Typesetting the Deseret Alphabet with LaTeX and METAFONT

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Abstract. The Deseret Alphabet was an orthographical reform for English, promoted by the Church of Jesus Christ of Latter-day Saints (the Mormons) between about 1854 and 1875. An offshoot of the Pitman phonotypy reforms, the Deseret Alphabet is remembered mainly for its use of non-Roman glyphs. Though ultimately rejected, the Deseret Alphabet was used in four printed books, numerous newspaper articles, several unprinted book manuscripts, journals, meeting minutes, letters and even a gold coin, a tombstone and an early English-to-Hopi vocabulary. This paper reviews the history of the Deseret Alphabet, its Unicode implementation, fonts both metal and digital, and projects involving the typesetting of Deseret Alphabet texts.

1 Introduction

The Deseret Alphabet was an orthographical reform for English, promoted by the Church of Jesus Christ of Latter-day Saints (the Mormons) between about 1854 and 1875. While the Deseret Alphabet is usually remembered today as an oddity, a strange non-Roman alphabet that seemed doomed to failure, it was in fact used on and off for 20 years, leaving four printed books (including *The Book of Mormon*), numerous newspaper articles, several unprinted book manuscripts (including the entire *Bible*), journals, meeting minutes, letters and even a gold coin and a tombstone. There is also growing evidence that the Deseret Alphabet was experimentally used by some Mormon missionaries to transcribe words in Spanish, Shoshone, Hopi and other languages.

A number of historians [19, 11, 20, 21, 4, 1, 22, 6] have analyzed the Deseret Alphabet, which was justly criticized by typographers [21, 31], but what is often overlooked is the corpus of phonemically written documents, which are potentially interesting to both historians and linguists. Because few people, then or now, can be persuaded to learn the Alphabet, the majority of the documents have lain unread for 140 years. For example, in December of 2002, an "Indian Vocabulary" of almost 500 entries, written completely in the Deseret Alphabet,

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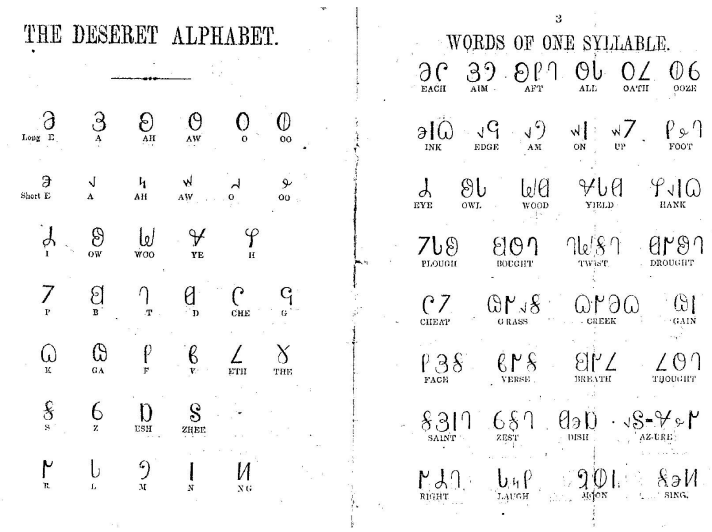


Fig. 1. On 24 March 1854 the newly adopted Deseret Alphabet was first printed, probably using wooden type, and presented to the Board of Regents of the Deseret University. Although this rare flier is undated, it matches the 38-letter Alphabet as copied into the journal of Regent Hosea Stout on that date [30]. Utah State Historical Society.

was finally identified as being English-to-Hopi, being perhaps the oldest written record of the Hopi language.

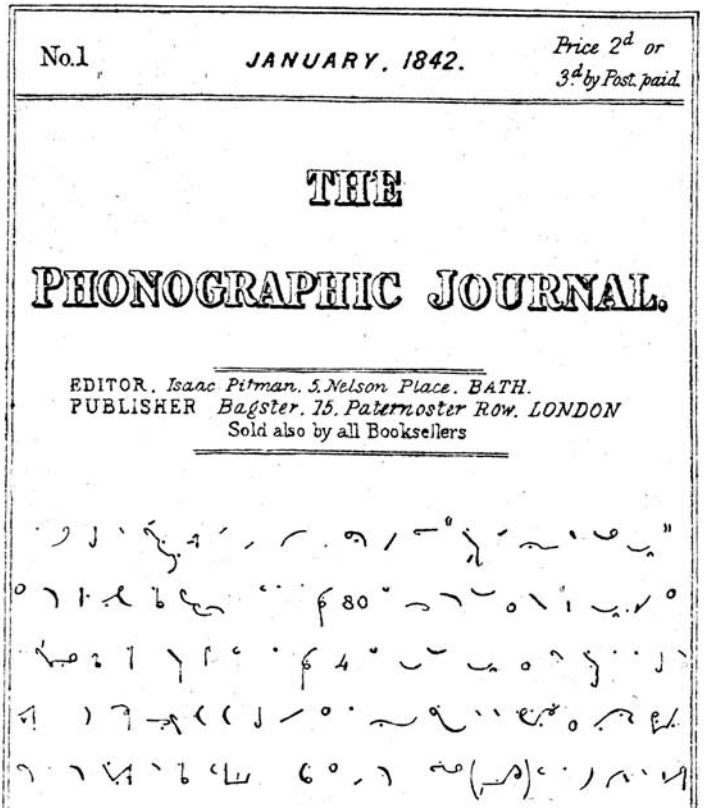
This paper will proceed with a short history of the Deseret Alphabet, putting it in the context of the Pitman phonotypy movement that inspired it from beginning to end[1]; special emphasis will be placed on the variants of the Alphabet used over the years, and on the cutting and casting of historical fonts. Then I will review some modern digital fonts and the implementation of the Deseret Alphabet in Unicode, showing how some honest mistakes were made and how the results are still awkward for encoding and typesetting some of the most interesting historical documents. Finally, I will show how I have used a combination of XML, LaTeX, the TIPA package and my own METAFONT-defined [16, 10] desalph font to typeset a critical edition of the English-to-Hopi vocabulary, and related documents, from 1859–60.

2 The Pitman Reform Context

2.1 The Pitman Reform Movements

To begin, it is impossible to understand the Deseret Alphabet without knowing a bit about two nineteenth-century orthographic reformers, Isaac Pitman (1813–1897) and his younger brother Benn (1822–1910). The Mormon experiments in

[1] Parts of this paper were first presented at the 22nd International Unicode Conference in San Jose, California, 11-13 September 2002 [6].


No.1 JANUARY. 1842. Price 2d or 3d by Post. paid.

THE

PHONOGRAPHIC JOURNAL.

EDITOR. Isaac Pitman. 5, Nelson Place. BATH.
PUBLISHER Bagster. 15. Paternoster Row. LONDON
Sold also by all Booksellers

Fig. 2. Early Pitman phonography.

orthographical reform, too often treated as isolated aberrations, were in fact influenced from beginning to end by the Pitman movements, at a time when many spelling reforms were being promoted.

Pitman Shorthand or Phonography. There have been hundreds of systems of stenography, commonly called shorthand, used for writing English; but Isaac Pitman's system, first published in his 1837 *Stenographic Sound-hand* and called "phonography"[2], was soon a huge success, spreading through the English-speaking world and eventually being adapted to some fifteen other languages. Modern versions of Pitman shorthand are still used in Britain, Canada, and in most of the cricket-playing countries; in the USA it was taught at least into the 1930s but was eventually overtaken by the Gregg system.

The main goal of any shorthand system is to allow a trained practitioner, called a "reporter" in the Pitman tradition, to record speech accurately at

[2] In 1839 he wrote *Phonography, or Writing by Sound, being also a New and Improved System of Short Hand.*

speed, including trial proceedings[3], parliamentary debates, political speeches, sermons, etc. Pitman's phonography, as the name implies, differs from most earlier systems in representing the distinctive sounds of English (what modern linguists call phonemes) rather than orthographical combinations. Simplicity and economy at writing time are crucial: consonants are reduced to straight lines and simple curves (see Figure 2). The "outline" of a word, typically just a string of consonants, is written as a single connected stroke, without lifting the pen. Voiced consonants are written as thick lines, their unvoiced counterparts as thin lines, which requires that a Pitman reporter use a nib pen or soft pencil. Vowels are written optionally as diacritical marks above and below the consonant strokes; one is struck by the similarities to Arabic orthography. In advanced styles, vowels are left out whenever possible, and special abbreviation signs are used for whole syllables, common words, and even whole phrases.

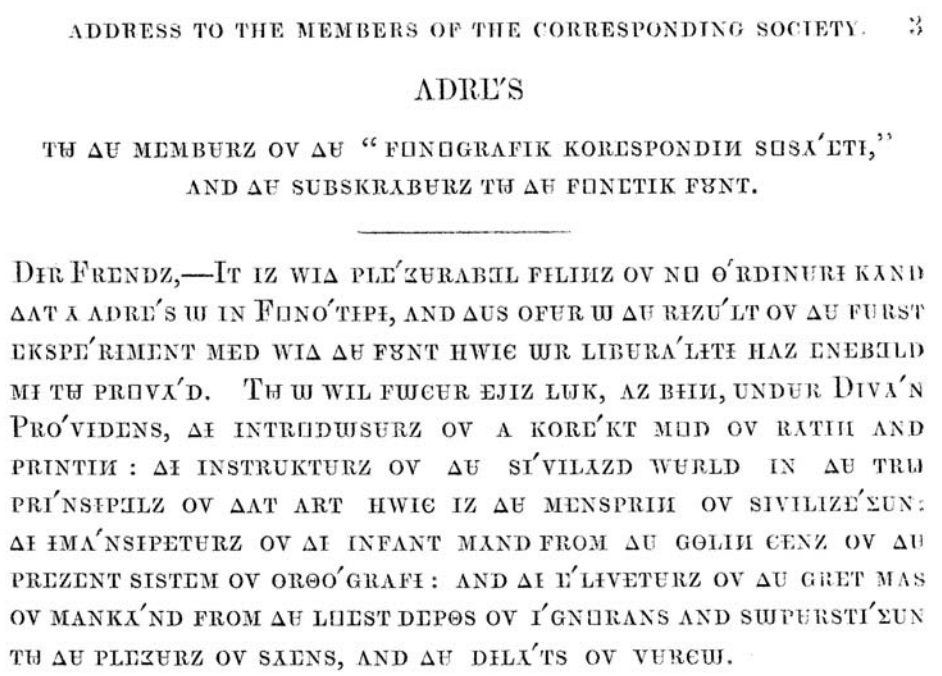
Pitman Phonotypy. Pitman became justifiably famous for his phonography. With help from several family members, he soon presided over a lecturing and publishing industry with a phenomenal output, including textbooks, dictionaries, correspondence courses, journals, and even books published in shorthand, including selections from Dickens, the tales of Sherlock Holmes, *Gulliver's Travels*, *Paradise Lost*, and the entire *Bible*. But while phonography was clearly useful, and was both a social and financial success, Pitman's biographers [25, 24, 2] make it clear that his real mission in life was not phonography but *phonotypy*[4], his philosophy and movement for reforming English orthography, the everyday script used in books, magazines, newspapers, personal correspondence, etc.

The first Pitman phonotypy alphabet for which type was cast was Alphabet No. 11, demonstrated proudly in *The Phonotypic Journal* of January 1844 (see Figure 3). Note that this 1844 alphabet is bicameral, sometimes characterized as an alphabet of capitals; that is, the uppercase and lowercase letters differ only in size. The letters are stylized, still mostly recognizable as Roman, but with numerous invented, borrowed or modified letters for pure vowels, diphthongs, and the consonants /θ/, /ð/, /ʃ/, /ʒ/, /ʧ/, /ʤ/ and /ŋ/[5].

[3] In modern parlance we still have the term *court reporter*.

[4] According to one of Pitman's own early scripts, which indicates stress, he pronounced the word /foˈnɒtipi/.

[5] To provide a faithful representation of original Pitman and Deseret Alphabet texts, I adopt a broad phonemic transcription that uses, as far as possible, a single International Phonetic Alphabet (IPA) letter for each English phoneme [12]. Thus the affricates ᶜ and ᵍ are transliterated as the rarely used IPA /ʧ/ and /ʤ/ letters, respectively, rather than the sequences /tʃ/ and /dʒ/ or even the tied forms /t͡ʃ/ and /d͡ʒ/. The diphthongs are shown in IPA as a combination of a nucleus and a superscript glide. The Deseret Alphabet, and the Pitman-Ellis 1847 alphabet which was its phonemic model, treat the /ʲu/ vowel in words like *mule* as a single diphthong phoneme; see Ladefoged [17] for a recent discussion and defense of this practice. Although in most English dialects the vowels in *mate* and *moat* are diphthongized, the Deseret Alphabet follows Pitman in treating them as the simple "long vowels" /e/ and /o/.



ADDRESS TO THE MEMBERS OF THE CORRESPONDING SOCIETY. 3

ADRL'S

TH ΔU MEMBURZ OV ΔU "FUNUGRAFIK KORESPONDIH SUSA'ETI,"
AND ΔU SUBSKRABURZ TH ΔU FUNETIK FΘNT.

DIR FRENDZ,—IT IZ WIΔ PLE'ΣURABUL FILIHZ OV NU O'RDINURI KΔND ΔAT Δ ADRE'S W IN FUNO'TIPI, AND ΔUS OFUR W ΔU RIZU'LT OV ΔU FURST EKSPE'RIMENT MED WIΔ ΔU FΘNT HWIC WR LIBURA'LΔTI HAZ ENEBUILD MI TH PRUVA'D. TH W WIL FWCUR EJIZ LUK, AZ BHIH, UNDUR DIVA'N PRO'VIDENS, ΔI INTRUDWSURZ OV A KORE'KT MUD OV RATIH AND PRINTIH : ΔI INSTRUKTURZ OV ΔU SI'VILΔZD WURLD IN ΔU TRH PRI'NSIPILZ OV ΔAT ART HWIC IZ ΔU MENSPRIH OV SIVILIZE'ΣUN: ΔI HMA'NSIPETURZ OV ΔI INFANT MΔND FROM ΔU GOLIH CENZ OV ΔU PRESENT SISTEM OV ORΘO'GRAFI : AND ΔI E'LIVETURZ OV ΔU GRET MAS OV MANKΔ'ND FROM ΔU LUEST DEPΘS OV I'GNURANS AND SUPURSTI'ΣUN TH ΔU PLEΣURZ OV SΔENS, AND ΔU DILΔ'TS OV VURCUI.

Fig. 3. In January 1844, Isaac Pitman proudly printed the first examples of his phonotypy. This Alphabet No. 11, and the five experimental variants that followed it, were bicameral, with uppercase and lowercase characters distinguished only by size.

The goals of general spelling reform, to create a new "book orthography", are quite different from those of shorthand. While shorthand is intended for use by highly trained scribes, a book orthography is for all of us and should be easily learned and used. Where shorthand requires simplicity, abbreviation and swiftness of writing, varying with the reporter's skill, a book orthography should aim for orthographical consistency, phonological completeness and ease of reading. Finally, a book orthography must lend itself to esthetic typography and easy typesetting; Pitman's phonographic books, in contrast, had to be engraved and printed via the lithographic process[6].

Pitman saw his popular phonography chiefly as the path leading to phonotypy, which was a much harder sell. His articles in the phonographic (shorthand) journals frequently pushed the spelling reform, and when invited to lecture on phonography, he reportedly managed to spend half the time talking about phonotypy. Throughout the rest of his life, Pitman proposed a long succession of alphabetic experiments, all of them Romanic, trying in vain to find a winning formula.

[6] Starting in 1873, Pitman succeeded in printing phonography with movable type, but many custom outlines had to be engraved as the work progressed.

Pitman's phonotypic publications include not only his phonotypic journals but dozens of books, including again the entire *Bible* (1850). But in the end, phonotypy never caught on, and the various phonotypic projects, including the constant cutting and casting of new type, were "from first to last a serious financial drain" [2]. In 1894, a few years before his death, Pitman was knighted by Queen Victoria for his life's work in phonography, with no mention made of his beloved phonotypy.

Today Pitman phonotypy is almost completely forgotten, and it has not yet found a champion to sponsor its inclusion in Unicode. But Pitman was far from alone – by the 1880s, there were an estimated 50 different spelling reforms under consideration by the English Spelling Reform Association. This was the general nineteenth-century context in which the Deseret Alphabet was born; lots of people were trying to reform English orthography.

2.2 The Mormons Discover the Pitman Movement

The Church of Jesus Christ of Latter-day Saints was founded in 1830 in upstate New York by Joseph Smith, a farm boy who claimed to have received a vision of God the Father and Jesus Christ, who commanded him to restore the true Church of Christ. He also claimed that he received from an angel a book, engraved on golden plates, which he translated as *The Book of Mormon*. His followers, who revered him as a prophet, grew rapidly in number, and soon, following the western movement and spurred by religious persecution, they migrated from New York, to Ohio, to Missouri and then to Illinois, where in 1839 they founded the city of Nauvoo on the Mississippi River.

Missionary work had started immediately, both at home and abroad, and in 1837, the same year that Pitman published his *Stenographic Sound-hand*, a certain George D. Watt was baptized as the first Mormon convert in England. Despite an unpromising childhood, which included time in a workhouse, young George had learned to read and write; and between the time of his baptism and his emigration to Nauvoo in 1842, he had also learned Pitman phonography. The arrival of Watt in Nauvoo revolutionized the reporting of Mormon meeting minutes, speeches and sermons. Other converts flowed into Nauvoo, so that by 1846 it had become, by some reports, the largest city in Illinois, with some 20,000 inhabitants.

But violence broke out between the Mormons and their "gentile" neighbors, and in 1844 Joseph Smith was assassinated by a mob. In 1845, even during the ensuing confusion and power struggles, Watt gave phonography classes; one notable student was Mormon Apostle Brigham Young. Watt was also President of the Phonographic Club of Nauvoo [1]. In addition to phonography, Watt was almost certainly aware of the new phonotypy being proposed by Pitman, and it is likely that he planted the idea of spelling reform in Brigham Young's mind at this time.

In 1846, Watt was sent on a mission back to England. The majority of the Church regrouped behind Brigham Young, abandoned their city to the mobs, and crossed the Mississippi River to spend the bleak winter of 1846–47 at Winter

Quarters, near modern Florence, Nebraska. From here Brigham Young wrote to Watt in April 1847[7]:

> It is the wish of the council, that you procure 200 lbs of phonotype, or thereabouts, as you may find necessary, to print a small book for the benefit of the Saints and cause same to be forwarded to Winter Quarters before navigation closes, by some trusty brother on his return, so that we have the type to use next winter.

The "phonotype" referred to is the actual lead type used for Pitman phonotypy. The Saints, meaning the members of the Church, were still in desperate times – 600 would die from exposure and disease at Winter Quarters – and while there is no record that this type was ever delivered, it shows that the Mormons' first extant plans for spelling reform involved nothing more exotic than an off-the-shelf Pitman phonotypy alphabet.

It is not known exactly which version of Pitman phonotypy Young had in mind; Pitman's alphabets went through no fewer than 15 variations between January 1844 and January 1847, and the isolated Mormons were likely out of date. In any case, Pitman's alphabets had by this time become more conventionally Roman. Alphabet No. 15 (see Figure 4), presented in *The Phonotypic Journal* of October 1844[8], marked Pitman's abandonment of the bicameral "capital" alphabets, and his adoption of alphabets that had distinguished uppercase vs. lowercase glyphs, which he called "lowercase" or "small letter" alphabets.

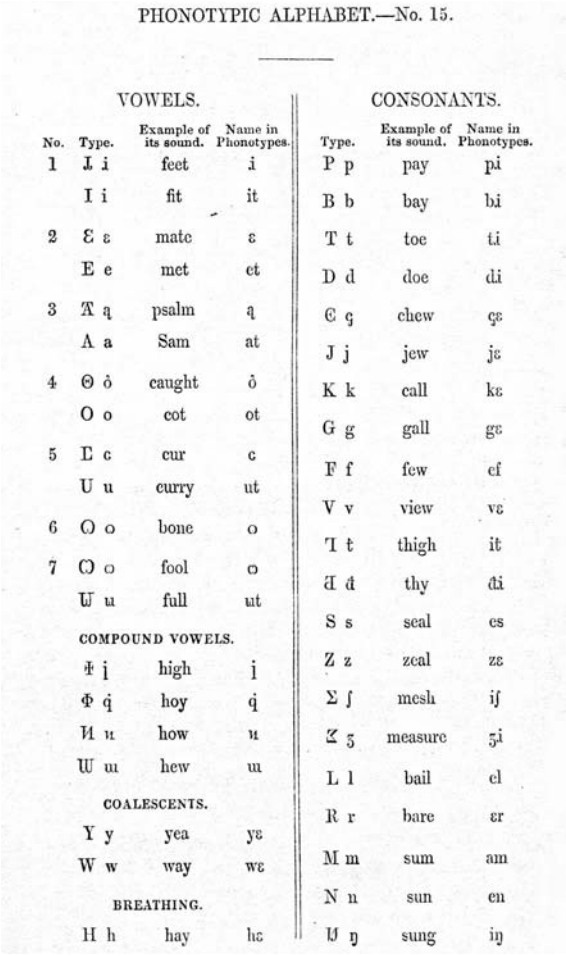
The Mormons started leaving Winter Quarters as soon as the trails were passable, and the first party, including Brigham Young, arrived in the valley of the Great Salt Lake in July of 1847, founding Great Salt Lake City. Mormon colonists were soon sent throughout the mountain west. They called their new land Deseret, a word from *The Book of Mormon* meaning honey bee. In response to Mormon petitions to found a State of Deseret, Congress established instead a Territory of Utah, naming it after the local Ute Indians. In spite of this nominal rebuff, Brigham Young was appointed Governor, and the name Deseret would be applied to a newspaper, a bank, a university, numerous businesses and associations, and even a spelling-reform alphabet. The name Deseret, and the beehive symbol, remain common and largely secularized in Utah today.

3 The History of the Deseret Alphabet

3.1 Deliberations: 1850–1853

Education has always been a high priority for the Mormons, and on 13 March 1850 the Deseret University, now the University of Utah, was established under a Chancellor and Board of Regents that included the leading men of the new society. Actual teaching would not begin for several years, and the first task given to the Regents was to design and implement a spelling reform.

[7] *The Latter-day Saints' Millennial Star*, vol. 11, 1847, p. 8.
[8] *The Phonotypic Journal*, vol. 3, no. 35, Oct. 1844.



PHONOTYPIC ALPHABET.—No. 15.

VOWELS.

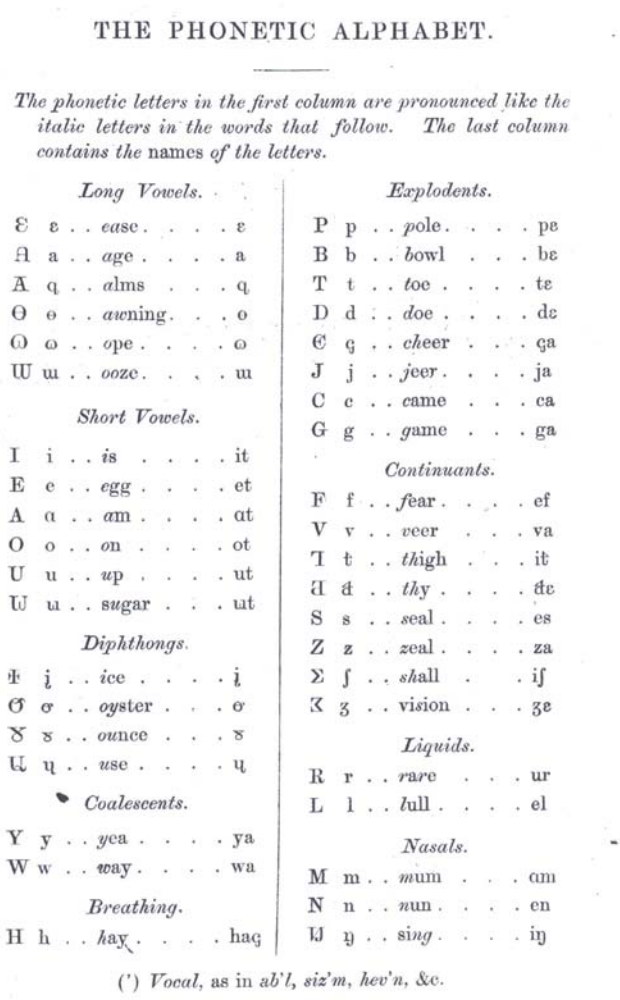
No.	Type.	Example of its sound.	Name in Phonotypes.
1	ɹ ɹ	feet	ɹi
	I i	fit	it
2	Ɛ ɛ	mate	ɛ
	E e	met	et
3	Ꞧ ą	psalm	ą
	A a	Sam	at
4	Θ ȯ	caught	ȯ
	O o	cot	ot
5	Ɛ c	cur	c
	U u	curry	ut
6	Ɔ ɔ	bone	ɔ
7	Ɔ ɔ	fool	ɔ
	Ʊ ʊ	full	ʊt
	COMPOUND VOWELS.		
	Ɨ ɨ	high	ɨ
	Φ q̇	hoy	q̇
	И и	how	и
	Ш ш	hew	ш
	COALESCENTS.		
	Y y	yea	yɛ
	W w	way	wɛ
	BREATHING.		
	H h	hay	hɛ

CONSONANTS.

Type.	Example of its sound.	Name in Phonotypes.
P p	pay	pɹi
B b	bay	bɹi
T t	toe	tɹi
D d	doe	dɹi
Є ç	chew	çɛ
J j	jew	jɛ
K k	call	kɛ
G g	gall	gɛ
F f	few	ef
V v	view	vɛ
Ƭ ƭ	thigh	iƭ
Ƌ đ	thy	đɹi
S s	seal	es
Z z	zeal	zɛ
Σ ʃ	mesh	iʃ
Ƶ ʒ	measure	ʒɹi
L l	bail	el
R r	bare	ɛr
M m	sum	am
N n	sun	en
Ʊ ŋ	sung	iŋ

Fig. 4. Alphabet No. 15 appeared in October 1844 and was the first of Pitman's "lowercase" or "small letter" alphabets, employing separate glyphs for uppercase and lowercase letters.

Although serious discussion of spelling reform began in 1850, I will jump ahead to 1853, when the Regency met regularly in a series of well-documented meetings leading to the adoption of the Deseret Alphabet. Throughout that year, the Regents presented to each other numerous candidate orthographies ranging from completely new alphabets, to Pitman shorthand, to minimal reforms that used only the traditional 26-letter Roman alphabet with standardized use of digraphs. The discussion was wide open, but by November of 1853, it was clear that the "1847 Alphabet" (see Figure 5), a 40-letter version backed jointly by Isaac Pitman and phonetician Alexander J. Ellis [15], was the recommended model. The 1847 Alphabet was presented to the Board in a surviving chart (see Figure 6) and the meeting minutes were even being delivered by reporter George D. Watt in the longhand form of this alphabet.



THE PHONETIC ALPHABET.

The phonetic letters in the first column are pronounced like the italic letters in the words that follow. The last column contains the names *of the letters.*

Long Vowels.

Ɛ	ɛ	*ease*	ɛ
Ā	a	*age*	a
Ä	ɑ	*alms*	ɑ
Ō	o	*awning*	o
Ō	ω	*ope*	ω
Ū	ɯ	*ooze*	ɯ

Short Vowels.

I	i	*is*	it
E	e	*egg*	et
A	ɑ	*am*	ɑt
O	o	*on*	ot
U	u	*up*	ut
Ŭ	ɯ	*sugar*	ɯt

Diphthongs.

Ɨ	ɨ	*ice*	ɨ
Ơ	ơ	*oyster*	ơ
Ȣ	ȣ	*ounce*	ȣ
Ų	ų	*use*	ų

Coalescents.

Y	y	*yea*	ya
W	w	*way*	wa

Breathing.

H	h	*hay*	haɕ

Explodents.

P	p	*pole*	pɛ
B	b	*bowl*	bɛ
T	t	*toe*	tɛ
D	d	*doe*	dɛ
Ȼ	ɕ	*cheer*	ɕa
J	j	*jeer*	ja
C	c	*came*	ca
G	g	*game*	ga

Continuants.

F	f	*fear*	ef
V	v	*veer*	va
Ƭ	ƭ	*thigh*	iƭ
Đ	đ	*thy*	đɛ
S	s	*seal*	es
Z	z	*zeal*	za
Σ	ʃ	*shall*	iʃ
Ʒ	ʒ	*vision*	ʒɛ

Liquids.

R	r	*rare*	ur
L	l	*lull*	el

Nasals.

M	m	*mum*	ɑm
N	n	*nun*	en
Ŋ	ŋ	*sing*	iŋ

(') *Vocal,* as in *ab'l, siz'm, hev'n,* &c.

Fig. 5. The 1847 Alphabet of Alexander J. Ellis and Isaac Pitman as it appeared in Pitman's 1850 *Bible*. This alphabet was the main phonemic model for the Deseret Alphabet in late 1853. The Board of Regents of the Deseret University almost adopted a slightly modified form of this alphabet, but they were persuaded, at the very last moment, to change to non-Roman glyphs. Compare the layout of this chart to that of the Deseret Alphabet charts in the books of 1868–69 (see Figure 17).

Brigham Young, President of the Church of Jesus Christ of Latter-day Saints and Governor of the Territory of Utah, took a personal interest in the 1853 meetings, attending many and participating actively. On the 22nd and 23rd of November, he and the Regents adopted their own modified version of the 1847 Alphabet, with some of the glyphs modified or switched, and names for the letters were adopted. A couple of Pitman letters were simply voted out, namely those for the diphthongs /ɔʲ/ and /ʲu/, which are exemplified with the words *oyster* and *use* in the 1847 chart. The result was a 38-letter alphabet, still very

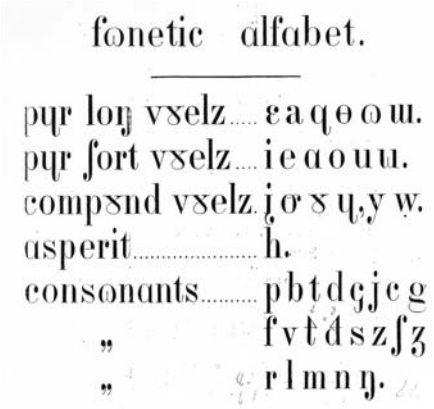


Fig. 6. In November 1853, Parley P. Pratt presented "Pitman's Alphabet in Small Letters" to the Board of Regents in the form of this chart. These are in fact just the lowercase letters of the famous 1847 Alphabet devised by Isaac Pitman and Alexander J. Ellis. More stable than Pitman's other alphabets, it lasted several years and was used to print a short-lived newspaper called *The Phonetic News* (1849), the *Bible* (1850), and other books. LDS Church Archives.

Pitmanesque and Romanic. For the second time – the first was in 1847 – the Mormons were about to embark on a Pitman-based spelling reform.

However, all plans were turned upside-down by the sudden arrival of Willard Richards at the meeting of 29 November 1853. Richards, who was Second Counselor to Brigham Young, was gravely ill, had not attended the previous meetings, and was not up to date on the Board's plans. But when he saw the Board's new Romanic alphabet on the wall, he could not contain his disappointment. The following excerpts, shown here in equivalent IPA to give the flavor of George D. Watt's original minutes, speak for themselves:

> wi wɒnt e nju kaʲnd ɒv ælfæbɛt, dɪfɛrɪŋ frɒm ðɪ kɒmpaʷnd mɛs ɒv stʌf ʌpɒn ðæt ʃɪt.... ðoz kærækt̷ɛrz me bi ɛmplɒɪd ɪn ɪmpruvɪŋ ðɪ ŋglɪʃ ɒrθɒgræfɪ, ðo æt ðɪ sem taʲm, ɪt ɪz æz aʲ hæv sʌmtaʲmz sɛd, ɪt simz laʲk pʌtɪŋ nju waʲn ɪmtu old bɒtlz.... aʲ æm ɪmklaʲnd tu θɪŋk hwɛn wi hæv rɪflɛkt̷ɛd lɒŋɛr wi ʃæl stɪl mek sʌm ædvæns ʌpɒn ðæt ælfæbɛt, ænd prhæps θro æwe ɔl kærækt̷ɛrz ðæt ber mʌʧ rɪzɛmblɛns tu ðɪ ŋglɪʃ kærækt̷ɛrs, ænd ɪmtrodjus æn ælfæbɛt ðæt ɪz ɒrɪʤɪmæl, so fɑr æz wi no, æn ælfæbɛt ɛntaʲrlɪ dɪfɛrɛnt frɒm ɛnɪ ælfæbɛt ɪn jus[9].

[9] "We want a new kind of alphabet, differing from the compound mess of stuff upon that sheet. ... Those characters may be employed in improving the English orthography, though at the same time, it is as I have sometimes said, it seems like putting new wine into old bottles. ... I am inclined to think when we have reflected longer we shall still make some advance upon that alphabet, and perhaps throw away all characters that bear much resemblance to the English characters, and introduce an alphabet that is original, so far as we know, an alphabet entirely different from any alphabet in use."

Some objections were tentatively raised. It was pointed out that the key committee had been instructed to keep as many of the traditional Roman letters as possible, and that Brigham Young himself had approved the alphabet and had already discussed ordering 200 pounds of type for it. Richards then attenuated his criticism a bit, but renewed his call for a complete redesign, waxing rhetorical:

> whɒt hæv ju gend baʲ ði ælfæbɛt ɒn ðæt kɑrd aʲ æsk ju. ʃo mi wʌn aʲtɛm, kæn ju pɒint aʷt ði fɛrst ædvæntɛʤ ðæt ju hæv gend ovɛr ði old wʌn? ... hwɒt hæv ju gend, ju hæv ði sem old ælfæbɛt ovɛr ægɛn, onlɪ a fju ædiʃnæl mɑrks, ænd ðe onlɪ mɪstɪfaʲ ɪt mor, ænd mor.[10]

Richards believed fervently that the old Roman letters varied too much in their values, that no one would ever agree on their fixed use, and that keeping them would just be a hindrance; a successful, lasting reform would require starting with a clean slate. He also argued for economy in writing time, paper and ink. These arguments anticipated those advanced by George Bernard Shaw in the 20th century to support the creation of what is now known as the Shaw or Shavian Alphabet [28, 18][11].

Brigham Young and the Board of Regents were persuaded, the Board's modified Pitman alphabet was defenestrated, and the first version of a new non-Roman alphabet was adopted 22 December 1853, with 38 original glyphs devised by George D. Watt and perhaps also by a lesser-known figure named John Vance. The Deseret Alphabet was born.

3.2 Early Deseret Alphabet: 1854–1855

In Salt Lake City, the *Deseret News* announced the Alphabet to its readers 19 January 1854:

> The Board of Regents, in company with the Governor and heads of departments, have adopted a new alphabet, consisting of 38 characters. The Board have held frequent sittings this winter, with the sanguine hope of simplifying the English language, and especially its Orthography. After many fruitless attempts to render the common alphabet of the day subservient to their purpose, they found it expedient to invent an entirely new and original set of characters.
>
> These characters are much more simple in their structure than the usual alphabetical characters; every superfluous mark supposable, is wholly excluded from them.
>
> The written and printed hand are substantially merged into one.

[10] "What have you gained by the alphabet on that card I ask you. Show me one item, can you point out the first advantage that you have gained over the old one? ... What have you gained, you have the same old alphabet over again, only a few additional marks, and they only mystify it more, and more."

[11] `http://www.shavian.org/`

Type of some kind, almost certainly wooden[12], was soon prepared in Salt Lake City, and on 24 March 1854 a four-page folded leaflet with a chart of the Deseret Alphabet was presented to the Board (see Figure 1). In this early 1854 version of the Alphabet, we find 38 letters, the canonical glyphs being drawn with a broad pen, with thick emphasis on the downstrokes, and light upstrokes and flourishes. The short-vowel glyphs are represented smaller than the others.

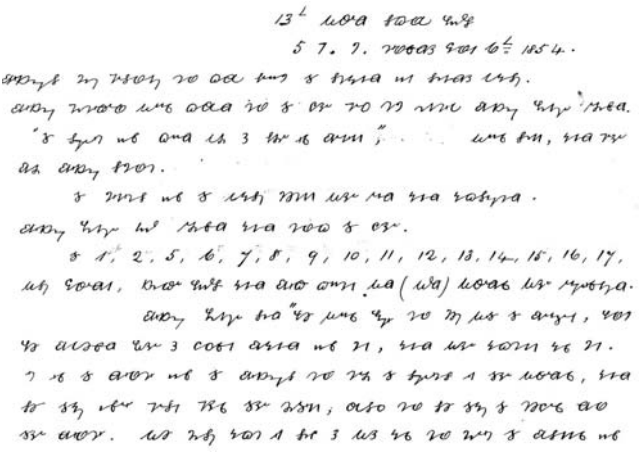


Fig. 7. Extract from the minutes of a Bishops' meeting, 6 June 1854, concerning the support of the poor. These minutes, written in a cursive, stenographic style, were prepared by George D. Watt and addressed directly to Brigham Young. LDS Church Archives.

George D. Watt was the principal architect of the Deseret Alphabet and, judging by surviving documents, was also the first serious user. Watt was a Pitman stenographer, and the early documents (see Figure 7) are written in a distinctly stenographic style[13]. Watt drew the outline of each word cursively, without lifting the pen. Short vowels, shown smaller than the other glyphs in the chart, were incorporated into the linking strokes between the consonants; thus vowels were usually written on upstrokes, which explains their canonical thin strokes and shorter statures in the first chart. The writer had to go back and cross the 𐑑 vowels after finishing the outline; and often short vowels were simply left out.

The demands of cursive writing seem to have influenced the design of several of the letters. In particular, the fussy little loops on the 𐑛 (/d/), 𐑕 (/s/), 𐑜 (/g/), 𐑪 (/ɔ/) and 𐑝 (/a^{w}/) were used to link these letters with their neighbors. Watt also combined consonants together with virtuosity, "amalgamating" them together to save space, but at the expense of legibility. Another lamentable

[12] *Deseret News*, 15 August 1855.

[13] James Henry Martineau was another early cursive writer.

Fig. 8. Rémy and Brenchley almost certainly copied this chart from an almost identical one in W.W. Phelps' *Deseret Almanac* of 1855. With the addition of letters for /ɔʲ/ and /ʲu/, this 40-letter version of the Deseret Alphabet had the same phonemic inventory as the Pitman-Ellis 1847 Alphabet.

characteristic of the early style was the inconsistent use of letters, sometimes to represent their phonemic value and sometimes to represent their conventional name. Thus Watt writes *people* as the equivalent of /ppl/, expecting the reader to pronounce the first p-letter as /pi/, that being the letter's conventional name when the alphabet is recited. Similarly, Watt can spell *being* as the equivalent of just /bŋ/, the letters having names pronounced /bi/ and /ŋ/, respectively. While probably seen by shorthand writers as a clever way to abbreviate and speed their writing, the confusion of letter names and letter values is a mistake in any book orthography.

Like Isaac Pitman, the Mormons could not resist experimenting with their new alphabet, changing both the inventory of letters and the glyphs. The 1854 alphabet was almost immediately modified, substituting new glyphs for /ɪ/ and /aʷ/ and adding two new letters for the diphthongs /ɔʲ/ and /ʲu/, making a 40-letter alphabet as printed in the 1855 *Deseret Almanac* of W.W. Phelps. This chart was almost certainly the one copied by Rémy and Brenchley [27] who visited Salt Lake City in 1855 (see Figure 8)[14].

[14] For yet another chart of this version of the Alphabet, see Benn Pitman's *The Phonographic Magazine*, 1856, pp. 102–103.

Watt apparently believed that the same basic alphabet could serve for both stenography and everyday orthography, or as the *Deseret News*, cited above, put it, "The written and printed hand are substantially merged into one." This was in fact an early goal of phonotypy, but it was soon abandoned by Pitman as impractical [15]. The retention of this old idea contributed to making the Deseret Alphabet an esthetic and typographical failure.

One of the fundamental design problems in the Alphabet was the elimination of ascenders and descenders. This was done in a well-intentioned attempt to make the type last longer – type wears out during use, and the ascenders and descenders wear out first – but the lamentable result was that all typeset words have a roughly rectangular shape, and lines of Deseret printing become very monotonous. Some of the glyphs, in particular 𐐮 and 𐐯, are overly complicated; and in practice writers often confused the pairs 𐐀 vs. 𐐯 and 𐐁 vs. 𐐃. These fundamental design problems need to be distinguished from the font-design problems, which will be discussed below.

3.3 The 1857 St. Louis Font

The reform was moving a bit slowly. On 4 February 1856 the Regents appointed George D. Watt, Wilford Woodruff, and Samuel W. Richards to prepare manuscripts and arrange for the printing of books. The journals of Richards and Woodruff show that they went at it hammer and tongs, working on elementary readers and a catechism intended for teaching religious principles to children. The next step was to get a font made.

There are references to an attempt, as early as 1855, to cut Deseret Alphabet punches right in Utah, by a "Brother Sabins"[15], but there is as yet no evidence that this project succeeded. In 1857, Erastus Snow was sent to St. Louis to procure type, engaging the services of Ladew & Peer, which was the only foundry there at the time [31]. But Snow abandoned the type and hurried back to Utah when he discovered that President Buchanan had dispatched General Albert Sydney Johnston to Utah with 2500 troops from Fort Leavenworth, Kansas, to put down a reported Mormon rebellion and install a new non-Mormon governor. The news of "Johnston's Army" reached Salt Lake City 24 July 1857, when the alleged rebels were gathered for a picnic in a local canyon to celebrate the tenth anniversary of their arrival in Utah. In the ensuing panic, Salt Lake City and the other northern settlements were abandoned, and 30,000 people packed up their wagons and moved at least 45 miles south to Provo. The territorial government, including records and the printing press, were moved all the way to Fillmore in central Utah. While this bizarre and costly fiasco, often called the Utah War or Buchanan's Blunder, was eventually resolved peacefully, it was another setback to the Deseret Alphabet movement.

By late 1858, the Utah War was over, the St. Louis type had arrived in Salt Lake City, and work recommenced. It is very likely that only the punches

[15] *The Latter-day Saints' Millennial Star*, 10 November 1855. The reference is probably to John Sabin (not Sabins), who was a general mechanic and machinist.

and matrices were shipped to Utah[16], and that the Mormons did the actual type casting themselves. The children's texts prepared by the committee of Woodruff, Richards and Watt had been lost; unfazed, Brigham Young told Woodruff to "take hold with Geo. D. Watt and get up some more"[17]. The first use of the new type was to print a business card for George A. Smith, the Church Historian. The stage was now set for the revival of the Deseret Alphabet reform in 1859–60.

3.4 The Revival of 1859–1860

Sample Articles Printed in the *Deseret News*. The period of 1859–60 was a busy and productive one for the Deseret Alphabet. The type was finally available, and on 16 February 1859 the *Deseret News* printed a sample text from the Fifth Chapter of Matthew, the Sermon on the Mount. Similar practice texts, almost all of them scriptural, appeared almost every week to May 1860. Despite this progress, everyone involved was extremely disappointed with the St. Louis font, which was crudely cut and ugly by any standards. Young felt that the poor type did as much as anything to hold back the reform.

The 1859 Alphabet as printed in the *Deseret News* (see Figure 9) had reverted to 38 letters, lacking dedicated letters for the diphthongs /ɔʲ/ and /ʲu/, which had to be printed with digraphs; but the *Deseret News* apologized for the lack of a /ʲu/ letter and promised a correction as soon as a new punch could be cut[18].

In 2002 I found the punches for the 1857 St. Louis font in the LDS Church Archives (see Figure 10). There proved to be only 36 punches in each of three sizes, but investigation showed that they were originally intended to support a 40-letter version of the Alphabet. The trick was the double use of four of the punches, rotating them 180 degrees to strike a second matrix. Thus the punch for 𐑕 also served to strike the matrix for 𐑓; the punch for 𐑗 also served for 𐑖; and similarly for the pairs 𐑚–𐑞 and 𐑛–𐑟. The sets include punches for the /ɔʲ/ and /ʲu/ diphthongs, being 𐑹 and 𐑺, respectively, but these glyphs had apparently fallen out of favor by 1859 and were not used in the *Deseret News*.

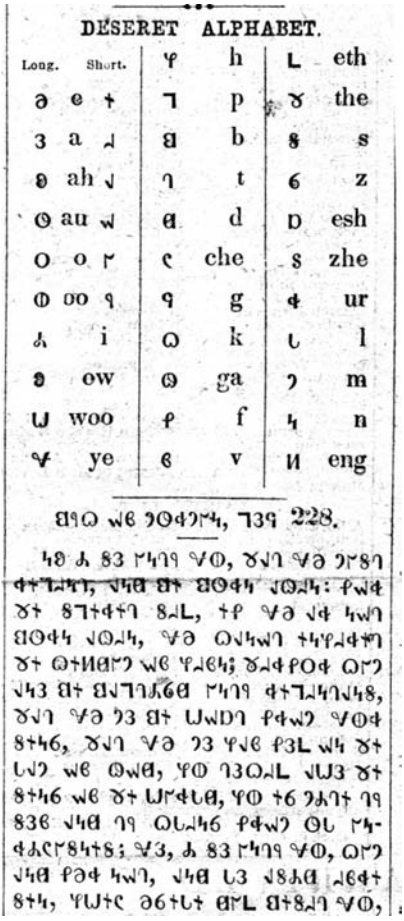
Handwritten Deseret Alphabet in 1859–60. Brigham Young directed his clerks to use the Alphabet, and the history or biography of Brigham Young was kept in Deseret Alphabet at this time. Another surviving text from this period is the financial "Ledger C", now held at Utah State University (see Figure 12). This ledger was probably kept by clerk T.W. Ellerbeck who later wrote [19], "During one whole year the ledger accounts of President Young were kept by me in those characters, exclusively, except that the figures of the old style were used, not having been changed."

The Ledger C alphabet has 39 letters, including the glyph 𐑽 for /ʲu/ but using a digraph for /ɔʲ/. The Ledger abandons the Alphabet in May of 1860, at

[16] *Deseret News*, 16 February 1859.

[17] Journal History, 20 November 1858. The journal of Wilford Woodruff for 22 November 1858 indicates that the manuscripts were soon found.

[18] The *Deseret News* also promised a new letter for the vowel in *air*, which was a highly suspect distinction made in some Pitman alphabets.



DESERET ALPHABET.

Long.	Short.					
𐐀	𐐨	𐐯	𐐑	h	𐐭	eth
𐐁	a	𐐰	𐐒	p	𐐮	the
𐐂	ah	𐐱	𐐓	b	𐐯	s
𐐃	au	𐐲	𐐔	t	𐐰	z
𐐄	o	𐐳	𐐕	d	𐐱	esh
𐐅	oo	𐐴	𐐖	che	𐐲	zhe
𐐆	i	𐐵	𐐗	g	𐐳	ur
𐐇	ow	𐐶	𐐘	k	𐐴	l
𐐈	woo	𐐷	𐐙	ga	𐐵	m
𐐉	ye	𐐸	𐐚	f	𐐶	n
			𐐛	v	𐐷	eng

𐐒𐐖𐐊 𐐌𐐸 𐐖𐐘𐐙𐐳𐐶, 𐐙𐐖𐐔 228.

𐐶𐐸 𐐯 83 𐐳𐐶𐐖 𐐉𐐊, 𐐮𐐖𐐔 𐐉𐐸 𐐖𐐳𐐶
𐐯𐐭𐐳𐐶, 𐐶𐐸𐐒 𐐒𐐯 𐐒𐐘𐐘𐐶 𐐖𐐊𐐳𐐶: 𐐷𐐌𐐯
𐐮𐐯 𐐯𐐙𐐯𐐯𐐖 𐐯𐐊𐐿, 𐐯𐐷 𐐉𐐸 𐐖𐐌 𐐶𐐌𐐖
𐐒𐐘𐐘𐐶 𐐖𐐊𐐳𐐶, 𐐉𐐸 𐐊𐐖𐐶𐐌𐐖 𐐯𐐶𐐷𐐳𐐯𐐖
𐐮𐐯 𐐊𐐯𐐒𐐙𐐖 𐐌𐐸 𐐷𐐳𐐸𐐶; 𐐮𐐳𐐯𐐘𐐷𐐊𐐘 𐐘𐐙𐐖
𐐖𐐶3 𐐒𐐯 𐐒𐐖𐐙𐐶𐐗𐐸 𐐙𐐶𐐖 𐐯𐐯𐐙𐐶𐐖𐐖𐐯𐐯,
𐐮𐐖𐐖 𐐉𐐸 𐐸3 𐐒𐐯 𐐙𐐌𐐒𐐖 𐐷𐐯𐐌𐐖 𐐉𐐘𐐯
𐐯𐐯𐐶6, 𐐮𐐖𐐖 𐐉𐐸 𐐸3 𐐉𐐳𐐸 𐐷3𐐿 𐐌𐐶 𐐮𐐯
𐐖𐐖𐐙 𐐌𐐸 𐐘𐐌𐐒, 𐐉𐐘 𐐖3𐐘𐐿 𐐖𐐙3 𐐮𐐯
𐐯𐐯𐐶6 𐐌𐐸 𐐮𐐯 𐐙𐐳𐐯𐐷𐐒, 𐐉𐐘 𐐯6 𐐸𐐶𐐖𐐯 𐐖𐐖
𐐯3𐐸 𐐖𐐒𐐒 𐐖𐐖 𐐘𐐙𐐖𐐶6 𐐷𐐯𐐌𐐖 𐐘𐐙 𐐳𐐶-
𐐯𐐶𐐳𐐳𐐯𐐶𐐯𐐯; 𐐉3, 𐐶 83 𐐳𐐶𐐖 𐐉𐐘, 𐐘𐐳𐐙
𐐖𐐶𐐒 𐐷𐐸𐐯 𐐶𐐌𐐖, 𐐖𐐶𐐒 𐐖3 𐐖𐐯𐐶𐐒 𐐿𐐸𐐯𐐯
𐐯𐐯𐐶, 𐐉𐐙𐐯𐐳 𐐸6𐐯𐐙𐐯 𐐒𐐳𐐿 𐐒𐐯𐐯𐐖 𐐉𐐘,

Fig. 9. The *Deseret News* printed sample articles in the Deseret Alphabet in 1859–60, and again in 1864, using the crude St. Louis type of 1857. This article, of which only a portion is shown here, appeared in the issue of 30 November 1864, vol. XIV, no. 9, which also included reports of the fall of Atlanta, Georgia to General Sherman during the American Civil War.

the same time that the *Deseret News* stopped printing sample articles, and the Deseret text was at some point given interlinear glosses in standard orthography.

My own favorite document from this era is the Deseret Alphabet journal of Thales Hastings Haskell [29], kept from 4 October 1859 to the end of that year while he and Marion Jackson Shelton[19] were serving as Mormon missionaries

[19] Shelton also kept a journal in 1858–59, in a mix of standard orthography, Pitman shorthand, and some Deseret Alphabet. LDS Church Archives.

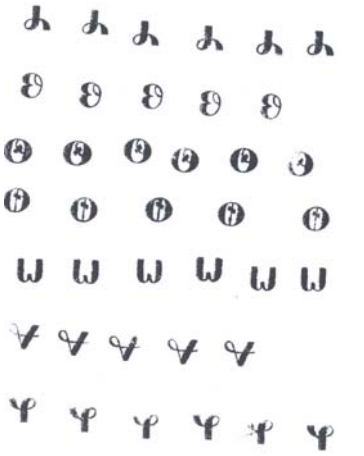


Fig. 10. Some smoke proofs of the 1857 St. Louis punches, found in 2002 in the LDS Church Archives. The 𐐮 and 𐐯 glyphs, representing /ɔʲ/ and /ʲu/, respectively, were not used when the *Deseret News* finally started printing sample articles with the type in 1859.

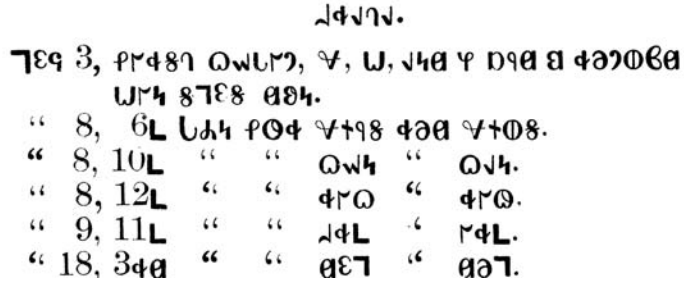


Fig. 11. A portion of the errata sheet, printed in Utah using the St. Louis type of 1857, for *The Deseret First Book* of 1868. A much better font was cut for printing the readers (see Figure 15), but it was left in the care of Russell Bros. in New York City.

to the Hopi[20]. They were staying in the Third-Mesa village of Orayvi (also spelled Oribe, Oraibi, etc.), now celebrated as the oldest continuously inhabited village in North America. Haskell used a 40-letter version of the alphabet, like the contemporary *Deseret News* version, but adding ʔ for /ʲu/ and, idiosyncratically, 𐐯 for /ɔʲ/. The original manuscript is faint and fragile; the following is a sample in typeset Deseret Alphabet and equivalent IPA:

[20] The original journal is in Special Collections at the Brigham Young University Library. At some unknown time after the mission, Haskell himself transcribed the Deseret text into standard orthography, and this transcription was edited and published by Juanita Brooks in 1944 [9].

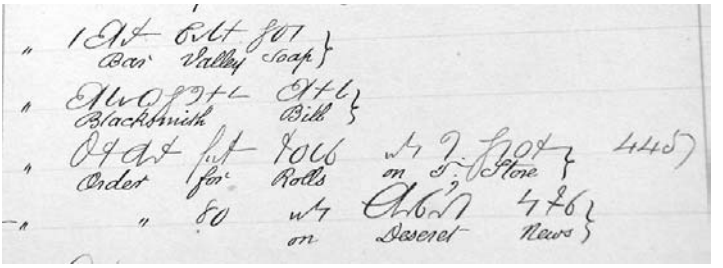


Fig. 12. *Ledger C* of 1859-60, probably kept by T.W. Ellerbeck, illustrates an idiosyncratic 39-letter version of the Deseret Alphabet. There are still cursive links and "amalgamations" in this text, but far fewer than in George D. Watt's early texts of 1854–55. Interlinear glosses in traditional orthography were added later. Utah State University.

𐐒𐑊𐑉 𐑓𐑗 𐑙𐑜𐐮 𐑚𐑊𐐮𐐯𐑓𐑎𐑉 𐑋𐑣𐐲 𐑎𐑉𐑚𐑑𐐲𐑛 𐑑𐑣𐑑𐑓𐑑 𐑢𐑋𐑣𐑉 𐑊𐑓𐑚𐑛 𐑙𐐮 𐑝𐑤𐐲 𐑒𐑑𐑤𐑑𐑓 𐑙𐐮 𐑙𐑊𐑤 𐑟𐑊𐑉 𐑟𐑊𐑙 𐑢𐐲 𐑢𐑊𐑤
𐐒𐑉𐑝𐑑𐑞

gɒt ʌp tʊk bɛkfʌst [sic] ænd stɑtɪd ɪmdɪʌn wɛnt æhɛd tu oraʲb vɪlɪʤ
tu tɛl ðɛm ðæt wi wær kʌmɪŋ

In standard orthography, this reads, "Got up, took b[r]eakfast and sta[r]ted [;] Indian went ahead to Oribe village to tell them that we were coming." The missing *r* in *breakfast* is just an isolated error, but the spelling of /stɑtɪd/ for *started* is characteristic; Haskell was from North New Salem, Franklin Country, Massachusetts, and he dropped his *r*s after the /ɑ/ vowel [5]. Other writers similarly leave clues to their accents in the phonemically written texts.

Marion J. Shelton was a typical 40-letter Deseret writer from this period, using the more or less standard glyphs 𐐺 for /ɔʲ/ and 𐑅 for /ʲu/, as in the following letter[21], written shortly after his arrival in Orayvi.

𐐒𐑉𐑞𐑚 𐑚𐑞𐑤𐑟𐑅. 𐑣𐑅 𐑟𐑤𐑙𐑞𐑙𐐮.
𐑣𐑝𐑚. 13, 1859.

𐑚𐑞𐑤𐑮𐑚𐑛 𐑚𐑞𐑮𐑘𐑞𐑚,

𐑓 𐑡𐑟 𐑘𐑞𐑙𐑞𐑥 𐑣𐑣 𐑙𐑤𐑗 𐑤𐑚 𐑟𐑅 𐑛𐑢𐑤𐑮𐑞𐑥 𐑞𐑤𐑙𐑞𐑥. 𐑘 𐑢𐑟 𐑢𐑙 𐑙𐑤𐑮 𐑣𐑣𐑙𐑙 𐑚𐑞 𐑮𐑚𐑚
𐑣𐑚 𐑤𐑞𐑙 𐑟 𐑤𐑣𐑤 𐑚𐑙𐑢𐑤𐑞 𐑮𐑝𐑤 𐑣𐑥 𐑘 𐑞𐑙𐑮. 𐑢𐑙 𐑙𐑙 𐑛𐑚𐑣 𐑟 𐑤𐑤𐑛 𐑣𐑚𐑛 𐑮𐑢𐑤𐑣 𐑢𐑙 𐑙𐑤𐑮 𐑛𐑚𐑣 𐑙𐑙 𐑮𐑚 𐑙 𐑚𐑤𐑚𐑛 𐑚𐑤𐑙𐑞𐑥
𐑞𐑞 𐑛𐑮𐑙𐑤 𐑚𐑞 𐑮𐑤𐑛𐑚. 𐑨𐑤𐑚𐑤𐑞𐑛𐑟 𐑟𐑞𐑞𐑥𐑥 𐑓 𐑙𐑙𐑤 𐑛𐑞𐑤𐑤𐑥 𐑚𐑞𐑤𐑛𐑮𐑤𐑚 𐑢𐑞𐑘 𐑢𐑣𐑣 𐑞𐑚 𐑙 𐑣𐑤𐑛 𐑮𐑞𐑣𐑣𐑚𐑛. 𐑘 𐑤𐑟𐑛𐑞 𐑞𐑚 𐑙 𐑮𐑚𐑚 𐑛𐑞𐑣𐑛 𐑮𐑞𐑣𐑣𐑚𐑛.
𐑚𐑚𐑤𐑞𐑛 𐑣𐑣 𐑚𐑚𐑮𐑙𐑤𐑛 𐑟𐑣𐑚𐑤𐑮 𐑣𐑣 𐑙 𐑮𐑤𐑞𐑛 𐑛𐑞𐑮𐑣𐑛 𐑟𐑅 𐑮𐑞𐑣𐑣𐑚𐑛. 𐑘 𐑤𐑟𐑛𐑞 𐑞𐑚 𐑙 𐑮𐑚𐑚 𐑛𐑞𐑞𐑛 𐑟 “𐑓𐑛𐑚𐑙𐑤𐑞𐑮”, 𐑞𐑞 𐑮𐑞𐑤𐑣𐑣
𐑚𐑚, 𐑮𐑤𐑤 𐑞𐑚 𐑚𐑞𐑞, 𐑣𐑣𐑛 𐑟 𐑛𐑤𐑚𐑙𐑤𐑞 𐑮𐑤𐑤 𐑞𐑚 “𐑞𐑛𐑙”. (𐑟 𐑛𐑞𐑛 𐑞𐑞𐑓𐑛𐑟𐑛𐑤𐑞𐑣 𐑛𐑤𐑅 𐑞𐑤𐑞𐑣𐑣 𐑞𐑟𐑞𐑤𐑞 𐑮𐑝𐑤𐑛𐑤𐑚) 𐑘 𐑝𐑤𐑛
𐑤𐑟𐑛𐑞 𐑚𐑙𐑞𐑤𐑛 𐑮𐑮𐑞𐑚𐑤𐑮, 𐑟 𐑤𐑣𐑤 𐑛𐑝 𐑝𐑤𐑚𐑝 𐑣𐑣𐑛 𐑤𐑤𐑚𐑤𐑞 𐑘 𐑙𐑤𐑞 𐑞𐑞 𐑘𐑚 𐑢𐑟 𐑘𐑣 𐑣𐑣𐑛 𐑢𐑣 𐑘𐑚 𐑣𐑣𐑛 𐑢𐑣 𐑘𐑚
𐑞𐑟𐑤 𐑣𐑣 𐑘 𐑞𐑟𐑝. 𐑚𐑝 𐑢𐑛 𐑛𐑞𐑝𐑤 𐑞𐑟𐑝 𐑛𐑤𐑞𐑞 𐑚𐑝𐑞 𐑢𐑞𐑘 𐑛𐑞 𐑞𐑣𐑙𐑤𐑞𐑥 𐑣𐑣𐑛 𐑣𐑛 𐑟 𐑟𐑣𐑞𐑞 𐑛𐑞𐑤𐑣𐑛𐑞𐑥.

[21] Marion Jackson Shelton to George A. Smith and others, 13 November 1859, George A. Smith Incoming Correspondence, LDS Church Archives.

𐑘𐑧𐑩 𐑴𐑓𐑛𐑚𐑓𐑩 𐑚𐑧𐑜𐑯 𐑥 𐑫𐑤𐑓𐑫𐑓𐑩𐑯 𐑐𐑤𐑓 𐑒𐑦𐑤𐑚𐑓𐑤𐑯, 𐑟 𐑐𐑭 𐑚𐑤𐑪𐑧 𐑯𐑛 𐑪𐑤𐑙𐑕 𐑯𐑛 𐑐𐑤𐑓𐑕𐑚𐑤𐑧, 𐑟 𐑪𐑞 𐑫𐑤𐑛 𐑫𐑯𐑛 𐑛𐑧𐑜𐑯, 𐑯𐑛 𐑚𐑧𐑜𐑯, 𐑫𐑤𐑮𐑩𐑯, 𐑓𐑮𐑛 𐑞𐑤𐑞𐑤, 𐑕𐑪𐑥𐑤𐑛𐑮𐑧 &c. 𐑘𐑧𐑩 𐑤𐑦𐑝𐑧 𐑘𐑟 𐑓𐑧𐑩.

𐑘𐑤𐑓 𐑥𐑓𐑪𐑛𐑥𐑞𐑕 𐑚𐑓 𐑮𐑯𐑚𐑤𐑓 𐑪𐑓𐑚𐑯𐑛. 𐑘𐑤𐑓 𐑥𐑓𐑓𐑪 𐑮𐑩 𐑒𐑚𐑐𐑤𐑮 𐑫𐑪𐑪𐑞𐑝 𐑚𐑤𐑙𐑯𐑪𐑤𐑞𐑕 𐑯𐑛 𐑚𐑤𐑞𐑕 𐑨𐑧 𐑥𐑪𐑤 — 𐑘𐑟 𐑓𐑧𐑩 𐑕𐑮𐑫 𐑪𐑞𐑥𐑤𐑞, 𐑯𐑛 𐑚𐑓 𐑘𐑓 𐑤𐑛𐑦𐑪𐑞𐑤𐑛 𐑞𐑯 𐑚𐑤𐑪𐑦𐑝, 𐑚𐑮𐑩 𐑚𐑓 𐑚𐑤𐑓𐑦 𐑮𐑯𐑞𐑤𐑤𐑮𐑤𐑯 𐑯𐑛 𐑯𐑛 𐑮𐑯𐑚𐑮𐑕𐑞𐑓𐑮𐑕 𐑮𐑯𐑚𐑦𐑯𐑩

𐑣 𐑓𐑭 𐑕𐑪𐑪𐑞𐑥𐑤𐑮 𐑚𐑮𐑩 𐑞𐑭𐑕𐑐𐑮𐑤𐑮. 𐑚𐑩𐑩, 𐑚𐑓𐑘𐑓𐑧, 𐑣 𐑛𐑤𐑤 𐑕𐑚 𐑝𐑬 𐑤𐑩𐑪𐑕𐑩 𐑐𐑪𐑤 𐑯𐑛 𐑚𐑤𐑓 𐑮𐑯𐑚𐑮𐑕𐑞𐑓𐑮𐑕 𐑮𐑯𐑚𐑦𐑯𐑩

𐑣 𐑓𐑭 𐑕𐑪𐑪𐑞𐑥𐑤𐑮 𐑚𐑮𐑩 𐑞𐑭𐑕𐑐𐑮𐑤𐑮. 𐑚𐑩𐑩, 𐑚𐑓𐑘𐑧, 𐑣 𐑛𐑤𐑤 𐑕𐑚 𐑝𐑬 𐑤𐑩𐑪𐑕𐑩 𐑐𐑪𐑤 𐑯𐑛 𐑚𐑤𐑓 𐑮𐑯𐑚𐑮𐑕𐑞𐑓𐑮𐑕 𐑮𐑯𐑚𐑦𐑯𐑩

𐑘𐑟 𐑐𐑴𐑩

𐐤 𐐁𐐯𐐃 𐐦𐑅𐑁 𐐨𐐡𐑂𐐨𐐃 𐐲𐐦 𐑉𐐬𐐦𐐲𐐣 𐑋𐑇𐐗 𐑊𐑁 𐐦𐐬𐑁 𐐗𐐡 𐑁 𐐁𐑅𐐦𐐨𐐣 𐑂𐑇𐐗𐑅𐐦𐑁 𐐁𐑅𐐬𐑊𐐦𐐲 𐐨𐐯 𐐦𐐬𐑁 𐐲𐐦 𐑁 𐐁𐑅𐐦𐐨𐐣 𐑂𐑇𐐗𐑅𐐦𐑁 𐐁𐑅𐐬𐑊𐐦𐐲 𐑉𐑊𐐁𐐣𐐯𐐁𐐃 𐑉𐐦𐑊𐐡. 𐐃𐐡𐑁 𐐤 𐑇𐐗 𐑅𐑊𐑊𐐨𐐨𐐃 𐑋𐑇𐐗 𐑊𐑁 𐑊𐐡𐑋 𐑈𐐬𐑊𐐦 𐑂𐑇𐐗𐑅𐐦𐑁 𐐂𐐨𐐁𐐃 𐐤 𐐂𐑅𐐦 𐑉𐐦𐐬𐐲 𐑋𐑇𐐗 𐑊𐑁 𐐬𐐲 𐑁 𐐬𐑅 𐑊𐑁 𐐡𐑅𐐦𐑁 𐑊𐐲 𐐬𐐲𐐦𐐡𐑊𐐦𐐲𐐃 𐐨𐐯 𐐦𐐬𐑁 𐐲𐐦 𐑉𐐦𐐬𐐲 𐑋𐑇𐐗 𐑊𐑁 𐐬𐐲 𐑁 𐐬𐑅 𐑊𐑁 𐐡𐑅𐐦𐑁 𐐬𐐲𐐦𐐡𐑊𐐦𐐲𐐃 𐐤 𐐂𐑅

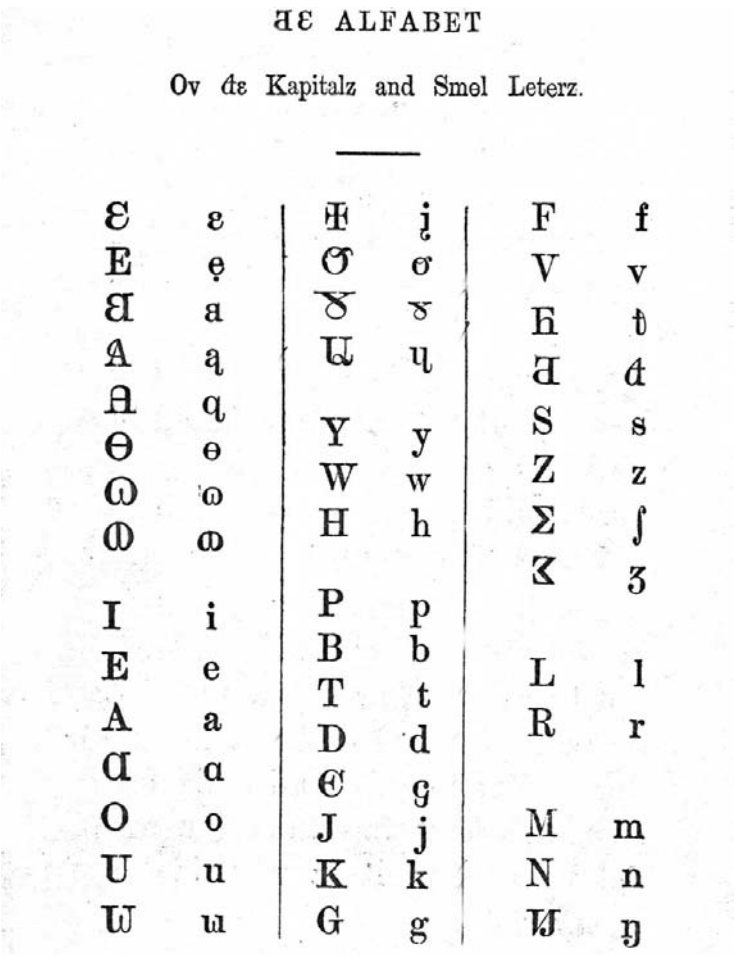


Fig. 13. The 1855 Benn Pitman or American Pitman Alphabet. In 1852, Benn Pitman carried the Pitman phonography and phonotypy movement to the United States, setting up The Phonographic Institute in Cincinnati in 1853. Whereas Isaac Pitman was an incurable tinkerer, constantly modifying his alphabets, brother Benn recognized the virtues of stability.

Salt Lake City in late 1868, at which time Orson Pratt had already turned his dogged energy to the transcription of *The Book of Mormon*.

In 1869, Pratt was sent as the agent to New York, to supervise the printing of *The Book of Mormon*. He too chose Russell Bros. and had a font of Long Primer (10-point) type cut and cast for the body of the text[28]. The bicameral

[28] Small Pica (11-point) type was also considered and, unfortunately, rejected. With the inherent design problems of the Deseret Alphabet, the Long Primer type is too small for comfortable reading.

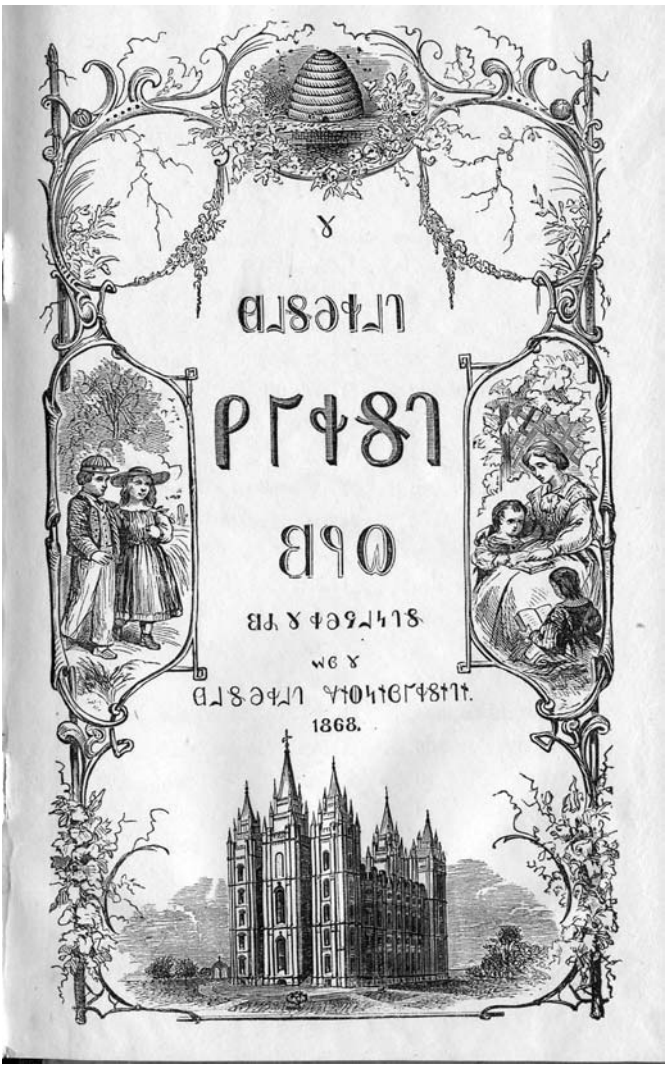
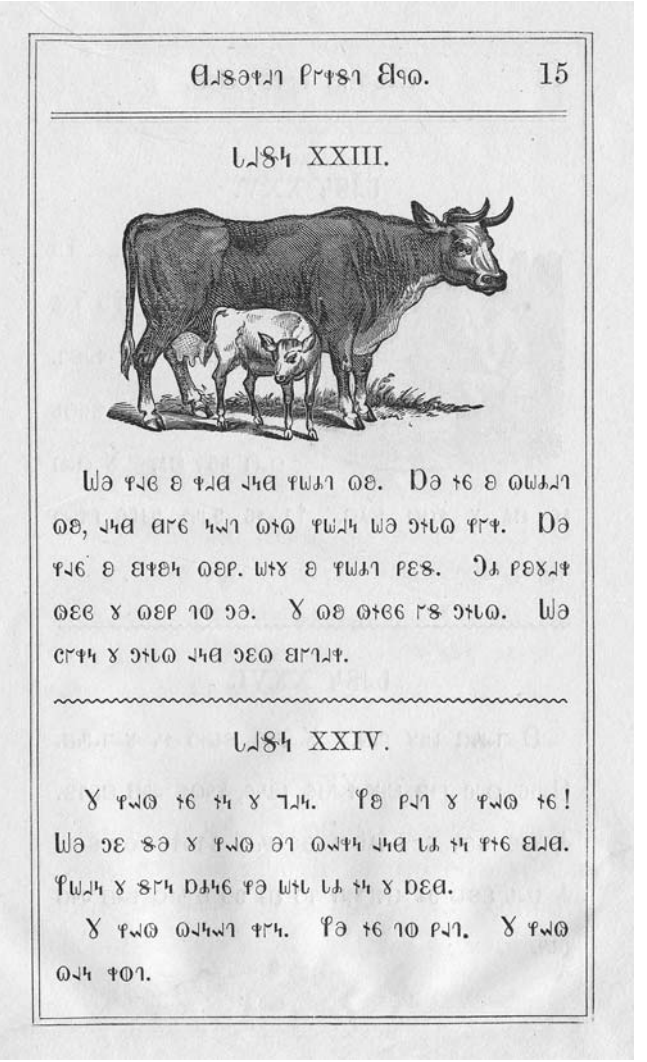


Fig. 14. In 1868, *The Deseret First Book*, shown here, and *The Deseret Second Book* were printed by Russell Bros. of New York and shipped to the Territory of Utah. The print run for each book was 10,000 copies.

nature of the Deseret Alphabet allowed him to save some money by using the lowercase letters of the existing English (14-point) font as the uppercase letters of the Long Primer (10-point) font. Pratt also had fonts prepared in the Great Primer (18-point) and Double English (28-point) sizes to serve in headings and titles. Not surprisingly, Pratt complained that the three unlucky compositors assigned to the project were making "a great abundance of mistakes in setting



ᏫᎯᏍᏫᏁ ᏢᏥᏐᏁ ᏫᏀᏬ. 15

ᏓᎯᏕᏂ XXIII.

ᏔᎾ ᏐᎯᏋ Ꮎ ᏐᎯᏆ ᎯᏂᏆ ᏐᏔᎯᏁ ᏫᏮ. ᗪᎾ ᎿᏣ Ꮎ ᏫᏔᎯᎯᏁ ᏫᏮ, ᎯᏂᏆ ᏆᏢᏣ ᏕᏁᏁ ᏫᎿᏐ ᏐᏔᎯᏂ ᏔᎾ ᏅᎿᏫ ᏐᏢᏠ. ᗪᎾ ᏐᎯᏋ Ꮎ ᏆᏐᏕᏂ ᏫᏮᏢ. ᏔᎿᏉ Ꮎ ᏐᏔᎯᏁ ᏢᏋᏕ. ᎩᏗ ᏢᏋᏉᎯᏐ ᏫᏋᏣ Ꮙ ᏫᏮᏢ ᏁᏫ ᏅᎾ. Ꮙ ᏫᏮ ᏫᎿᏣᏣ ᏥᏕ ᏅᎿᏫ. ᏔᎾ ᏣᏢᏐᏂ Ꮙ ᏅᎿᏫ ᎯᏂᏆ ᏅᏋᏫ ᏆᏢᏁᏐᏐ.

ᏓᎯᏕᏂ XXIV.

Ꮙ ᏐᏔᏫ ᎿᏣ ᎿᏂ Ꮙ ᏀᎯᏂ. ᏈᏆ ᏢᎯᏁ Ꮙ ᏐᏔᏫ ᎿᏣ! ᏔᎾ ᏅᏋ ᏕᎾ Ꮙ ᏐᏔᏫ ᎾᏁ ᏫᏔᏂᏂ ᎯᏂᏆ ᏓᎯ ᎿᏂ ᏐᎿᏣ ᏆᎯᏆ. ᏈᏔᎯᏂ Ꮙ ᏕᏢᏂ ᗪᎯᏂᏣ ᏈᎾ ᏔᎿᏓ ᏓᎯ ᎿᏂ Ꮙ ᗪᏋᏆ.

Ꮙ ᏐᏔᏫ ᏫᎯᏂᏔᏁ ᏐᏢᏂ. ᏈᎾ ᎿᏣ ᏁᏫ ᏢᎯᏁ. Ꮙ ᏐᏔᏫ ᏫᏫᏂ ᏐᏫᏁ.

Fig. 15. A page from *The Deseret First Book*.

type", and he had to give the proofs four good readings and supervise many corrections before the pages could be stereotyped[29].

The Book of Mormon (see Figure 16) was published in two formats. *The Book of Mormon Part I*, intended to serve as an advanced reader, consisted of The First Book of Nephi, The Second Book of Nephi, The Book of Jacob, The Book

[29] Orson Pratt to Robert L. Campbell, 12 June 1869, Deseret Alphabet Printing Files 1869, LDS Church Archives.

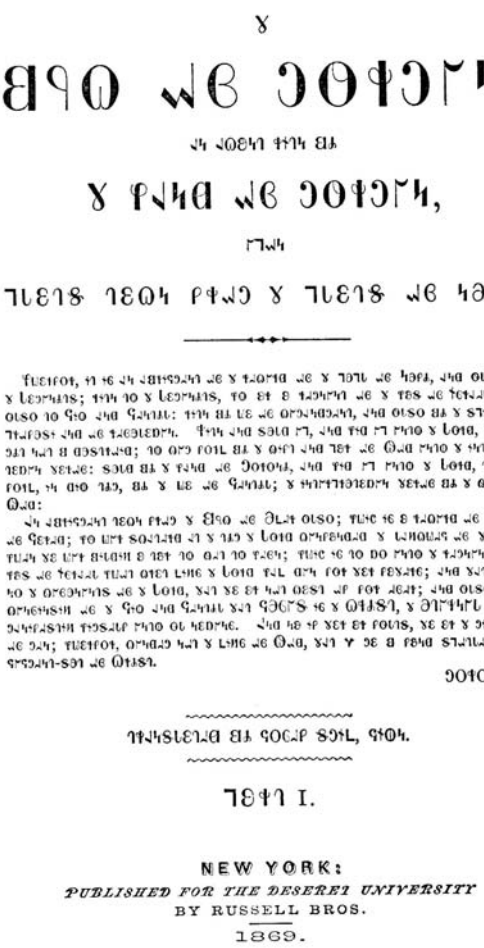


Fig. 16. In 1869, *The Book of Mormon*, a book of Mormon scripture, was published in two formats: the first third of the book, which cost 75 cents, and the full text, which cost $2. Part I had a print run of 8000 copies, and a good specimen today sells for perhaps $250 to $300. Only 500 copies of the full *Book of Mormon* were printed, and in 2004 an average copy sells for about $7000 or $8000.

of Enos, The Book of Jarom, The Book of Omni and The Words of Mormon[30]. The entire *Book of Mormon* was also printed on better paper, and was more expensively bound.

[30] *The Book of Mormon Part I* is usually known, inaccurately, among used-book dealers as "The First Book of Nephi". The Regents' plan was eventually to offer the whole book in three parts, printing Parts II and III with proceeds from the sale of the first four books.

Receipts from 1868 and 1869[31] show that the punches, matrices, type and other printing paraphernalia remained the property of the Board of Regents of the Deseret University, but they were left in the care of Russell Bros. in expectation of future work, which in fact never materialized. Although a large collection of nineteenth-century punches survives at Columbia University in New York City, attempts to locate the Russell Bros. Deseret Alphabet punches have so far been unsuccessful.

3.6 The 1868–69 "Book" Alphabet and Fonts

After the disappointing debut of the St. Louis type, used reluctantly to print sample articles in the *Deseret News* in 1859–60 and 1864, Brigham Young had vowed to go to England the next time to get better workmanship[32]. But in fact in 1868 and 1869 the Mormons went only as far as New York City, engaging Russell Bros. to cut new punches, strike matrices, cast type, typeset and print the books.

This time they did get professional workmanship, but the resulting book font is still somewhat bizarre, partly because of the inherent awkwardness of the basic shapes, and partly because of choices in font design that now seem old-fashioned. A look at the book font (see Figures 15, 16 and 17) shows that the glyphs, compared to the earlier charts, have been Bodonified: made rigidly vertical, symmetrical wherever possible, and with extreme contrasts of thick and thin. Thom Hinckley, an expert typographer and printer (personal communication), has pointed out that the extreme thins of the font reveal the punch cutter as a master; at the same time, these thin lines would have caused the type to wear quickly, which was one of the very problems the Regents were trying to avoid; printing the extreme thins also required the use of unusually high-quality paper. The 38 glyphs of the 1868–69 book font were basically the same as the 38 glyphs used in printing articles in the *Deseret News* in 1859–60 and 1864; the only significant difference was that the old 3 glyph was mirror-imaged to Ɛ.

Nash [21, pp. 23–29] lays out in devastating detail how the Deseret Alphabet type violates principle after principle of good book type, including the catastrophic lack of ascenders and descenders. In the words of printing historian Roby Wentz [31], "The result was a very monotonous-looking line of type." Hinckley has emphasized the problems of "weight" and "color" in the book font, resulting from the extreme contrast of thicks and thins and the uniformly thin short vowels.

I believe that the problems of weight and color, including the thin representation of short vowels, the fussy loops that overcomplicate some glyphs, and the overall inharmonious collection of glyphs, go all the way back to the original amateur conception of the Deseret Alphabet as being suitable for both shorthand and everyday orthography. It was awkward enough as shorthand, and the translation to type was a failure that no amount of good type design

[31] Deseret Alphabet Printing Files 1868 and 1869, LDS Church Archives.
[32] Journal History, 16 February 1859.

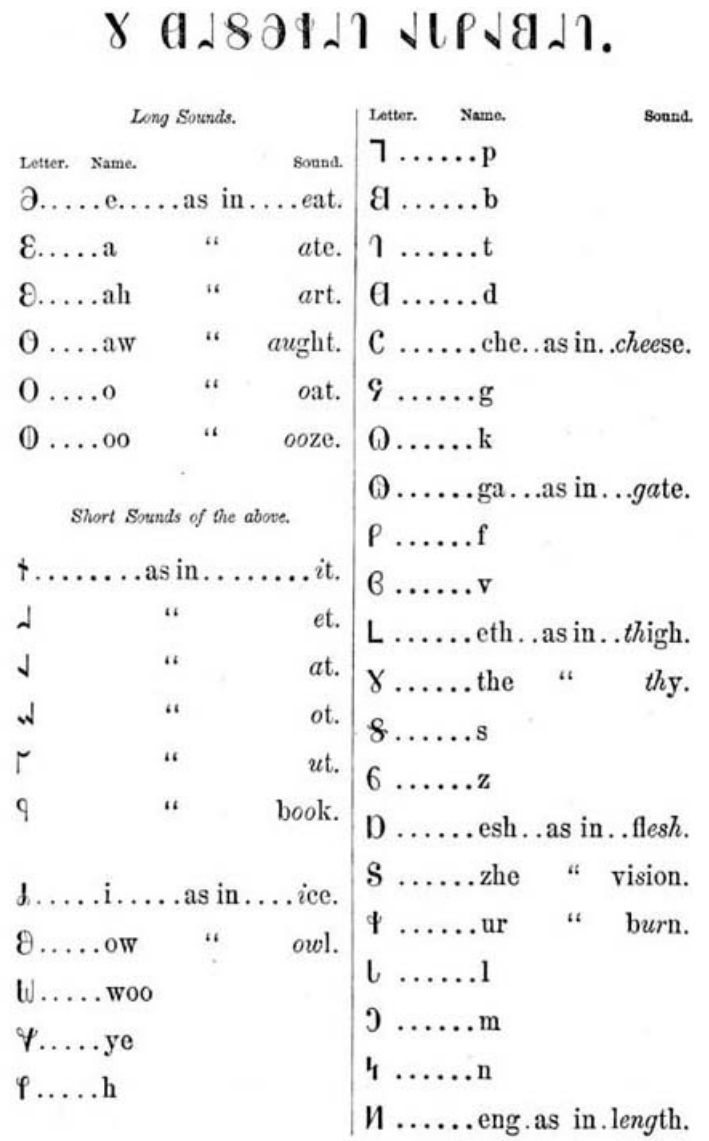


Fig. 17. The 1868–69 Book Version of the Deseret Alphabet consisted of 38 letters, with uppercase and lowercase characters distinguished only by size. Aside from the strange glyphs, the inventory, grouping and alphabetical order of the Alphabet are based solidly on the 1847 Alphabet of Alexander J. Ellis and Isaac Pitman (see Figure 5).

can really cure. One need only compare the Deseret Alphabet to the Shavian Alphabet (see Figures 19 and 18) to see the difference between an amateur and a professional design.

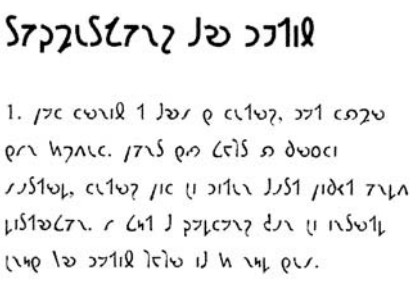


Fig. 18. In this extract of Shavian script, the title is set in the Ghoti (pronounced "fish") font, and the body in the Androcles font, both by Ross DeMeyere. Copyright © 2002 DeMeyere Design Incorporated. All rights reserved. Reproduced by permission.

3.7 The 1870s: Decline and Fall

The Deseret First Book and *The Deseret Second Book* had print runs of 10,000 copies each and sold for 15 and 20 cents, respectively. The first third (in actual quantity about a fourth) of the *Book of Mormon*, intended as an advanced reader, had a print run of 8,000 copies, and sold for 75 cents. Only 500 copies of the full *Book of Mormon* were printed, and they sold for $2. Or more to the point, the books did not sell.

By the mid 1870s, the Deseret Alphabet was recognized as a failure even by Brigham Young. The bottom line was that books were expensive to produce, and not even loyal Mormons could be persuaded to buy and study them. On 2 October 1875 *The Juvenile Instructor*, a magazine for Mormon youth, laid the Deseret Alphabet to rest.

> The Book of Mormon has been printed in the Deseret Alphabet, but President Young has decided that they are not so well adapted for the purpose designed as it was hoped they would be. There being no shanks [ascenders or descenders] to the letters, all being very even, they are trying to the eye, because of their uniformity. Another objection some have urged against them has been that they are entirely new, and we should have characters as far as possible with which we are familiar: and they have felt that we should use them as far as they go and adopt new characters only for the sounds which our present letters do not represent. There is a system known as the [Benn] Pitman system of phonetics which possesses the advantages alluded to. Mr. Pitman has used all the letters of the alphabet as far as possible and has added seventeen new characters to them, making an alphabet of forty-three letters. The Bible, a dictionary and a number of other works, school books, etc., have been printed in these new characters, and it is found that a person familiar with our present method of reading can learn in a few minutes to read those works printed after this system. We think it altogether likely that the regents of the University will upon further examination adopt this system for use in this Territory.

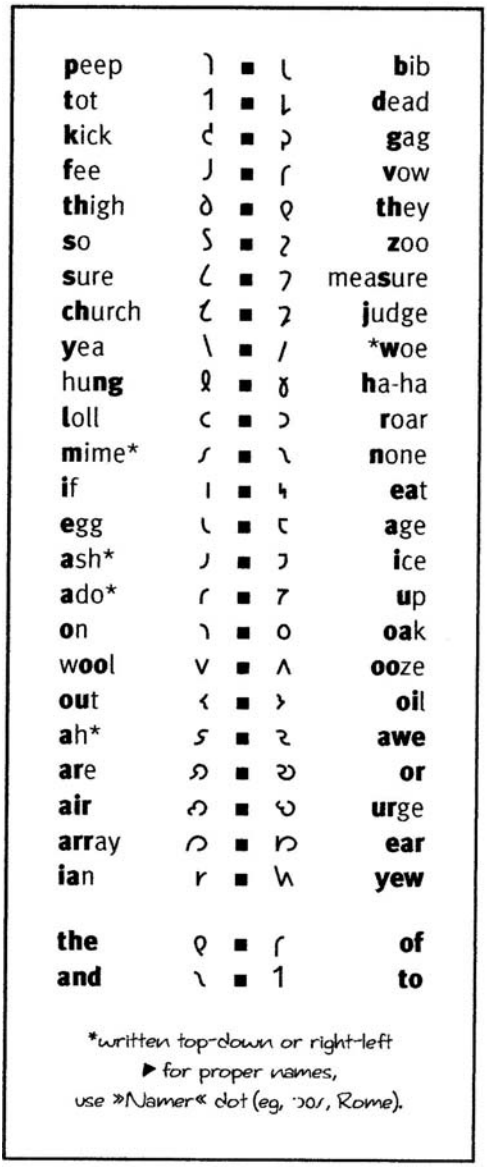


Fig. 19. The Shaw or "Shavian" Alphabet was designed by typographer Kingsley Read and has inspired a number of other professional typographers, including Ross DeMeyere (`http://www.demeyere.com/shavian/`). The glyphs are simple and harmonious; ascenders and descenders give words distinctive shapes and avoid monotony. Copyright © 2002 DeMeyere Design Incorporated. All rights reserved. Reproduced by permission.

So while the Deseret Alphabet was dead, the Mormons hadn't yet given up on spelling reform. In July of 1877, Orson Pratt was sent to Liverpool to arrange to have *The Book of Mormon* and *The Book of Doctrine and Covenants*, another book of Mormon scripture, printed in the Benn Pitman orthography, "with the exception of two or three characters"[33]. But in August of that year, after most of the specially ordered phonotype had arrived from London, Brigham Young died; Orson Pratt was called back home, and the Mormons never dabbled in orthographical reform again.

It has been written, and repeated numerous times, that "the Deseret Alphabet died with Brigham Young"; however, the Deseret Alphabet had already been dead for at least a couple of years, and what died with Brigham Young was a very serious project, well in progress, to print Mormon scripture in a slight modification of Benn Pitman's "American phonotypy".

4 The Deseret Alphabet in Unicode

4.1 The Character Inventory and Glyphs

The Deseret Alphabet was first added to the Unicode 3.1 standard[34] in 2001, in the surrogate space 10400–1044F, mostly through the efforts of John H. Jenkins of Apple Computer[35]. It holds some distinction as the first script proposed for the surrogate space; as Jenkins describes it, "Nobody started to implement surrogates because there were no characters using them, and nobody wanted their characters to be encoded using surrogates because nobody was implementing them"[36]. The Deseret Alphabet, being a real but pretty dead script, was chosen as a pioneer – or sacrificial lamb – to break the vicious circle.

The Unicode 3.1 encoding handled only the 38-letter version of the Deseret Alphabet (this made 76 characters, including uppercase and lowercase) used in the printed books of 1868–69. The implementors were honestly unaware that earlier 39- and 40-letter versions of the Alphabet had been seriously used, and so might need to be encoded. I later argued vigorously[37] for the addition of the /ɔʲ/ and /ʲu/ letters used in several earlier versions of the Alphabet, including the one used in the Haskell journal and Shelton letters that I have transcribed. John Jenkins backed me up[38] and again deserves the credit for dealing with most of the paperwork and bureaucracy.

The two new letters were included in Unicode 4.0, but unfortunately I could not persuade them to use the 1859–60 glyphs 𐐘 and 𐐙 as the citation glyphs; instead they went all the way back to the primitive glyphs of the 1854–55 charts. Unicode fonts based on the current heterogeneous collection of glyphs will be useless for any practical typesetting of 40-letter Deseret Alphabet documents.

[33] *Journal of Discourses*, vol. XIX, p. 112.
[34] `http://www.unicode.org/`
[35] `http://homepage.mac.com/jenkins/`
[36] `http://homepage.mac.com/jenkins/Deseret/{Unicode.html,Computers.html}`
[37] Unicode discussion document N2474 2002-05-17.
[38] Unicode discussion document N2473 2002-05-17.

Fig. 20. The Deseret Alphabet as it appears in Unicode 4.0. Copyright © 1991–2003 Unicode, Inc. All rights reserved. Reproduced by permission of Unicode, Inc.

4.2 Unicode Character Names

The Unicode implementation of the Deseret Alphabet is also flawed by some changes to the letter names. Not to criticize anyone personally, but just for the record, there are several reasons why the name changes were ill-advised:

Table 1. The Deseret Alphabet was added to Unicode by General American English speakers who honestly misunderstood the 𐑮 (/ɒ/) and 𐑪 (/ɔ/) vowels, which have collapsed to /ɑ/ in their dialect, and renamed them confusingly as SHORT AH and LONG AH.

Char.	IPA	Original Name	Unicode Name
𐑩	/i/	e as in eat	LONG I
𐑦	/e/	a as in ate	LONG E
𐑨	/ɑ/	ah as in art	LONG A
𐑪	/ɔ/	aw as in aught	LONG AH
𐑬	/o/	o as in oat	LONG O
𐑫	/u/	oo as in ooze	LONG OO
𐑦	/ɪ/	i as in it	SHORT I
𐑧	/ɛ/	e as in et	SHORT E
𐑭	/æ/	a as in at	SHORT A
𐑮	/ɒ/	o as in ot	SHORT AH
𐑳	/ʌ/	u as in ut	SHORT O
𐑵	/ʊ/	oo as in book	SHORT OO

1. The Deseret Alphabet had a traditional set of letter names already established and available. Arbitrary changes in the names make it more difficult to compare the original charts and the Unicode charts.
2. Some early Deseret Alphabet writers, including George D. Watt, consciously or unconsciously confused the traditional letter names and their phonological values. Some of their spellings make sense only if the letters are read with their original names.
3. Some letter-name changes were made because the implementors simply did not hear and understand some of the vowel distinctions provided in the Deseret Alphabet; they were speakers of General American English, a dialect that has lost some of the vowel distinctions still present in English and New England dialects.

The last point is the most unfortunate. Consider Table 1: The original name for the Deseret 𐑨 letter, which is /ɑ/ in IPA, was "ah", using a common convention in English romanization whereby "ah" represents an unrounded low-back vowel. Most English speakers use this vowel in the words *father*, *bah* and *hah*. In England, and in much of New England, this vowel is distinct from the first vowel in *bother*, represented in Deseret Alphabet as 𐑮 or in IPA as /ɒ/, which is a rounded low-back vowel; thus for these speakers the words *father* and *bother* do not rhyme. But the rounded /ɒ/ has collapsed into unrounded /ɑ/ in General American English, so the words do rhyme for most Americans. Similarly, the Deseret 𐑪 letter, IPA /ɔ/, represents a mid-low back rounded vowel that has also collapsed into /ɑ/ for many American speakers. It can still be heard quite distinctly in the speech of many New Yorkers, Philadelphians, and New Englanders in general. The original Deseret name for the 𐑪, "aw", used a common convention for representing this rounded vowel, which occurs in words like *law*, *flaw*, *paw*, *aught*, *caught*, etc. The equivalent letter in the Shaw

Alphabet is appropriately named AWE. Not understanding the phonological distinctions involved, the implementors of Unicode renamed 𐑩 as SHORT AH and 𐑪 as LONG AH, giving precisely the wrong clues to the pronunciation of these rounded vowels. Unfortunately, Unicode policy values consistency over accuracy, and it's almost impossible to change character names once they have been adopted.

Fig. 21. Kearney's Deseret font.

5 Digital Fonts for the Deseret Alphabet

5.1 Non-METAFONT Fonts

Kearney's Deseret Font. A number of digital fonts have been designed for the Deseret Alphabet, most of them based on the 38-letter inventory and glyphs of the book font of 1868–69. The following is a very preliminary survey of fonts that I was able to find and test in early 2004[39].

The prize for the first digital font would seem to go to Greg Kearney, whose Deseret font was created about 1991 using Fontographer. Kearney (personal communication) says that his font, now in the public domain, was created for the LDS Church History Department, now the LDS Church Archives, as a display font for an exhibit.

I had difficulty testing this font[40] to input specific texts on my Mac OS X system, but see Figure 21 for a sample of the glyphs as displayed by the FontBook application.

Bateman's Deseret Font. Edward Bateman, a graphic designer in Salt Lake City, scanned the Russell Bros. fonts from a copy of *The Deseret Second Book*,

[39] The world of fonts, and especially amateur fonts, is woefully lacking in documentation. I would be extremely grateful for corrections and additions to the information in this section.

[40] `http://www.fontage.com/pages/deseret.html`; `http://funsite24.com/fo/d/`

cleaned them up electronically using Fontographer, and created his font, also called Deseret, in August 1995 [3]. The font came out of his graphics work on the delightfully tongue-in-cheek 1995 science-fiction film *Plan 10 from Outer Space*[41], with a plot that revolves around a mysterious plaque written by aliens in the Deseret Alphabet. The font (see Figure 22) is still available from Bateman[42], in both a TrueType version for Windows and a PostScript version for Macintosh[43]. He has plans (personal communication) to repackage the font on a CD-ROM for modern Mac owners who no longer have a floppy-disk drive.

An unusual feature of the Bateman font is that it contains only lowercase letters, or perhaps only uppercase – you really can't tell the difference in the Deseret Alphabet. This font is notable for reproducing the extreme contrast of thicks and thins seen in the original Russell Bros. font.

Jenkins' Zarahemla and Sidon Fonts. John Jenkins of Apple has created two fonts. The first, named Zarahemla, was created about 1995, originally using Fontographer (personal communication). Jenkins scanned the 1868–69 Russell Bros. glyphs, traced them, and cleaned them up digitally. This font is still available stand-alone and was part of Jenkins' DLK[44] (Deseret Language Kit) for typing Deseret Alphabet in Apple operating systems up to OS 9. The Zarahemla glyphs (see Figure 23) are now included in the Apple Symbols font distributed with OS X. Real Unicode Deseret Alphabet text can be typed using the Character Palette or the Unicode Hex Keyboard.

A second Jenkins font, called Sidon, was created about 1999, originally using METAFONT, with the glyphs later copied into FontLab. "The idea was to have a Deseret Alphabet font which was *not* intended to just slavishly copy what the Church did in the 1860s." Sidon is not yet available stand-alone, but the glyphs (see Figure 24) are now incorporated into the Apple Simple font used to demonstrate the Apple Font Tools[45].

Brion Zion's Beehive Font. A certain Brion Zion (perhaps a pseudonym) at some point created a font named Beehive. As far as I can tell, it is no longer available, and numerous Internet links to Zion pages are dead. A webpage[46] dedicated to Deseret Alphabet fonts is a virtual cemetery of dead links.

Kass's Code2001 Font. The freely available Code2001 font[47] by James Kass is a Plane 1 Unicode-based font, providing glyphs for the characters in the surrogate space, including Old Persian Cuneiform, Deseret, Tengwar, Cirth, Old Italic,

[41] http://www.cc.utah.edu/~th3597/kolob1.htm
[42] http://www.xmission.com/~capteddy/
[43] Macintosh OS X can now handle Windows TrueType fonts.
[44] http://homepage.mac.com/jenkins/Deseret/
[45] http://fonts.apple.com/
[46] http://cgm.cs.mcgill.ca/~luc/deseret.html
[47] http://home.att.net/~jameskass/code2001.htm

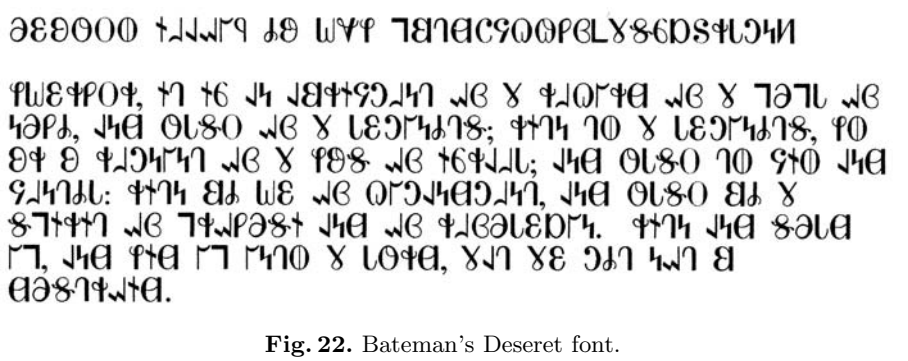


Fig. 22. Bateman's Deseret font.

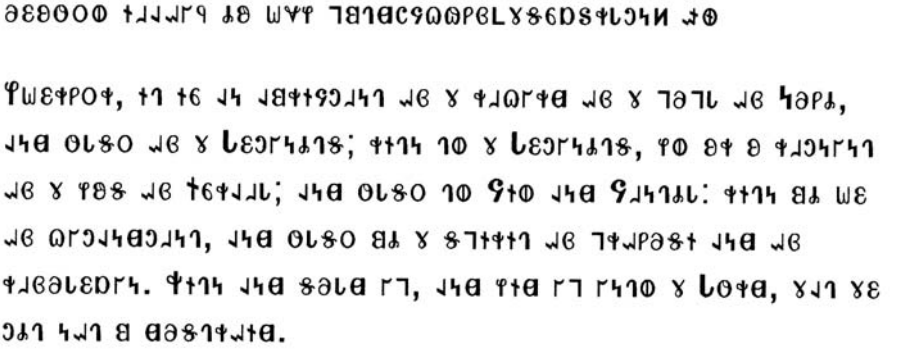


Fig. 23. Jenkins' Zarahemla font.

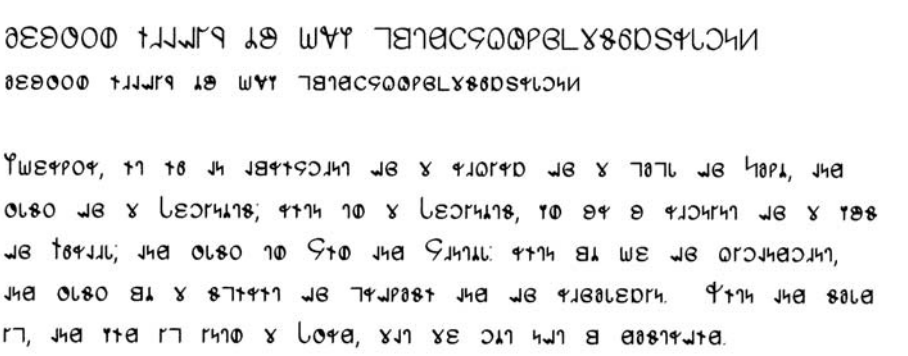


Fig. 24. Jenkins' Sidon font.

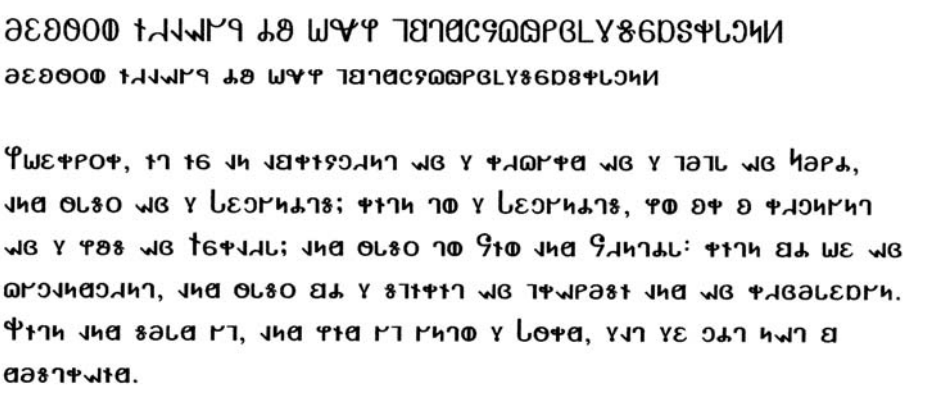


Fig. 25. Kass's Code2001 font.

Gothic, etc. Kass informs me that the glyphs (see Figure 25) were designed from scratch and resided originally in the Private Use Area of the Code2000 font until Deseret was officially accepted and assigned code points in the surrogate space.

Thibeault's Deseret and Bartok's HuneyBee Fonts. Daniel Thibeault took the Deseret Alphabet glyphs from the Code2001 font and transposed them into the ANSI range to make yet another font named Deseret[48]. Stephen Bartok's HuneyBee font[49] was created in September 2003 by rearranging the glyphs in Thibault's Deseret font to effect a different keyboard layout (personal communication). In both fonts the glyphs are ultimately from the Code2001 font, already illustrated in Figure 25.

Elzinga's Brigham Font. Dirk Elzinga of the Department of Linguistics and English Language at Brigham Young University is working on a new font called Brigham (see Figure 26), using FontForge, that is largely mono-width but judiciously uses thinner strokes for the loops.

Robertson's Fonts. Graphic designer Christian Robertson is working on two fonts, "trying to make the Deseret Alphabet look good in type" (personal communication), which is quite a challenge. In his first font, Robertson is not afraid to "take out some of the curly queues that really mucked things up", to rethink the representation of the short vowels, to add serifs, and even to introduce something like ascenders. The sample in Figure 27, kindly provided by Robertson, does not represent the latest version of his font, and the text is gibberish, but it illustrates his innovative approach. Robertson's next font will be even more challenging, designed for typesetting the early cursive manuscripts from 1854–55.

[48] http://www.angelfire.com/pq/Urhixidur/Fonts/Fonts.html
[49] http://home.earthlink.net/~slbartok/projects/fonts.htm

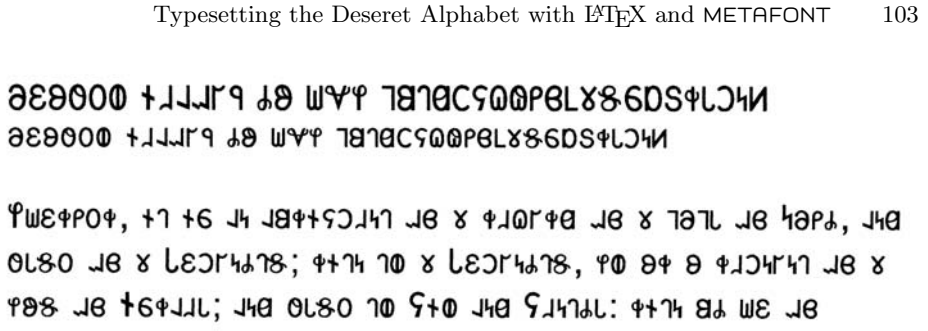


Fig. 26. Elzinga's Brigham font.

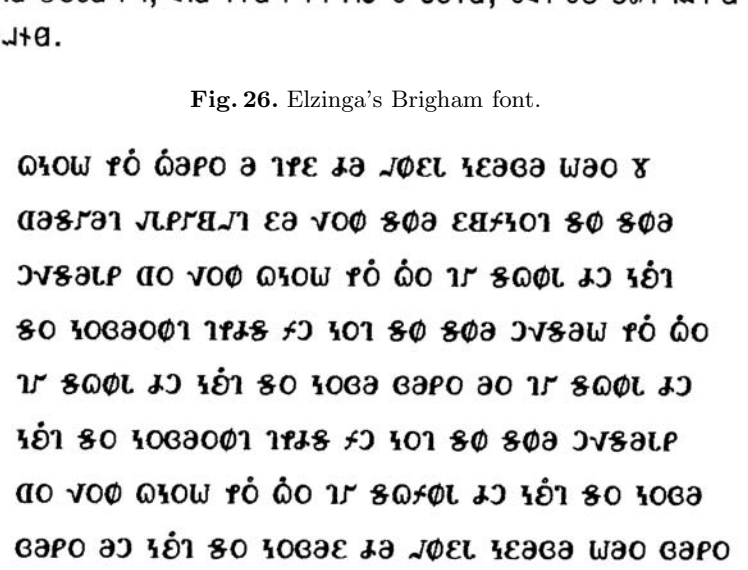


Fig. 27. Robertson's experimental font.

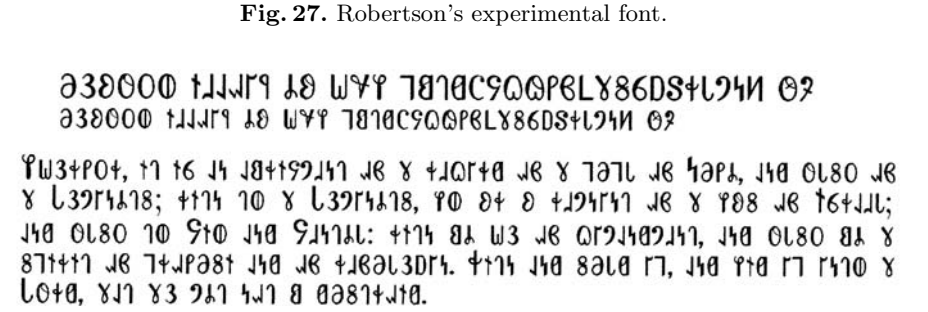


Fig. 28. Beesley's desalph font.

5.2 Beesley's METAFONT desalph Font and LaTeX Package

My own desalph font (see Figure 28) was created with METAFONT for the specific purpose of typesetting 40-letter Deseret Alphabet manuscripts from 1859–60.

These documents were typically written with narrow nib pens, producing some thick-thin distinction, so the coding relies heavily on METAFONT penstroke commands. I took my inspiration from the pre-book charts of 1854–55, and from real handwriting. The penstrokes follow the path used to draw the glyphs, giving a hint of the original handwriting that is completely obscured in the Bodonified book font of 1868–69.

The desalph font is made available in a desalph package, which can be used in a LaTeX document much like the TIPA package[50]. The input of Deseret Alphabet characters can be done somewhat clumsily using commands like `\dalclongi` (Deseret Alphabet lowercase long i) for ∂ or `\dauclongi` (Deseret Alphabet uppercase long i) for ∂. Inside `\textda{}` commands, a more convenient system of transliteration "shortcuts" can be used. As I was already somewhat comfortable with the shortcuts of the TIPA package, for entering IPA letters, I laid out the desalph font internally so that the same shortcuts could be used wherever possible. Simple commands were defined to enter diphthongs and affricates, which have no shortcuts in TIPA. A simply defined `\ipa{}` command allows the same commands to be used to enter equivalent IPA diphthongs and affricates. The principal entry commands are summarized in Table 2, and some extra commands for unusual and idiosyncratic glyphs are shown in Table 3. Uppercase letters, found in Deseret Alphabet but not in IPA, can be entered with corresponding uppercase "uc" commands with names like `\dauclongi`, or by placing the shortcut in the `\uc{}` command, e.g. `\uc{i}`.

The use of METAFONT allowed me to define the proper glyphs for the 1859–60 manuscripts, especially the 𐐬 used for /ɔʲ/ and the 𐐭 used for /ʲu/, which I have never seen in a printed chart or document[51]. When I found a manuscript with the experimental new letter ǀ for the neutral vowel called schwa (/ə/), making a 41-letter alphabet, adding it to my METAFONT font was a simple exercise.

The skeleton example in Figure 29 illustrates the use of the desalph and tipa packages, and the definition of the `\ipa{}` command. This file yields the following output:

A sample of Deseret Alphabet entered using shortcuts:

𐐨 𐐩 𐐪 𐐫 𐐬 𐐭 𐐮 𐐯 𐐰 𐐱 𐐲 𐐳 𐐴 𐐵 𐐶 𐐷 𐐸 𐐹 𐐺 𐐻 𐐼 𐐽 𐐾 𐐿 𐑀 𐑁 𐑂 𐑃 𐑄 𐑅 𐑆 𐑇 𐑈 𐑉 𐑊 𐑋 𐑌 𐑍

Parallel phonemic IPA entered using the same shortcuts:

i e ɑ ɔ o u ɪ ɛ æ ɒ ʌ ʊ aʲ ɔʲ aʷ ʲu w j h p b t d ʧ ʤ k g f v θ ð s z ʃ ʒ r l m n ŋ

6 Current and Future Projects

6.1 The Deseret Alphabet and Native American Languages

Although the Deseret Alphabet was intended for writing English, there was some hope and expectation that it could be used to transcribe other languages, that it

[50] `http://tooyoo.l.u-tokyo.ac.jp/~fkr/`

[51] An 𐐬 punch appears in the set of St. Louis punches of 1857, but it was not used when printing finally started in 1859.

Table 2. Commands from the desalph package to insert 1859–60 Deseret Alphabet glyphs into running text, and shortcuts that can be used in desalph environments. The single-letter shortcuts are parallel to the input transliteration for the TIPA package. The commands defined for diphthongs and affricates can also be used inside `\ipa{}` commands, allowing the same entry method to be used for both the Deseret Alphabet and equivalent phonemic IPA.

Deseret	Command	Shortcut	IPA
𐐙	`\dalclongi`	i	i
𐐚	`\dalclonge`	e	e
𐐛	`\dalclonga`	A	ɑ
𐐜	`\dalclongaw`	O	ɔ
𐐝	`\dalclongo`	o	o
𐐞	`\dalclongu`	u	u
𐐑	`\dalcshorti`	I	ɪ
𐐒	`\dalcshorte`	E	ɛ
𐐓	`\dalcshorta`	`\ae`	æ
𐐔	`\dalcshortaw`	6	ɒ
𐐕	`\dalcshorto`	2	ʌ
𐐖	`\dalcshortu`	U	ʊ
𐐗	`\dalcay`	`\aI` or `\aJ`	a^{j}
𐐘	`\dalcoi`	`\OI` or `\OJ`	$ɔ^{j}$
𐐛	`\dalcow`	`\aU` or `\aW`	a^{w}
𐐠	`\dalcyu`	`\ju` or `\Ju`	^{j}u
𐐡	`\dalcwu`	w	w
𐐢	`\dalcye`	j	j
𐐣	`\dalch`	h	h
𐐤	`\dalcpee`	p	p
𐐥	`\dalcbee`	b	b
𐐦	`\dalctee`	t	t
𐐧	`\dalcdee`	d	d
𐐨	`\dalcchee`	`\tS`	ʧ
𐐩	`\dalcjee`	`\dZ`	ʤ
𐐪	`\dalckay`	k	k
𐐫	`\dalcgay`	g	g
𐐬	`\dalcef`	f	f
𐐭	`\dalcvee`	v	v
𐐮	`\dalceth`	T	θ
𐐯	`\dalcthee`	D	ð
𐐰	`\dalces`	s	s
𐐱	`\dalczee`	z	z
𐐲	`\dalcesh`	S	ʃ
𐐳	`\dalczhee`	Z	ʒ
𐐴	`\dalcer`	r	r
𐐵	`\dalcel`	l	l
𐐶	`\dalcem`	m	m
𐐷	`\dalcen`	n	n
𐐸	`\dalceng`	N	ŋ

Table 3. Extra commands used to enter rare and idiosyncratic Deseret Alphabet glyphs.

𐐞	`\daucslju`	St. Louis 1857 font, unused glyph for /ʲu/
𐐞	`\dauchaskoi`	Haskell's idiosyncratic glyph for /ɔʲ/
𐐡	`\daucschwa`	Shelton's proposed glyph for schwa /ə/
𐐢	`\daucspellerow`	Deseret Phonetic Speller glyph for /aʷ/

```
\documentclass[]{article}
\usepackage{times}
\usepackage{desalph}
\usepackage{tipa}
% commands used in \ipa{}, parallel to commands in \textda{}, to get
% an equivalent phonemic IPA transliteration of Deseret Alphabet
\newcommand{\ipa}[1]{{\tipaencoding%
\providecommand{\aI}{}\renewcommand{\aI}{a\textsuperscript{j}\xspace}%
\providecommand{\aJ}{}\renewcommand{\aJ}{a\textsuperscript{j}\xspace}%
\providecommand{\OI}{}\renewcommand{\OI}{O\textsuperscript{j}\xspace}%
\providecommand{\OJ}{}\renewcommand{\OJ}{O\textsuperscript{j}\xspace}%
\providecommand{\aU}{}\renewcommand{\aU}{a\textsuperscript{w}\xspace}%
\providecommand{\aW}{}\renewcommand{\aW}{a\textsuperscript{w}\xspace}%
\providecommand{\ju}{}\renewcommand{\ju}{\textsuperscript{j}u\xspace}%
\providecommand{\Ju}{}\renewcommand{\Ju}{\textsuperscript{j}u\xspace}%
\providecommand{\dZ}{}\renewcommand{\dZ}{\textdyoghlig\xspace}%
\providecommand{\tS}{}\renewcommand{\tS}{\textteshlig\xspace}#1}}

\begin{document}
\begin{center}
A sample of Deseret Alphabet entered using shortcuts:\\
\textda{i e A O o u I E \ae{} 6 2 U \aI{} \OI{} \aU{} \ju{}
w j h p b t d \tS{} \dZ{} k g f v T D s z S Z r l m n N}
\smallskip
Parallel phonemic IPA entered using the same shortcuts:\\
\ipa{i e A O o u I E \ae{} 6 2 U \aI{} \OI{} \aU{} \ju{}
w j h p b t d \tS{} \dZ{} k g f v T D s z S Z r l m n N}
\end{center}
\end{document}
```

Fig. 29. A skeleton LaTeX example using the TIPA and desalph packages.

could serve as a kind of international phonetic alphabet[52]. The Deseret Alphabet reform coincided with a period of intense Mormon interest in Native Americans, and there is growing evidence that missionaries tried to use the Alphabet in the field. For example, Isaac Bullock wrote a Shoshone vocabulary that includes

[52] Parley P. Pratt to Orson Pratt, 30 January 1854, Orson Pratt Incoming Correspondence, LDS Church Archives. Journal History, 4 June 1859.

Deseret Alphabet pronunciations for at least some of the Shoshone words[53]. In 1859, Marion J. Shelton tried to teach the Deseret Alphabet to the Paiutes in the area of Santa Clara, Utah, and there are hints that missionaries may have tried to introduce Deseret-Alphabet-based literacy to the Navajo, the Zuñi, the Creeks, and other tribes. Much research remains to be done in this area.

6.2 The Second Mormon Mission to the Hopi: 1859–60

In the last couple of years, it has become clear that there was a serious attempt to introduce Deseret-Alphabet-based literacy to the Hopi. In 1859, President Brigham Young personally chose Marion J. Shelton, instructed him to go to Hopi-land, stay a year, learn the language and try to "reduce their dialect to a written language" using the Deseret Alphabet[54]. This was the second of fifteen early missions to the Hopi [23, 13, 14]. In December of 2002 I discovered an uncatalogued and unidentified "Indian Vocabulary" in the LDS Church Archives, and I was able to identify it as English-to-Hopi. I have argued [8] that it was written by Marion J. Shelton during this mission, and it appears to be the oldest written evidence of the Hopi language.

The entire vocabulary has now been typed into an XML format, with fields added for modern English and Hopi orthography, modern dictionary definitions, and comments and references of various kinds. The XML file is downtranslated using a Perl-language script, with the helpful Perl XML::Twig package[55], to produce LaTeX source code with Deseret Alphabet output, using the desalph package and font, and equivalent phonemic IPA output, using the TIPA package. The use of XML, the desalph font, TIPA and LaTeX allows me and my co-author Dirk Elzinga to reproduce this extraordinary document for study and publication. Creating and maintaining the original data in an XML format gives us all the advantages of XML validation and abstraction; and the flexibility of downtranslation to LaTeX allows us to format the output in different ways suitable for proofreading or for final publication.

The English-Hopi Vocabulary (see Figure 30) is written entirely in the Deseret Alphabet and includes 486 entries like the following

𐐤𐐋𐐚𐐡·𐐛𐐡𐐐 𐐗𐐃𐐀𐐀·𐐠𐐏

with an English word on the left and a Hopi word in Third Mesa (Orayvi) dialect on the right. Encoded as XML, and with auxiliary information added, this entry appears as shown in Figure 31. The XML file is validated using a Relax NG schema. Downtranslation of the XML entry currently yields the LaTeX output in Figure 32, which is a line in a table. When typeset, the entry appears as shown in Table 4. This open tabular format is ideal for proofreading, and for the final paper all that will be required is a modified Perl script to downtranslate the same XML file into other LaTeX codes that waste less space.

[53] Glossary of Isaac Bullock, University of Utah Library, Special Collections.

[54] Brigham Young to Jacob Hamblin, 18 September 1859, Brigham Young Outgoing Correspondence, LDS Church Archives.

[55] http://www.xmltwig.com/xmltwig/

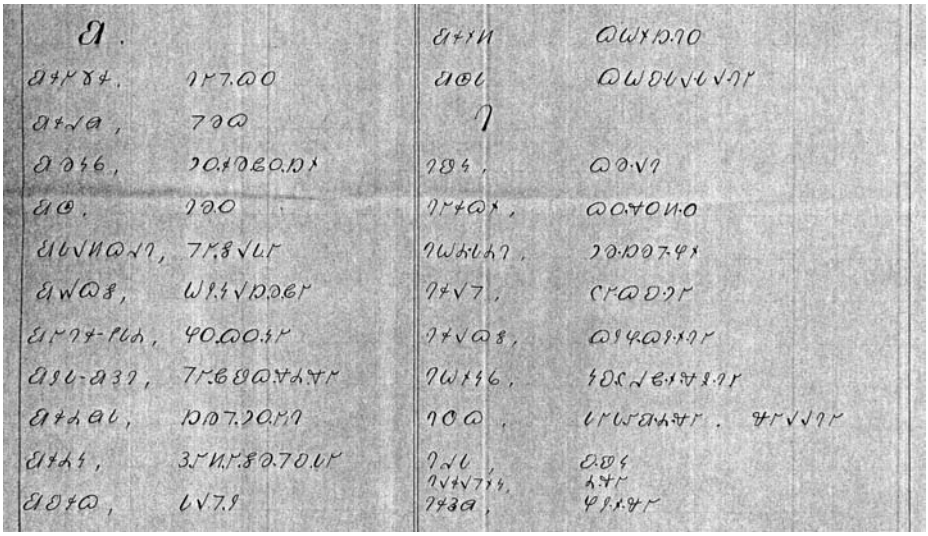


Fig. 30. A selection from the English-to-Hopi vocabulary showing parts of the entries for words starting with /b/ and /t/ in English. The entry for *bread*, /brɛd/=/pik/ (ᐁᔾᒧᑎ=ᒣᐅᓇ), is the second from the top on the left; the Hopi word is now written *piiki*. The entry for *boy*, /bɔʲ/=/ti.o/ (ᐁᑯ=ᒣᐅ.ᑯ), is the fourth from the top; the word is now written *tiyo*. LDS Church Archives.

```
  <entry>
    <left>r\ae{}bIt-stIk</left>
    <eng>rabbit stick</eng>
    <right>pe\tS{}.ko.ho</right>
    <hd pages="449">puts$|$koho ‘rabbit stick, a flat
boomerang-like stick used for hunting; used for throwing
and hitting it on the run’</hd>
    <mk></mk>
   </entry>
```

Fig. 31. An XML entry for the Hopi vocabulary.

```
340 & \raggedright \index{rabbit stick, 340} rabbit stick \\
 \textda{r\ae{}bIt-stIk} \\
 \ipa{r\ae{}bIt-stIk} & \raggedright \ipa{pe\tS{}.ko.ho} \\
 \textda{pe\tS{}.ko.ho} & HD p.\@ 449: puts$|$koho
‘rabbit stick, a flat boomerang-like stick
used for hunting; used for throwing and hitting
it on the run’\\
```

Fig. 32. LaTeX output from downloading an XML entry.

Table 4. Entry of the English-Hopi vocabulary typeset for proofreading.

340	rabbit stick 𐑮𐑨𐑚𐑦𐑑-𐑕𐑑𐑦𐑒 ræbɪt-stɪk	pet͡ʃ.ko.ho ꟻ3C.QO.ዖO	HD p. 449: puts|koho 'rabbit stick, a flat boomerang-like stick used for hunting; used for throwing and hitting it on the run'

I have also transcribed the journal of Thales H. Haskell, kept in the Deseret Alphabet from October through December of 1859, and will include it in a general history of the second mission to the Hopi [7]. Here, for reading practice, is an extract from his journal in the original Deseret Alphabet and in equivalent phonemic IPA. Haskell idiosyncratically uses the 𐐮 glyph for the /ɔʲ/ diphthong instead of the 𐐬 glyph used by most other writers in 1859.

𐑢𐑨𐑣 𐑛𐑞𐑣 𐑑𐑦 𐑝𐑨 𐑢𐑑𐑤𐑮 𐑞𐑨𐑖 𐑚𐑮𐑑 𐑣𐑴 𐑑𐑤𐑚𐑧 𐑮𐑛 𐑚𐑤𐑣 𐑑𐑦 𐑦𐑑 𐑄𐑟𐑭 𐑣𐑴 𐑞𐑨𐑣 𐑞𐑦𐑣 𐑚𐑦 𐑛𐑩𐑤𐑑𐑦𐑣 𐑟 𐑞𐑨𐑛 𐑛𐑞𐑣 𐑞𐑦𐑣 𐑝𐑧 𐑟 𐑚𐑦𐑤𐑭 𐑑𐑦 𐑩𐑦 𐑢𐑦𐑟 𐑮𐑕 𐑮𐑛 𐑚𐑾𐑤𐑛 𐑙𐑮𐑣 .3. 𐑝𐑧 𐑟 𐑮𐑛 𐑙𐑣 𐑝𐑧 𐑟 𐑚𐑦𐑤𐑭 𐑑𐑦 𐑩𐑦 𐑢𐑦𐑟 𐑮𐑕 𐑮𐑛 𐑚𐑾𐑤𐑛 𐑙𐑮𐑣 𐑕𐑮𐑛 𐑑𐑩𐑒𐑦𐑝 𐑕𐑭𐑦 𐑛𐑮𐑙𐑤𐑦𐑣𐑝 𐑞𐑦𐑛𐑩𐑟𐑩𐑕 𐑤𐑣𐑟𐑩𐑕 𐑣𐑛 𐑑𐑩𐑟 𐑤𐑞𐑟 𐑛𐑞𐑦 𐑢𐑩 𐑕𐑙𐑟𐑩𐑑 𐑕𐑮𐑯 𐑟 𐑮𐑭 𐑣𐑛 𐑮𐑛 𐑕𐑮𐑙 𐑩𐑤𐑢𐑦𐑟 𐑣𐑛 𐑞𐑨𐑣 𐑣𐑛 𐑣𐑧𐑛 𐑞𐑦𐑣 𐑚𐑦 𐑕𐑥𐑴𐑒𐑑 𐑕𐑭𐑦 𐑢𐑦𐑞 𐑮𐑕 𐑮𐑛 𐑨𐑯𐑛 𐑣𐑧𐑛 𐑞𐑨𐑣 𐑤𐑝𐑟 𐑞𐑦𐑣 𐑕𐑙𐑟 𐑟 𐑭𐑯 𐑣𐑛 𐑣𐑧𐑛 𐑕𐑨𐑥 𐑒𐑪𐑯𐑝𐑮𐑕𐑧𐑓𐑨𐑯 𐑢𐑦𐑞 𐑩 𐑮𐑥𐑦𐑛𐑨𐑯 𐑓𐑮𐑧𐑯𐑛𐑟 𐑞𐑧 𐑨𐑦𐑮𐑛 𐑑𐑵 𐑧𐑯𐑒𐑘𐑷 𐑝𐑧𐑮𐑤 𐑥𐑨𐑑𐑓.

wɛnt da^{w}n tu ma^{j} wʊlf træp bʌt no wʊlvz hæd bɛn tʊ ɪt kem hom ænd fa^{w}n br ʃɛltn pripærɪŋ e krɪstmʌs fist gɒt ɪt rɛdɪ ænd ɪmva^{j}tɪd .3. ɔv ð hɛd mɛn ɔv ð vɪlɪʤ tu it wɪð ʌs hæd bɔ^{j}ld mʌtn st^{j}ud pitʃɪz s^{j}uɪt dʌmplɪmz fra^{j}dkeks pænkeks ænd pik æftr dɪmr wi smokt sʌŋ e hɪm ænd hæd sʌm kɒnvrseʃʌn wɪð a^{w}r ɪmdɪʌn frɛndz ðe æpird tu ɛnʤɔ^{j} ðɛmsɛlvz vɛrɪ mʌtʃ.

6.3 Other Possible Deseret Alphabet Typesetting Projects

Around 1985 the original Deseret Alphabet *Book of Mormon* was scanned and OCRed under the direction of Prof. John Robertson of the Brigham Young University Linguistics department, and the text was proofread by Kristen McKendry[56]. The surviving files from this project are not well organized, and may not be complete, but it appears that the Deseret Alphabet *Book of Mormon* could now be reproduced without too much difficulty. As the original *Book of Mormon* had a print run of only 500 copies, and as a copy today can fetch upwards of $7000 or $8000, there has always been some interest in retypesetting it.

The Deseret First Book and *The Deseret Second Book* had print runs of 10,000 copies each, are therefore much more plentiful, and copies today go for around $200. *The Deseret First Book* has even been reprinted photographically for sale to tourists as a Utah curiosity [26], and the text has been keyed in by John Jenkins, and proofread by Michael Everson and by myself. Such projects are of interest to linguists who want to search the texts electronically.

In 1967, LDS Church archivists found a bundle of forgotten Deseret Alphabet manuscripts, some of them ready for the typesetter but never printed [32]. These

[56] This project, circa 1985–86, used a Kurzweil scanner, which was trained to recognize Deseret text. However, McKendry reports (personal communication) that the raw output of the OCR was so poor and the proofreading so onerous that it might have been easier just to type in the text manually.

include *The Doctrine and Covenants*, with the *Lectures on Faith*; the *Catechism* of John Jaques; and the entire text of the *Bible*. The LDS Church Archives also hold the *History of Brigham Young*, a number of letters, an unfinished *Deseret Phonetic Speller*, journals, letters and probably a number of other documents still to be found.

7 Conclusion

Although the Deseret Alphabet was never intended for secrecy [6], few people then or now can be persuaded to learn it, and a number of interesting documents have been ignored and unstudied for over 140 years. The letters and journals are of interest to historians, and the phonemically written texts are also of interest to linguists. With the help of XML, LaTeX, TIPA and new digital fonts for the Deseret Alphabet, these neglected documents are coming to light again.

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