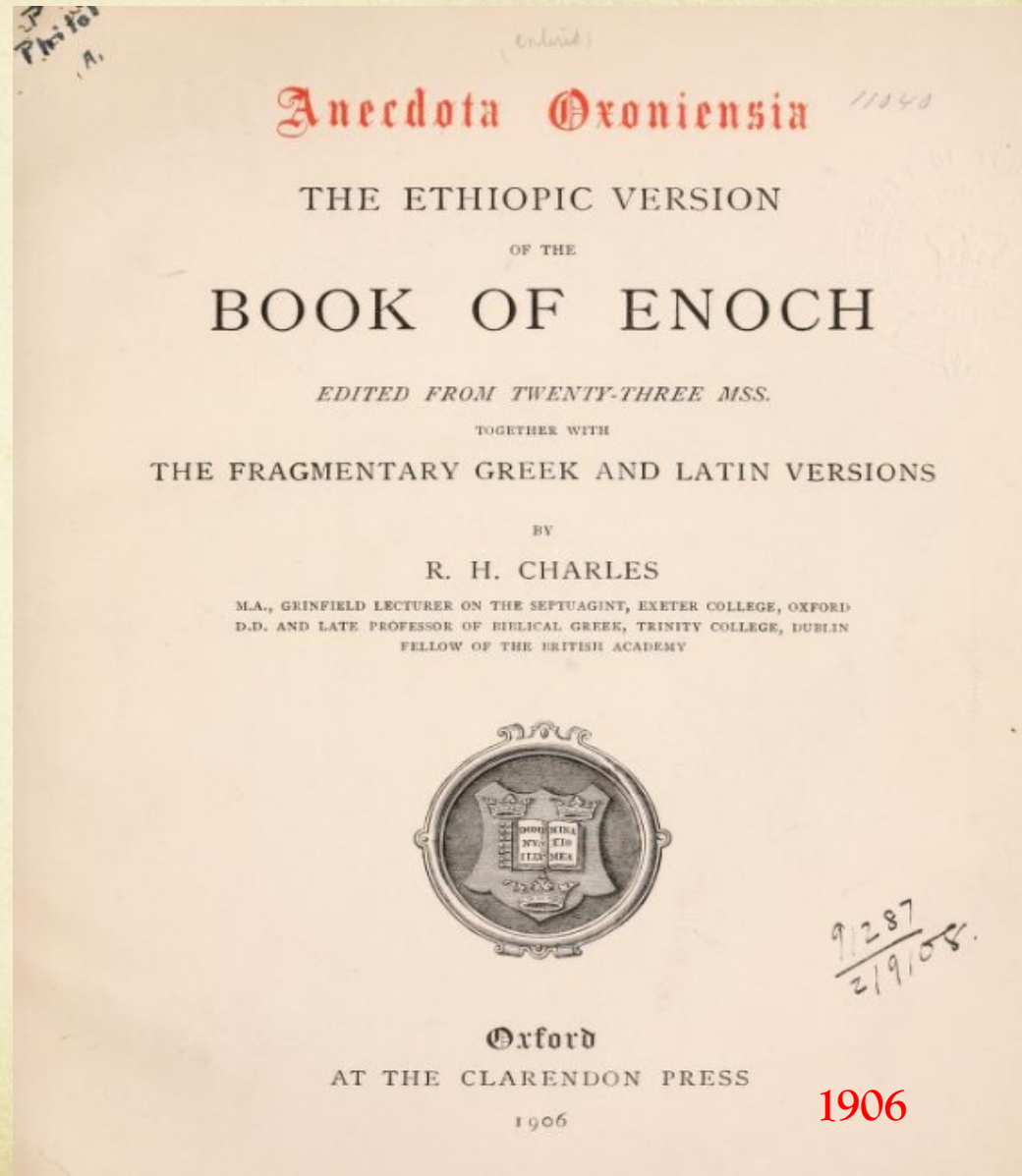1st Century in the Bible

Biblical Narrative. Philip the Evangelist was told by an angel to go to the road from Jerusalem to Gaza, and there he met the **Ethiopian** nobleman. He had been to Jerusalem to worship (Acts 8:27), and was returning home. The nobleman was sitting in his chariot reading the Book of Isaiah, and had come to Isaiah 53:7-8.

Q 2 Answer....

"....... the book of Enoch resurfaced at the beginning of the 17th century when it was discovered in Ethiopia, written in an Ethiopic language. In fact, the book of Enoch is preserved in it's entirety in the Church at Ethiopia, and is included in their Bible. The Ethiopians claim it was divine scripture, and treat it as such to this day......."

Israel-a history-of.com

Anecdota Oxoniensia

THE ETHIOPIC VERSION

OF THE

BOOK OF ENOCH

EDITED FROM TWENTY-THREE MSS.

TOGETHER WITH

THE FRAGMENTARY GREEK AND LATIN VERSIONS

BY

R. H. CHARLES

M.A., GRINFIELD LECTURER ON THE SEPTUAGINT, EXETER COLLEGE, OXFORD
D.D. AND LATE PROFESSOR OF BIBLICAL GREEK, TRINITY COLLEGE, DUBLIN
FELLOW OF THE BRITISH ACADEMY

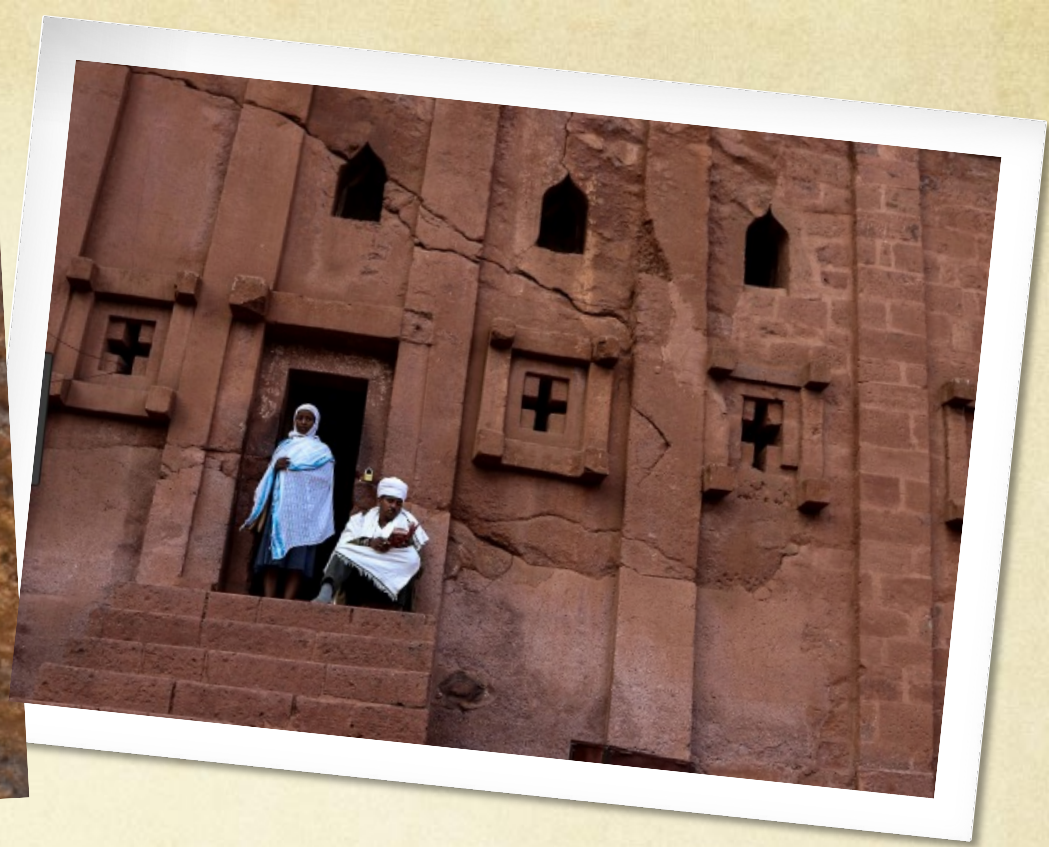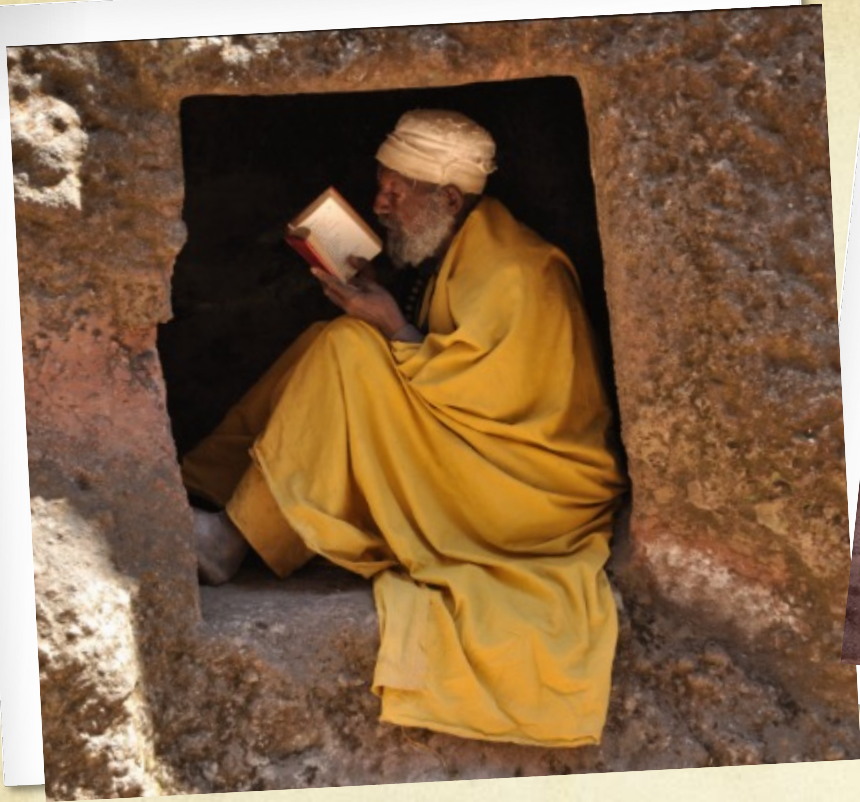Oxford

AT THE CLARENDON PRESS

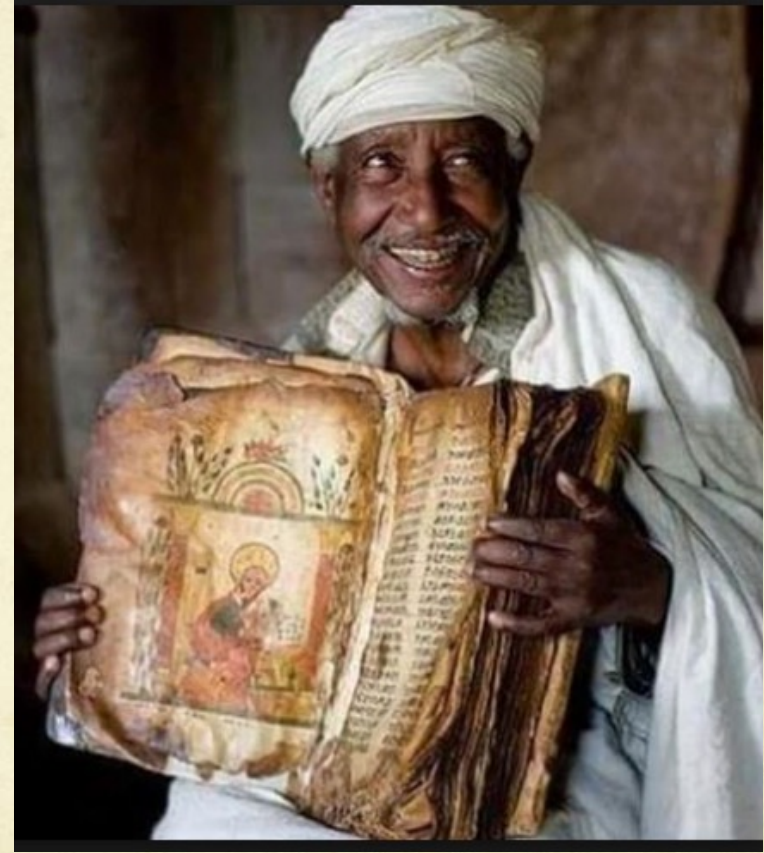1906

1906

The Book of ENOCH in Ethiopic

A reading Culture …..

A reading cultures for centuries

A reading cultures for centuries

Q3 Answer....

Ethiopia is the 12th most populous Country in the world

Countries in the world by popu

This list includes both **countries** and **dependent territories**. Data based o
Click on the name of the country or dependency for current estimates (live
See also: World Population

# ▲	Country (or dependency)	Population (2018)	Yearly Change	Net Change	Den (P/K
1	China	1,415,045,928	0.39 %	5,528,531	
2	India	1,354,051,854	1.11 %	14,871,727	
3	U.S.	326,766,748	0.71 %	2,307,285	
4	Indonesia	266,794,980	1.06 %	2,803,601	
5	Brazil	210,867,954	0.75 %	1,579,676	
6	Pakistan	200,813,818	1.93 %	3,797,863	
7	Nigeria	195,875,237	2.61 %	4,988,926	
8	Bangladesh	166,368,149	1.03 %	1,698,398	
9	Russia	143,964,709	-0.02 %	-25,045	
10	Mexico	130,759,074	1.24 %	1,595,798	
11	Japan	127,185,332	-0.23 %	-299,118	
12	Ethiopia	107,534,882	2.46 %	2,577,444	
13	Philippines	106,512,074	1.52 %	1,593,984	
14	Egypt	99,375,741	1.87 %	1,822,590	
15	Viet Nam	96,491,146	0.99 %	950,346	
16	DR Congo	84,004,989	3.28 %	2,665,001	
17	Germany	82,293,457	0.22 %	179,233	
18	Iran	82,011,735	1.05 %	848,947	

Q 4 Answer….

The world's fastest growing economies
Forecast GDP growth, 2017

Country	Growth
Ethiopia	8.3%
Uzbekistan	7.6
Nepal	7.5
India	7.2
Tanzania	7.2
Djibouti	7
Laos	7
Cambodia	6.9
Myanmar	6.9
Philippines	6.9

Source: World Bank

WORLD ECONOMIC FORUM

COMMITTED TO IMPROVING THE STATE OF THE WORLD
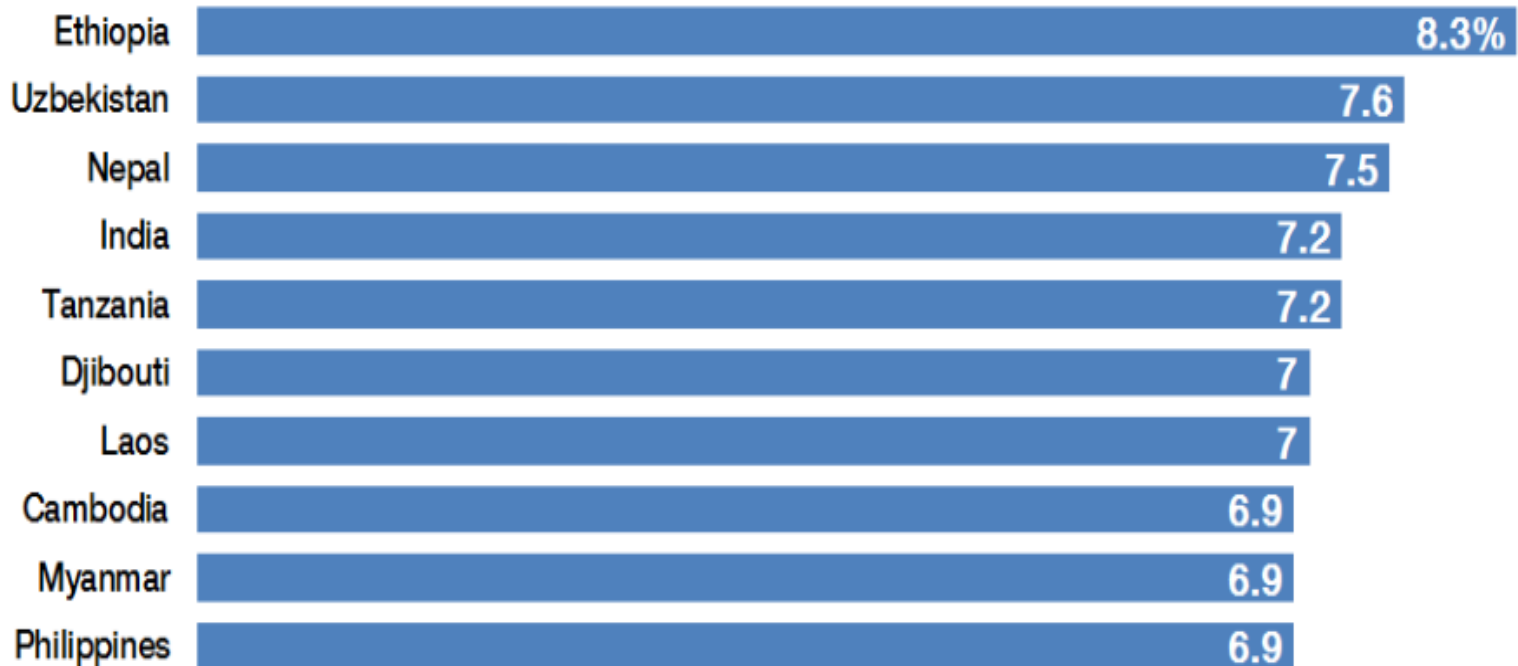
Q 5 Answer

"...The ranking of the world's Writing system in order of commercial importance as measured by total GNP of countries using each system.." Joe Becker 1988

Rank	Writing System	Languages	% of World GNP
1	Latin	English, German, French, Spanish, Italian, Portuguese, Indonesian/Malay, ...	68
2	CJK ideographs	Chinese, Japanese, (Korean)	14
3	Cyrillic	Russian, Ukrainian, ...	14
4	Arabic	Arabic, Persian, ...	3
5	Devanāgarī family	Hindi, Bengali, Punjabi, Marathi, ...	1
6	Korean (Hangul)	Korean	1
7	Dravidian family	Telugu, Tamil, ...	ε
8	Greek	Greek	ε
9	Khmer	Thai, Lao, Khmer	ε
10	Hebrew	Hebrew	ε

Ethiopic was less than insignificant

From the 1988 Article by Dr. Joseph D Becker entitled "UNICODE 88

In brief.....

- What is Ethiopic ?

- Significance of Ethiopia in World history

- Uniqueness of Ethiopic & Ethiopian culture

- Why Ethiopic alphabet was on the verge of extinction

- How Writing in Ethiopic has thrived because of the Unicode

- Who are the contributors of early implementation of Ethiopic in the Unicode.

Ethiopic/ኢትዮጲክ

○ Also known as Ge'ez

○ An ancient script some say goes before Christ

○ The Old Testament mentions refers to Ethiopia more than 50 times

○ Ethiopia is mention in the New Testament once

○ About 40AD: **Philip** the Evangelist was told by an angel to go to the road from Jerusalem to Gaza, and there he **met** the **Ethiopian**. He had been to Jerusalem to worship (Acts 8:27), and was returning home. The Ethiopian was sitting in his chariot reading the Book of Isaiah, and had come to Isaiah 53:7-8.

○ It is not clear what he was reading was in Ethiopic but at least Ethiopia has been a "Reading Culture"

Amharic Type Writer

Ethiopic Alphabet

Ethiopia's ancient Ge'ez script, also known as "Ethiopic", is one of the oldest alphabets still in use in the world.

- Ethiopic is used to write : Amharic; Tigrinya ; Ge'ez language (liturgical) and more than 80 other Ethiopian dialects

- Phonetic based Alphabet : Each character is a constant plus vowel

  - ሺ =She ; ጆ =Joe   ዩኒኮድ =Unicode;

- Semitic Origin but written left to write (unlike Hebrew & Arabic)

Ethiopic Alphabet

○ Before Ethiopic was introduced to computers only about 268 characters were in use mainly due to difficulty in accommodating them in a typewriter

○ It was a consideration to truncate the alphabet even below 268 during early Ethiopic computerization.

   ○ Elimination of similar sounding characters (70)

   ○ ሀ ሐ ኀ ኸ   * ሠ ሰ * አ ዐ * ፀ ጸ

   ○ Elimination of Rarely used characters : (37 characters)

   ○ ኴ ቌ ኹ � etc

Ethiopic Alphabet Before used for Printing
Before the Unicode

	a	u:	i:	a:	e:	(ə)	o:
h	ሀ	ሁ	ሂ	ሃ	ሄ	ህ	ሆ
l	ለ	ሉ	ሊ	ላ	ሌ	ል	ሎ
ḥ	ሐ	ሑ	ሒ	ሓ	ሔ	ሕ	ሖ
m	መ	ሙ	ሚ	ማ	ሜ	ም	ሞ
s	ሠ	ሡ	ሢ	ሣ	ሤ	ሥ	ሦ
r	ረ	ሩ	ሪ	ራ	ሬ	ር	ሮ
š	ሰ	ሱ	ሲ	ሳ	ሴ	ስ	ሶ
q	ቀ	ቁ	ቂ	ቃ	ቄ	ቅ	ቆ
b	በ	ቡ	ቢ	ባ	ቤ	ብ	ቦ
t	ተ	ቱ	ቲ	ታ	ቴ	ት	ቶ
ḫ	ኀ	ኁ	ኂ	ኃ	ኄ	ኅ	ኆ
n	ነ	ኑ	ኒ	ና	ኔ	ን	ኖ
'	አ	ኡ	ኢ	ኣ	ኤ	እ	ኦ

	a	u:	i:	a:	e:	(ə)	o:
k	ከ	ኩ	ኪ	ካ	ኬ	ክ	ኮ
w	ወ	ዉ	ዊ	ዋ	ዌ	ው	ዎ
'	ዐ	ዑ	ዒ	ዓ	ዔ	ዕ	ዖ
z	ዘ	ዙ	ዚ	ዛ	ዜ	ዝ	ዞ
y	የ	ዩ	ዪ	ያ	ዬ	ይ	ዮ
d	ደ	ዱ	ዲ	ዳ	ዴ	ድ	ዶ
g	ገ	ጉ	ጊ	ጋ	ጌ	ግ	ጎ
ṭ	ጠ	ጡ	ጢ	ጣ	ጤ	ጥ	ጦ
p̣	ጰ	ጱ	ጲ	ጳ	ጴ	ጵ	ጶ
ṣ	ጸ	ጹ	ጺ	ጻ	ጼ	ጽ	ጾ
ḍ	ፀ	ፁ	ፂ	ፃ	ፄ	ፅ	ፆ
f	ፈ	ፉ	ፊ	ፋ	ፌ	ፍ	ፎ
p	ፐ	ፑ	ፒ	ፓ	ፔ	ፕ	ፖ

	a	i:	a:	e:	(ə)
qʷ	ቈ	ቊ	ቋ	ቌ	ቍ
hʷ	ኈ	ኊ	ኋ	ኌ	ኍ

	a	i:	a:	e:	(ə)
kʷ	ኰ	ኲ	ኳ	ኴ	ኵ
gʷ	ጐ	ጒ	ጓ	ጔ	ጕ

	a	u:	i:	a:	e:	(ə)	o:
š	ሸ	ሹ	ሺ	ሻ	ሼ	ሽ	ሾ
v	ቨ	ቩ	ቪ	ቫ	ቬ	ቭ	ቮ
č	ቸ	ቹ	ቺ	ቻ	ቼ	ች	ቾ
ñ	ኘ	ኙ	ኚ	ኛ	ኜ	ኝ	ኞ

	a	u:	i:	a:	e:	(ə)	o:
x	ኸ	ኹ	ኺ	ኻ	ኼ	ኽ	ኾ
ž	ዠ	ዡ	ዢ	ዣ	ዤ	ዥ	ዦ
j	ጀ	ጁ	ጂ	ጃ	ጄ	ጅ	ጆ
č̣	ጨ	ጩ	ጪ	ጫ	ጬ	ጭ	ጮ

Left chart column headers:

120	121	122	123	124	125	126	127	128	129	12A	12B

Right chart column headers:

12C	12D	12E	12F	130	131	132	133	134	135	136	137

Now

- Ethiopic in the Unicode is 380+ characters   (U+1200 – U+137F)
  - Addition of non Amharic sounds
  - Extended Ethiopic
    ቐ ፤ ዸ ፤ ኜ ፤ ኗ ቕ
  - Music (Zeima)Notations
  - Punctuation Marks

- All 80 dialects/languages in Ethiopian can use Ethiopic Unicode if they choose to.

- Amharic speakers who can't read & Understand English can now read The Washington Post or LA Times in Amharic daily

The Unicode Chart

- https://www.unicode.org/charts/PDF/U1200.pdf

https://www.unicode.org/charts/PDF/U1200.pdf

Computerization Challenges

- Ethiopic was a very minor and "commercially un attractive"

  - As an HP engineer – I offered my first Amharic/Ethiopic word processor to Hewlett –Packard for FREE – HP declined but supported my after--hour work on Ethiopic

- Ethiopia as a country was experiencing its worst time in its history under a brutal military communist regime

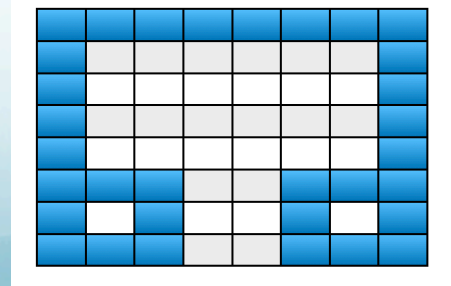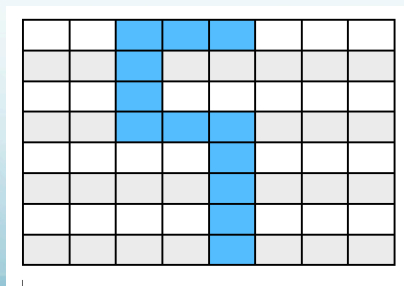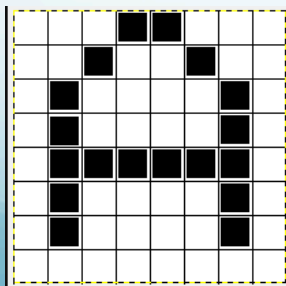- The task of accommodating over 230 variable widths characters was not trivial in 8-bit & ASCII environment

Fonts Design

- First designs were designed pixel by pixel
- In ASCII environment Limited
- Unicode made it possible for wide fonts
- Scanning
  - Font design software became available

- Now there are 1000's of Ethiopic fonts

Ethiopic Alphabet

○ Before Ethiopic was introduced to computers only about 268 characters were in use mainly due to difficulty in accommodating them in a type writer

○ Ethiopic and extended Ethiopic in the Unicode is 380+ characters (U+1200 – U+137F)

   ○ Addition of non Amharic sounds – Extended Ethiopic

     ○ ፚ ፧ ዷ ፧

○ It was a consideration to truncate the alphabet even below 268 during early Ethiopic computerization.

   ○ Elimination of similar sounding characters (70)

   ○ ሀ ሐ ኀ ኸ ⃰ ሠ ሰ ⃰ አ ዐ ⃰ ፀ ጸ

   ○ Elimination of Rarely used alphabets : (37 characters)

     ○ ኄ ቼ ኹ ጚ etc

The Story of **ሀ** (U+1200)

Unicode Character 'ETHIOPIC SYLLABLE HA' (U+1200)

ሀ

Browser Test Page
Outline (as SVG file)
Fonts that support U+1200

Unicode Data	
Name	ETHIOPIC SYLLABLE HA
Block	Ethiopic
Category	Letter, Other [Lo]
Combine	0

- **You can design your own keyboard and**
- **You assign keys (h+a) or (h+v) to U+1200**
- **This process is too easy so many are designing their own schemas and *Patent* them..**

- **Keyboard Input Methodology**
  - Not a Technical issue
  - Anyone can design Input methodology in few hours
    - Developers software available
    - The schema can be patented or Copyrighted
  - There is no standard but that doesn't mean App's and software are not compatible with each other
  - For example to type "ሀ"
    Some type : "HA" Some "HV" and some just " H"
    if you Google Ethiopic U+1200 you get this :
  -

- ## Applications :
  - ### 1000's of Ethiopic Applications
    - **Anything you can do with English Text you can do with Ethiopic**
      - **MS Excel/Word and PPT**
      - **Neon Signs ; Fancy Animations**
      - **Programming in Amharic**
      - **Design hardware & electro mechanical devices that use Ethiopic**

  - Not a Technical issues
  - Anyone can design Input methodology in few hours
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Keyboard Input Methodology

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-

Objectives of presentation is to:

○ Show how the unique nature of the history of the Ethiopic and the cultural environment

○ Describe how the addition of Ethiopic to the Unicode in 1996 has made a significant difference to the Ethiopian community and it has contributed to the survival and thriving of languages that use Ethiopic

○ Briefly discuss the unique aspects of Ethiopic and extended Ethiopic character set

○ Give credit to those that have contributed to the addition of Ethiopic to the Unicode and continuously working to improve it .

○ Briefly show some of the Amharic/Ethiopic Applications that were possible because of the Unicode

Demonstration of Amharic on the Computer in 1987
Addis Ababa, Ethiopia

Looking Amharic Fonts on the computer screen for the first time was like **a MIRACLE**

Fesseha Atlaw during a demonstration at Addis Ababa Hilton Hotel

UNICODE to the Rescue !

Dr. Joe Becker
Xerox; MIT

Fesseha Atlaw
HP; Dashen Engineering
1ˢᵗ Amharic Computer Demonstration

DASHEN ENGINEERING CO.
39120 ARGONAUT WAY, SUITE 161
FREMONT, CALIFORNIA 94538
415-791-1159 or 408-270-0636

*"....Joe Becker who has been working at Xerox to incorporate Many of the world's languages — contacted **Fesseha Atlaw** of HP Engineer who later formed Dashen Engineering and had developed font sets to be used in a multilingual word processor ... Initial proposal and inclusion of Ethiopic to the Unicode standard was made by the efforts **of Joe Becker and Fesseha Atlaw** ..."*   Ethiopian Computer News 1991

Other Early Contributors Include:
- * Daniel Admssie; * Feqade Mesfin;
- * YiTna FirdYiwok; * Yemane Russom
- * Abass Alemneh   * Amha Asfaw
  - **And Team Work by**
- Daniel Yacob; ; Michael Everson;
- Lloyd Anderson; Daniel Abera

- Terefe RasWork;
- Teshager Tesfaye; Matewos Worku
- Ted Kidane; Tadesse Tsegaye;
- Tekele Awdew; Yonas Fisseha; Tsehay Demeke
- Grum Ketema Samuel Kinde
- Rick McGowan, Hugh McGregor Ross & more

Prof. Getachew Haile ; Early user of the first Ethiopic Software developed by Fesseha Atlaw of Dashen Engineering Co,

ታኅሣሥ 20 ቀን፡ 1980 ዓ፡ም፡
Dec. 30, 1987

ለእ�ु፡ ፍሥሐ፡ እኛሳው፡

በንግግራችን፡ መሠረት፡ ሰኛ፡ጠዋት፡ ሥራ፡ ኅንደገባሁ፡
ለኮምፒውተሬ፡ የሚያስፈልገኝን፡ ዕቃ፡ አዘዝኩ፡፡ በአንድ፡ሳም
ንት፡ ውስጥ፡ ይደርሳልዛል፡ብለውኛል፡፡ ይኅንት፡ ልነግርህ፡
ማፉ፡ ስልኳ፡ ደውያልህ ፡ ነበር፡ በዚህ፡ ቤት፡ እቀመጣር፡
ኮምፒተ፡ አሳት፡ ሰዓት፡ ተኩል፡ ሳይ ፡፡

የምፈልገቸው፡ ተጨማሪ፡ ምልክቶች፡ በአገሬው፡ ወረቀት፡
ሳይ፡ ይሉት፡ ናቸው፡፡ እነሱንም ፡ ከቀረጽኳልኝ፡ ብዙ፡ቸግር
ይቃለልልኛል፡፡ የምንጼራው፡ በ Pc Write ነው፡፡ ወይስ
ት፡ ወደሌላ፡ ለመዛወር፡ እየሳብን፡ ነው፡ — ምናልባት፡
Word Perfect ወይም፡ Word.

ለአሁኑ፡ እውነት ፡መልግም ፡ ማኛፉን፡ እቀርባለሁ፡፡

ቸቸፈው፡ ኃይሌ፡፡

ለእት ፋሲካ ጸጋዬለው።

የእግርኛውን አደጻፍ ጋና ልሰራግ መዴ ለይ ጎን። ደለቸገረን።
ካሚ ጀውተፈ በይሁን ሊደከቸን ማግናቸ ነው። ባልቤ በእሳርኛ
የጸሑፈት መሠረን ልሞሁዴ አልነበራቸም።

1. እንዚቸን (ፀ፣ ፄ፣ ፆ …) ሊልገን ጸማናቸው እንደኩ ዩተ
ደበቀበተን በቃ ቸንግሬናሲ።

2. ለእንግሊዝኛው ዩዘጀሀልን ምልክቸቸ ሁሉም ዩጀርፈት
ከለደኩ ሊከ ለይ ሀናውን ለሞሁ ዣ፣ ፟፣ ኰ ለሰደፈ አሬልግ
ዩማግናው ዩግሰሬልገውን ዣ፣ ፟፣ ኸ ነው። ዩወ ዓዴናቸ ቸዠዘ
ካልሰን ብቀር ነው ?

3. የእግርኛውን ዩሊደኩቸን ቁናዩ ምነው ግፀብ ሃልከ
ሊብሰ ግሞሰ ካኺክ አብሰ እዴለ ሊ F2, ሊ F3, ሲ F4, ሴ F5,
ስ F6, ኰ F7 እንዴሆን እሰዴወኙሁም ?

እግናልበው ለሪሞት ጋሊ
ያቸው ሃጀሊ

Computer Applications using Ethiopic Unicode

○ Amharic translations (to and from any world language)
  ○ Google – Thank you !

○ Amharic Dictionary & Spell checker

○ Amharic Search engines

○ Amharic OCR (Microsoft; Google and others)

○ Speech to Text (Amharic Speech recognition)

○ Text to speech applications

○ Amharic Braille Encoding

○ Ethionux Operating system in Amharic

○ B4X IDE in Amharic & Other Amharic programming tools

Miscelleneous Ethiopic Software Links

https://ethiopicsoftware.org/index.html

https://www.facebook.com/Ethiopic.Software

https://ethiopicapps.com/

https://www.ethiocloud.com/

https://www.metaappz.com/

https://bunnatech.com/

https://www.senamirmir.org/senamirmir2023/#/home

http://abyssiniagateway.net/fidel/legends/

https://youtu.be/M95Nfj8huTQ?si=hDDDsFclKFMy5PFV