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Fieldworker and Computer : An End User's View of Computer Ethnology

メタデータ	言語: eng
	出版者:
	公開日: 2009-04-28
	キーワード (Ja):
	キーワード (En):
	作成者: 江口, 一久
	メールアドレス:
	所属:
URL	https://doi.org/10.15021/00003271

# Fieldworker and Computer: An End User's View of Computer Ethnology

PAUL K. EGUCHI
National Museum of Ethnology

#### INTRODUCTION

As a fieldworker in African oral literature, I have been interested in the application of computer in my research. I am a so-called *end user*. Although I lack knowledge of computer mechanisms and programming, I can still benefit from modern technology, thanks to the National Museum of Ethnology's *joint research* system between the computer specialists and myself.<sup>1)</sup> For several years, I have been accumulating texts and dictionary information of the Fulfulde language of West Africa, in cooperation with Prof. S. Sugita. Through this process I have thought about the possibility of *computer ethnology* and coexistence with modern tools. I feel a need to recognize the concepts of researchers in order to make full use of computer. In this paper I would like to show what I feel about *machines* and *men*, and suggest the possibility of new research methods.

#### **OBSERVATIONS ON MARGINAL PROBLEMS**

#### **Printing Out**

There are a number of terminals which are connected to the main computer system in the museum. This means the main system is accessible from almost everywhere, a very satisfactory situation. The type and use of these terminals, however, is not completely satisfactory. Of course each terminal is furnished with a printer, but the quality of print-out is not very good. High quality printing out must be directed to the laser beam printers located on the third floor.<sup>2)</sup>

<sup>1)</sup> The National Museum of Ethnology is a joint research facility primarily for anthropologists and ethnologists in the national universities. Each researcher in the museum has a budget to organize a joint research unit to invite researchers necessary for his joint research. The museum encourages all kinds of joint research. In the research section there are four region-oriented research departments: Asian, Oceanian, American, African and European, and a cross-cultural department comprising music, art, linguistics and *computer ethnology*. Each researcher belongs to one of these departments. Many researchers are carrying out joint research with cross-cultural specialists.

<sup>2)</sup> The third floor of the museum is a place to store and process all kinds of information in the form of books, records, films, magnetic tapes, etc. The main system and accompanying machines, including high speed laser beam printers, are kept on this floor.

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Masks and Social Organization among the Bakwele People of Western Equatorial Africa, Siroto, Leon.

Krisen und Konflikt im Tschad, Soulas de Russel, Dominique.

Figure 1. An Example Typewritten by Ordinary Typewriter

These laser beam printers in the computer room can print out a large amount of documents. They are quite satisfactory for printing out ordinary alphabets and some simple Chinese characters, but they cannot print out other scripts of the world. A researcher has to design the font patterns of new letters each time they are needed.<sup>3)</sup> They cannot print out all titles of books in the original language.<sup>4)</sup> We must make further efforts to provide common non-alphabet characters, such as Tibetan, Arabic, Hebrew, etc., and uncommon but frequently used International Phonetic Symbols, or International African Institute Alphabets.

Due to historical reasons, most terminals at present are designed for only major West European languages and, here, Japanese.

### **Aesthetically Beautiful Letters and Characters**

There is a great conceptual difference between computer specialists and non-specialist ethnologists concerning the value of letters. Letters are not only tools which convey information, but also objects of aesthetic beauty. It is a pity that few printers can print out letters as attractive as those produced by an ordinary typewriter. (See Fig. 1) Some printing machines can print out excellent letters, but cannot be used as a printer of the main system. The frustration on our side comes mainly from our misunderstanding of the capacity of each machine. But still I believe this is a human problem. The technicians and computer specialists ought to provide more possibilities.

## Wasting Paper

From the standpoint of an ordinary consumer, it appears that a great deal of paper is wasted for printing out. The very fast printing machines connected to the big computer are adapted to large size paper, a situation which sometimes leads to waste of paper. Should the concept of economy be forgotten in this field? I do not think so. It is a problem of ethics and aesthetics as well. Buying cheap pulp from the third world causes the destruction of beautiful rain forests in Southeast Asia. I cannot stand this as a fieldworker.

<sup>3)</sup> Prof. S. Sugita and several Thai specialists have experience in printing out a huge amount of Thai texts by creating fonts of Thai alphabets.

<sup>4)</sup> There are 123 kinds of languages according to the Library of Congress classification. The museum can print out languages written in Roman, Greek, and Cyril alphabets, Japanese syllabics, and traditional Chinese characters. At present the simplified Chinese characters, jiǎn tǐ zǐ, cannot be printed. Other scripts may be printed in transcribed forms.

# TEXT PROCESSING AND DICTIONARY MAKING

# **Computer for Text Processing**

As a specialist in the oral literature of the Fulfulde-speaking people in West Africa, I have been dealing with text information. I input the text into the computer, then correct it. I prepare the ordinary and reversed KWIC's (Key Word

jolloors." 883 jolloors. april 1818 jolloors. april 2019 jolloors. april			
jonnga. 190 vit 114 jonngali man m 634 jonngali m 634	iollooru." 883		
jonnganii maa maaco. jonnganii maaco.	jollooru." 890	. Moylo daangel	jollooru."
jonnganii man ma 666 jonnganii 666 javdi. Ko oo lutti. 0 jonnganii aaro. 0 eaaro. 0 o o 'b jonnganii aaro. 866 javdi. Ko oo lutti. 0 jonnganii aaro. 0 eaaro. 0 junal oori. 0 lutti tosi 19 jonnganii aaro. 0 eaaro. 70 jonnganii aaro. 1 601 jonnii aaro. 1 601 jo	jonnga. nge wi' 1114	Nge soppa. Nge	jounga. Nge wi'i nge 'benndataa. Ngel wi
jonnyl maaro. 866 javál. Ko oo lutti. O jonnyl maaro. 0 o 'b jonnyl maaro. 866 juvál. Ko oo lutti. O jonnyl maaro. 866 juvál. Ko oo lutti. O jonnyl maaro. 866 juvál. Ko oo lutti. O jonnyl maaro. 866 juvál. Junni ozi. O iutti kozi. 19 jonnyl maaro. 1851 jonnyl maaro. 1852 jourden. 1851 jonnyl maaro. 1852 jourden. 1851 jonnyl maaro. 1852 jonnyl maaro. 1852 journyl maaro. 1852 jonnyl maaro. 1852 j	jonnganii maa m 654	. 0	jonnganii saa maaro.
joneji maaro, 160 juoni ori. Olutti kositeg joneji maaro, Ovafdi Dani Joneji maaro, 1801 aade2, Inc. Samebo lutti. Joneji maaro alienta aade2, Inc. Samebo lutti. Joneji maaro alienta aade2, Inc. Samebo lutti. Joneji maaro alienta aaro alienta aade2, Inc. Samebo lutti. Joneji maaro alienta aaro aaro aaro aaro aaro aaro aaro aa	jonnyanii maa m 696	0	jounganii mas masro-
jonngi mearo. 1681 aande? Inne Samebo intil. jonngi mearo. Jenejyel Jab jonngi mearo ni 681 to takitu, so inne samebo jonngi mator nii, wat da besi, teora jonngi mearo ni 681 to takitu, so inne samebo jonngi mator nii, wat da besi, teora jonngi jonngi, milai 137 to laide debo o fondati jonngi, milai 137 to jonngi jonngi mearo ni wat jonngi	ionnai 646	javdi. Ko oo lutti. O	jonngi maaro. Oo o 'b
jonngi mearo, 1881 and 24 Janes Sambo junti, joneg mearo, jonejel 1 joneg jungi mearo ni 881 io biskitche no inne Sambo jonngi mearo nii, wird bein tribun vii nonneoje mearo 1781 jonegoje mearo, jonngoje me	ionngi maaro. 686	' funni oori. O lutti kasi'ng	jonngi magro. O wa'di basi
jonngi, niini 1317 jonngori marco 731 jonngori marco 732 jonngori marc			jonngi maaro. Juppiyel
jonngi, mimi 1337 jonngori marco, 731 jonngori marco, 732 jonngori marco, 732 jonngori marco, 733 jonngori marco, 733 jonngori marco, 734 jonngori marco, 734 jonngori marco, 735 jonngori	topngi maaro ni 641	takkito, so inna Samubo	jonngi maaro nii, wa'da basi, 'boosa
jonngori saaro 781 jonngori saar		i. O hokki debbo o founditi	jonngi, niisi hur'bi. O vi'
jonngoji qulida '722 jonigoji da de legge '422 jonigoji da legge '4222 jonigoj		n nii. inna Sammbo yeyi	jonngoyi maaro, jonngoyi g
joo'da 'doo, d 61		ionngovi maaro.	jonngovi gul'da'ng, vari, vi'i: "Sammb
joo'd i e legge 1] e ladde. Deeko wari joo'd e leggel, oc'pul "Mer", hat'r, joo'd i don non lijs 'gri loa'dan no suuda.  yor'd loa'n non lijs 'dri loa'dan no suuda.  yor'd loa'n non lijs 'dri loa'd loa'n non nii, no c'taa.  yor'd or'd loa'n non nii, no c'taa.  yor'd loa'n non nii, no c'taa.  yor'd loa'n non nii,			
joo'de' don non 1339 joo'de ryamin 737 joo'd opt yearin 737 joo'd opt ye		e ladde. Deeko wari	joo'di e leggel go'ng: "Ha*y ha*y,
joordoyi, yasasi 1021 jood doyi, yasasi 1021 jood doying asasasi 1021 j		wa'dani no suudu. O	joo'di 'don non nii, no o rima.
joot doyi rasasi 1021 joo doyi rasasasi 1021 joo doyi rasasi 1021 joo doyi rasasi 1021 joo doyi rasas	100'di nyaami n 797	vevi lootovi. Walti non nii.	joo'di nyaami mii.
jood dojt-no yaa 1022 jood dojt-no yaa 1022 jood dojt-no yaa 1022 jood dojt-no yaa 1022 jood dojt-no yaand yaa yaa yaa yaa yaa yaa yaa yaa yaa ya			loo'dovi yaasi'ng.
jour dopr. 373 i 'din talli ta			joo'doyi-no yaasi'ng mii, o yi'i non mi
joosu tawaand 777		i 'din talli talli talli yeyi	
jooss no cease of the grant of	. loomu tawaand 777		joonu rawaandujo'ng gesa
joosujo'ng g 807 joosujo'ng g 807 joosu'jo'ng g 807 joosu'jo'ng g 807 joosu'jo'ng g 807 joosu'jo'ng geas on ennda'ng tappa'd joosu'jo'ng geas on ennda'ng tappa'd joosu'jo'ng geas on ennda'ng tappa'd joosu'jo'ng jonsy'jo'ng jonsy'jo			
joona'ng hangi 802 joona'ng'en, o 1311 joona'ng hangi 802 joona'ng'en, o 1314 joona'ng hangi 802 joona'ng'en, o 1324 joona'ng'en, oo 1324 joona'ng'en, oo 1411 joona		Hii.	loomulo'ng gesa on ennda'ng, tappu'd
joona'ng'en. o 1331 tofete." Bil nas wondd e joona'ng'en. o witi "Joona'ng joonal'ng j			
joona'ng'en. o 1331 tofete." Bil nas wondd e joona'ng'en. o witi "Joona'ng joonling kap ningen joon ling kap ningen joon ling kap ningen joona'ng j	iconuing nanvi 802	Too.	loonu'ng nanyi fayin.
jooning joonin			loguingien. O wit: "Joomuing
joon leg kay n 1935  joon leg kay n 1935  jotti luuso. 1270  jotti luuso. 1270  jotti luuso. 1271  jotti luuso. 1027  jot non. niin o. 155  to yer. 150  jot non. niin o. 155  to yer. 150  jot non. niin o. 155  jot niin o. 155  j			fooni'ng fooni'ng. 0 wi'i:
jooning. o 1334 jooning. o 1334 jotti Juno. 1270 jotti Juno. 1271 juno Juno. 1272 juno Juno Juno. 1272 juno Juno Juno Juno Juno Juno Juno Juno J			Jooni'ng kay nappdi e Mayrama, Paandi
jotti juuno. 1270 jottino juuno 1271 jottino juuno juu			
jotti-no luuno fuy, fovca ndu yi*ji jii*  jottoji magvo. 1012  joy non_nii_0 o 155  toyna*. O 102  joy non nii_0 o 155  toyna*. O 102  joy non nii_0 o 102  joy noi nii_0 o 102  joy nii leddilibe b joy. O o'dio fasia wa'di.  juni   160			
jottoji masyo. 1002	iotti-no luumo 1271		
jor non_nii_o 515			fottovi maavo.
joyo nda'ng, t 90 tato no, no be joyo nda'ng, foo acca go'd'do go'ng joyo no'd'do f 101 joyo. go'd'do f 101 joyo. go'd'd'do f 101 joyo. go'd'do f 101 joyo. go'd'd'do f 101 joyo. go'd'd'do f 101 joyo. go'd'd'd' f 101 joyo. go'd'd' f 101 joyo. g			Joy non nii. O wa'da kasi
joro nda'ng, t 90 joro nda'ng, t 90 joro nda'ng, t 90 joro nda'ido f 112 joro, o witti 0 501 joro nda'ng, t 90 jor			
jojo, go'dido f 112 jojo, go'dido f 112 jojo, go'dido f ania wa'di. jojo, ou'titi o soi, wa'titi o'di o soi, wa'titi o'di o soi, wa'titi o'di o soi, wa'titi o'di o'di o'di o'di o'di o'di o'di o'd		tato no. no be	joyo nda'ng. Too acca qo'd'do qo'ng
jorno vittio 601 jorni 1707 va don pralliu tallito." Junni junni 1160 ii "mory sikito Junni, Junni Million Junni junni 1160 ii "mory sikito Junni, Junni Million Junni junni 1174 junni 117		No heddi	joyo. Go'd'do fasin wa'di.
junni 707 va 'don nyallin tallito." Junni vi'l: "ayra'nytaa. junni 1160 i: "Moy vi'eto junni, Junni Malassaande? Inna junni 1162 : Inna Sasabo noddo saa, Junni Malassaande. O vi'l junni vata." 160 o vi'l: "Too, Junni vata." O vi'l: "Roy, vi junni acci fa 770 u.o. öxddi 'don, 'daani. Junni vata." O vi'l: "Roy vi junni acci fa 770 u.o. öxddi 'don, 'daani. Junni vata." O vi'l: "Roy vi junni noo. no. 1201 sasabo mala." Hil Junni acci fa no herdo junni vata. "Dani vata." Dani vata. "O vi'li "Roy vi junni ori ni 1707 junni ori nil 717 junni vati. Sasabo mala. Junni vata. "Li'l: "Waay heary,		yeyi. Heddi 'bi'b'be	joyo. O witti o yeyi. O wi'i: "An ka'ng
junt 1150 i: "Nor whete Juni, Juni Melassande? lone, Juni Juni 1122 a jertijardi. Juni asari Juni Juni Juni Juni Juni Juni Juni Jun	iunni 707	va 'don nvallin tallito."	
junni ji62 i Inia Sambio hoddo saa, Juni Malamanando. O ulil junni 1224 a jeyti jaudi. Junni manja Junni 1224 a jeyti jaudi. Junni manja Junni vata." 160 O ulil "Roo, un.o middi 'dum, 'danni. Junni acci faa 10 un.o un.o hoddi 'dum, 'danni. Junni acci faa 10 un.o un.o hoddi 'dum, 'du	iunni 1160		Junni Malagmaande? Inna
junni vara." 160 0'viii: "Too, uno maidi 'dus, 'daani. Junni vara." O viii: "Boy vi junni acci fa 720 uo 'uddi 'dus, 'daani. Junni acci fas junni noono 739 A juti javdi mea." Hii Junni noonoo herso no be'do junni on inna 1803 - Samabo vain da, Junni oonoo herso no be'do junni oori nii 717 - Samabo vain da, Junni oori nii aus maaji. secil Samab junni oori nii 717 - Too, heddi non nii, Junni oori nii, Puni vaiti. O viii: "Neay heary, junni vatti. 600 - Junni vatti. 0 viii: "Neay heary,			
junni vara." 1800 O'u'ii. "Noo, u Junni vara." O u'ii. "Nooy vi junni acci fa 720 uo uddi 'dus, 'daasi. Junni acci fa 720 uo u daasi. Junni u daas	iunni 1229	a devti davdi. Junni maavi.	Junni fowru adii 'du'ng."
junni acci fa 720 uo "uddi 'dus, 'dasni. Junni acci fae junni nonno 719 A jeyti javdi maa." Bil Junni nonno herso no ba'do junni on inna 1203 . Sarabo valea. junni on, o vo 1202 . Too, 'uunni on Junni on, o vodi na maa, ja, seci Sasab. junni ori nii 717 junni ori nii 717 junni valti. O sarabo valea. Junni uni na maa, ja, seci Sasab. junni ori nii 717 junni valti. O sarabo valea. Junni walti. O sarabo valea. Junni walti. O sarabo valea.			Junni wara." O wi'i: "Hoy wi
juni noono 739 A jeyti javdi maa." Hil Juni noonoo berno no ba'do juni on juni 100]. <u>Samabo walaa.</u> Juni on inna mas maayi, secti <u>Samabo</u> juni on, o wo 1262 <u>Too, Juni on Juni on, o woodi nait</u> . Samabo walaa.  juni valit. 600 Too, beddi non nii, Juni walit. 0 with "Waay baary, juni valit. 10 walit. 10 wany		uo suddi 'dup. 'daani.	Junni acci fas
junai on inna 100] . Sassbo walea. Junai on inna suu saari, secti Sassb junai on, ovo 1202 no Too, junai on Junai on, ovoodi na d'il. Sassbo walea. junai cori nii 717 Too, heddi non nii, Junai cori nii, walti. Jesus 'be junai valti. 680 Junai walti. 0 zivii "swaay hwaay,			Juni noonoo herso no ba'do
junni on, o wo 1202 too, junni on Junni on, o woodi ne'i. Sambo walaa. junni oori nii 717 too, heddi non nii, Junni oori nii, walti. Jema 'be junni walti. 680 Junni walti. O wi'ii "Hwaay h*aay,		Cambo valas	lunni on inne sum manui soci Sassh
junni oori nii 717 Too, heddi non nii, Junni oori nii, walti. Jessa be junni walti. 680 Junni walti. O wi'iz "Heasy heasy,			Junni on, o woodi na'i. Samabo walaa.
junni walti. 680 Junni walti. O wi*iz "H*aay h*aay,			
lunni vi'i: "m   117)	lunni vi'i: "m 1171	waawaaka." O wi'i	Junni wi'l: "Hin koy yahataa fonngo
junni votti e 1199 asi, wi'i o nyasnyi Junni. Junni votti e wuro basmu'			
junni bii buu 799 hande. Junniyel waati. Junni bii buuru wari adii du'ng.			
junni dilli." 1223 i jawdi hannde. Junni dilli." Junni no de'y'yi mu'ng, n	junni dilli. " 1223	i jawdi hannde.	Junni dilli." Junni no de'y'yi su'ng, n

Figure 2. An Example of KWIC of Togolese Fulfulde

tas J04
taa 117 taa 121 taa 122 taa 123 taa 12
tan 111 tan 11
tan 111 tan 11
taa 1919 Ataa 19
tata 1919 tan no yonya yi ataa bandua ming."
yitana 1419 an tan no joosa jitataa banada yanga." O yaari non ndi soodataa 103 ke, nga seedataa. Tiyevu viii soodataa 103 ke, nga seedataa. Tiye viii soodataa 103 yaataa 103 yaat
accataa [51] non won'don, a scataa [52] non ke, nga seedataa. Tiyevu vi'i seedataa. Hyel wi'i seedataa. Hy
socidatea 1109 socidatea 1109 beandatea 1119 pa. Hgo jonngat. Nge wi'i nge ' socidatea 1119 pa. Hgo jonngat. Nge wi'i nge ' socidatea 1119 pa. Hgo jonngat. Nge wi'i nge ' socidatea 1114 pa. La socidatea   Sige wi'i nge ' socidatea   Sige wi'i nge ' socidatea   Sige wi'i nge ' beandatea   Sige wi'i nge ' beand
sondataa 1109 benndataa 1204 inndataa 1204 inndataa 1204 inndataa 1207 condataa 1107 pa. Ngo jonnga. Ngo wil in ngo 'seedataa. Ngol wil is eedataa. Ngol wil inndataa 1201 condataa 1201 yahataa 1201 yahataa 1171 yahataa 1171 yahataa 1172 yahataa 1012 ya
benndataa 1114 pa. Ngo jonnga. Ngo wiiinga' benndataa. Ngol wiiii nadaa 281 aso inndataab 'du'ng nii. O 'yaa canadatag 550 an. ngol njiyesungel, a conndatag 481mg," condatag 550 an. ngol njiyesungel, a conndatag kalmg," condatag 1171 wiiiJunnal wilit "Min boy yahataa 1172 o nanyo. Nin koy yahataa 2003 ya nanyo nin koy ya hataa 2003 ya nanyo nin koy ya hataa 2003 ya nanyo nin koy ya hataa 2003 ya
inndataa 281 aó inndataa ko'do'ng, o inndataa 'du'ng nil. O yaa  condataa 281 aó inndataako'do'ng, o inndataa 'du'ng nil. O yaa  roondataa 888 ay'a, an ngan npa'dunga a'  roondataa 188 ay'a, an ngan npa'dunga a'  roondataa 188 ay'a, an ngan npa'dunga '  rabataa 188 ay'a, an ngan npa'dunga '  roondataa 188 ay'a, an ngan npa'dunga '  rabataa 188 ay'a, an ngan npa'dunga '  roondataa 188 ay'a, an ngan npa'dunga '  rabataa 188 ay'a, an ngan npa'dunga '  roondataa 188 ay'a, an ngan npa'dunga '  rabataa 188 ay'a, an ngan npa'dunga '  rabataa 188 ay'a, an ngan npa'dunga '  roondataa 188 ay'a, an ngan npa'dunga '  rabataa 188 ay'a, an ngan npa'dunga '  roondataa 188 ay'a, an ngan npa'dunga '  rabataa 188 ay'a, an ngan npa'dunga '  roondataa 188 ay'a, an ngan npa'dunga '  rabataa 188 ay'a, an ngan npa'dunga '  rabataa 188 ay'a, an ngan npa'dunga '  roondataa 188 ay'a, an ngan npa'dunga '  rabataa 188 ay'a, an ngan npa'dunga '  roondataa 188 ay'a, an ngan npa'dunga '  rabataa 188 ay'a, an ngan npa'dunga '  rabataa 188 ay'a, an ngan npa'dunga '  rabataa 188 ay'a, an ngan npa' nungan '  rabataa 188 ay'a, an ngan npa' nungan '  rabataa 188 ay'a, an ngan npa' nil no '  rabataa 188 ay'a, an ngan npa' nil no', rabataa 188 ay'a, an ngan '  rabataa 188 ay'a, an ngan npa' nil no', rabataa 188 ay'a, rabataa
conndates 850 an ngel priyeeungei, a conndates kaing," rondates 848 ay ay, an ngen priyeungei, a conndates condates yahates 1171 viiiJunni viii min koy rondates conngo weendu. " saayo. Sin koy rahates fonngo weendu. " saayo. " yahates 1172 ahates 1172 ahates 1176 a'di ooli vaslde. O wiii" rahates fonngo saayo. Sin koy rahates fonngo saayo. Sin koy rahates fonngo saayo. " saayo. " saayo." yahates fonngo saayo. " saayo." yahates saa, " soo 'ibi. ' doo yahate
roondataa 888 ay aq, an ngaa nga'duuga a roondataa ghabataa 171 u'iiununi u'ii. miin koy gabataa fonago weedu. maayo. Sin yabataa 168 ay
yshataa 1171 viii. Junni viii "Min koy yshataa fonngo weendu." yshataa 1172 ahataa fonngo maayo. Hin koy yshataa fonngo weendu. " yshataa 1172 ahataa fonngo maayo. Hin koy yshataa fonngo weendu." yshataa 1172 ahataa fonngo maayo. Hin koy yshataa fonngo weendu. " yshataa 1172 ahataa fonngo maayo. Hin koy yshataa fonngo weendu. " yshataa 1172 ahataa fonngo maayo. Hin koy yshataa fonngo weendu. " yshataa 1172 ahataa fonngo maayo. Hin koy yshataa fonngo weendu. " yshataa 1172 ahataa fonngo maayo. Hin koy yshataa fonngo weendu. " yshataa 1172 ahataa 1172 yshataa fonngo weendu. " yshataa 120 yshataa fonngo weendu. " yshataa fonngo w
yahataa 1160 yahataa 1172 yahat
yahataa 1172 o maayo. Min koj yahataa fonngo maayo. Min koj yahataa 1672 maayo. Min koj yahataa 1672 maayo. Min koj yahataa fonngo wegody. Min koj yahataa fonngo maayo. Min koj yahataa fonngo wegody. Min koj yahataa 167 maa 160
yahataa 1172 ahataa Conngo maayo. Hin koy yahataa Conngo maayo. Hin koy yahataa 1172 yahataa 1173 aa'di ooli waldo. O wi'ii'' Yahataa Ennugo weendu, maayo yahataa 185 aa'di ooli waldo. O wi'ii'' Takkataa maa, maayo maayo ya ababaa maa, maayo weendu, maaya yakataa maa, maayo weendu, maayo maayo ya maayo ya maayo ya maayo wa maayo maayo maayo oo dayataa 905 salii. Nayrama walik o dayataa 905 salii. Nayrama walik o cayo maayo oo dayataa 40m, kanko duu. O cataa 105 rataa rataa Musaa ra
yahataa 176 aa'di ooli waalde. O wi'ii" Yahataa aa. Ko 'bl' d'do yakkataa 186 aa'di ooli waalde. O wi'ii" Yakkataa aa. Ko 'bl' d'do yakkataa 186 'F. "Soa ifittii ka'ng 'yakkataa aa. Ko 'bl' d'do yakkataa 249 "Soa ifittii ka'ng 'yakkataa aa. "Boo'y uura ao moo'ya mo holiataa 603 weliri kay? A bollataa ka'ng yaa?" nedoy'i anyo. O dawlataa 185 salii. Nayrama sali ka bollataa ka'ng yaa?" nedoy'i anyo. O dawlataa 105 salii. Nayrama sali ka calaa 105 salii. Nayrama salii ka calaa 105 saliii. Nayrama saliii saliii. Nayrama saliii saliii. Nayrama salii ka calaa 105 saliii. Nayrama salii ka calaa 105 saliii. Nayrama saliii saliii. Nayrama salii ka saliii sali
yakhataa 185 ai'd ooli walde. O wi'ii'' Takhataa saa. W ob! d'do yakhataa 299 "30 afilti ka'ng' yakhataa saa. " 3001 sura ao soo'ya so kokataa 167 : "So si roondii maa, 'duue hohataa ka'ng yaa'' ka'ng'? Debbo go' hohataa ka'ng yaa'' waldeyi sayo. O dalia nayraaa sailk e o dawlataa 'dua, kanko duu. O sayo. O s
yakkataa 209
Xokataa   367   1
holista 603   velici kay? A   holista ka'ng pan?"   Heddori nayo. O
daviatea   965   salii   Nayrana   salike   o   daviatea   dui, kanko   duu   O     retaa   105   rataa   rataa   Ruusa     rataa   110   rataa   rataa   Ruusa     rataa   110   rataa   rataa   Ruusa     rataa   120   rataa   rataa   Ruusa     rataa   120   rataa   rataa   Ruusa     rataa   120   rataa   rataa   Ruusa     rataa   125   rataa   rataa   Ruusa     rataa   125   rataa   rataa   Ruusa     rataa   105   rataa   rataa   Ruusa     rataa   105   rataa   rataa   Ruusa     rataa   115   rataa   rataa   Ruusa     rataa   115   rataa   rataa   Ruusa     rataa   125   rataa   rataa   Ruusa     rataa   rataa   rataa   Ruusa     rataa   rataa   rataa   rataa   rataa   rataa   rataa   rataa     rataa   rata
reta   100
Totam   105
Tetan
Tatas
Total   120
Teta
Fatea
Tataa   162
ratea         100         ratea         ratea         rusa         rusa         ratea         rusa         ratea         rusa         ratea         rusa         ratea         rusa
Totas         105         ratea ratea Huusa           retua         110         ratea ratea Huusa           ratea         125         ratea ratea Huusa           ratea         120         ratea ratea Huusa           ratea         125         ratea ratea Huusa
ratua 110 rataa rataa Ruusa rataa 115 rataa rataa Ruusa rataa 115 rataa rataa Ruusa rataa 125 rataa 125 rataa rataa Ruusa rataa 125 rataa rataa Ruusa
rataa 115
rataa 120 rataa Ruusa rataa Ruusa rataa Ruusa
rataa 125 rataa rataa musa
rataa 142 rataa rataa fuusa
rataa 162 rataa rataa Buusa
rataa 147 rataa rataa, Haane,
rataa 152 rataa rataa, Haane,
rataa 157 rataa rataa, Haane,
rataa 147 rataa rataa, Maane,
rataa 152 rataa rataa, Haane,
rataa 157 rataa rataa, Haane,
noorataa 222 e noorete, amaa noorataa maa e lekki. Ee, moorataa maa
moorataa 222 a moorataa maa e lekki. Ee, moorataa maa e leydi s ey e
vaatataa 1081 taa, Be coppi nge vi'i nge vaatataa. Binngel ng el
waatataa 1081 pi. Nje wi'i nye waatataa. 'Be coppi ng e wi'i nge waata
waawataa 1262 kee ga'i hirsete, dee mi waawataa fuu yehi. Hannde
waawataa 1266 n, dee bi'a a waawataa yehi." Hoje re wi'i: "Haba,
waawataa 1264   wrufowru wi'i mo: "Haba,
waawatan 1263 'de a'ng fuu no naawa, mi waawataa yehu." yowrufo

Figure 3. An Example of Reversed KWIC of Togolese Fulfulde

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In Context), and the frequency list of words. In the reversed KWIC, sorting of key words in alphabetical order is performed by scanning their letters from tail to head, as shown in Fig. 3, whereas in the ordinary KWIC from head to tail as shown in Fig. 2.

Sometimes I input the dictionary of words. I have tried to make both linguistic and ethnographic dictionaries. In every case the computer was a great help.

I used both KWIC's before establishing the right texts. I have not established a mechanical checking procedure for unexpected and ungrammatical forms. I check the irregular forms by using these KWIC's. In Fulfulde, word formation is done by means of suffixation. So the reversed KWIC can serve for checking the irregular grammatical forms, namely, the wrong suffixes.

In case of the texts of a newly described dialect of the same language, one may easily extract the list of all the suffixes. Thus it enables the establishment of the grammar.

12	palar	18	maaki	28	nĵamndi
13	buri	18	mbonnga	28	rimi
13	henndu	18	ngaɗa	29	haɗi
13	maygari	18	rusngum	29	mbi'i
13	mba66attu	18	tokka	31	wi'i
13	mbi'-moo-mi	18	wuro	31	wor6e
13	moo-mi	19	alaji	33	dume
13	njidda	19	arngaawo	33	yaaya
13	nyaama	19	bilaa	35	maa
13	tanni	19	ngam	36	ndi
13	yoo	19	ta	37	dow
14	ma	20	hoolaare	38	ngool
14	ndanyi	20	ѕивааве	40	bello
14	ndu	20	waawi	41	bee
14	paapaarammbe	21	bel <b>d</b> 'i	41	duuniya
14	rufa	21	bi'do	43	waɗi
14	sey	21	habaruuji	44	ndee
14	woodaa	21	oon	44	woni
15	ba	21	semmbe	46	nder
15	cakki	21	yaabi	47	dum
15	haala	21	yottine	48	cakaawa
15	ittaay	22	haadi	48	gala
15	koo	22	kooli	49	biyye
15	maaroori	22	kusulu	49	nyaamo
15	maayo	22	laamii <b>d</b> o	52	nano
15	mbi'-mi	22	njoobaari	53	belngol
16	gooro	22	yerima	53	biriiji
16	hakkunde	23	dumo	53	kam
16	hamman	23	hiraande	55	wi'ete
16	maagani	23	jaabe	56	<b>a</b> uu <b>a</b> ndi
16	nagge	23	kasala	56	woodi

Figure 4. An Example of Frequency List

The frequency list serves for teaching of the language in the daily situation. The frequency list, as shown in Fig. 4, produced from the ordinary texts such as folktales, daily conversation and so forth, suggests the order of importance in the daily situation. I selected about fifty words according to their frequency, and used them in the classroom. In this way the students were able to learn a natural language in the daily situation.

# The Techniques of Intellectual Creativity<sup>5)</sup>

It is generally believed that a computer can treat a large amount of texts. It accepts them, but it is human beings who input the data. When one feeds a large amount of texts into a computer, one is obliged to check them to obtain correct texts. Those texts which have already undergone many corrections before being inputted should be fed in with an optical character reader. (6) In so doing we may be able to avoid wasting time for correction. (7)

In the same manner, manuscripts prepared with computer or word-processor ought to be sent to the printing machine in the form of diskette or magnetic tape.<sup>8)</sup> This will reduce printing time and cost, and guarantee the correct printing. In Japan this system has not yet been widely adopted. The administration still works with the printer in the traditional way. It seems that it will take a long time before the above-mentioned method becomes popular. This is a problem of human concept on the utilization of computer.

#### Ordinary KWIC and Dictionary Making

Since the stems and roots of words are followed by suffixes, ordinary KWIC can be used to find out the right head words. The reason why we use KWIC very frequently is that the meaning of each word should be defined only in context. Whenever new texts are prepared, their KWIC is produced. Then I choose the right head words to be included in the main dictionary corpus.

Right now we are thinking of listing the words which are already found in the main corpus. The words which are grammatical rather than lexical should also be listed and eliminated from the KWIC. We would like to use a KWIC which has undergone such filtering.

<sup>5)</sup> This is the direct translation of a best seller book with the same title [UMESAO 1969], in which Dr. T. Umesao teaches the method to express one's creative idea in the simplest and most effective way.

<sup>6)</sup> According to Dr. M. McIntosh, who checked the Fulfulde texts kept in the Oxford Concordance Library, a huge amount of time was spent correcting the texts inputted by optical character reader. She had to inspect the whole texts several times (Personal communication).

<sup>7)</sup> At present, probably due to commercial factors, spelling check programs are available only for some Western European languages. For other languages a researcher has to make his own spelling check program.

<sup>8)</sup> Some printing companies accept only diskettes prepared with certain word-processors.

The production of head words in the KWIC of the Fulfulde texts causes somewhat complicated problems. The initials of all the words change morphophonemically. For example:

Singular	Plural	Meaning	
waandu	baa <b>d</b> i	monkey	
fowru	pobbi	hyena	
rawaandu	dawaa <b>a</b> i	dog	
sawru	cabbi	stick	

There is a rule for the alternation of consonants. The fricatives and continuants (w, r, y, w) change into plosives and affricates (b, d, j, g), and into nasal compounds (mb, nd, nj, ng). The fricatives (f, s, h) change into plosives and affricates (p, c, k). The nasal consonants (m, n, ny, y), the glottalized consonants (', b, d, y) and a few others, (t and l) do not change. In order to put the words with different initial consonants but of the same root and stem together, we have been using manual change and sort commands, instead of writing the formula for transformation, for the time being. We change the initials which are arranged in the same column into a combination of numerals and consonants. For example b, d, j, g, into lw, lr, ly, 2w. We then sort them into the same column, and change them into the original letters.

I feel the need for automatic transformation, that is, the process to introduce the expected forms automatically, according to the purpose. Before I begin doing this, we need the list of words which will not alternate the initial consonants.

In the dictionary each word appears in the form of a head word. We think it would be very convenient to derive the head word automatically from any given form. If a word selected from the KWIC for the main corpus can obtain its dictionary form automatically, it can save an enormous amount of time. Here we need to set rules for this procedure.

Dictionary making by means of KWIC is a test case here. We have to prepare different tactics for different purposes. There is an apparent need for the various usages of KWIC.

#### **Automatic Translation**

Although it depends on the size and purpose of the dictionary, in most cases, the dictionary of Fulfulde should be at least trilingual, namely, with English and French, since it is spoken in various countries of West and Central Africa. At present we have an international project with English and French speaking researchers. Although we are supposed to give the translation in English and French, the question of whether we should give the translation in Japanese is secondary, since the abovementioned Western European languages were adopted by the African governments as national or official languages. Now, nobody knows the exact linguistic situation in Guinea Bissau.<sup>9)</sup> According to the traditional source, the majority of people

<sup>9)</sup> According to [DE TRESSAN 1935] and [DALBY 1977], this area is supposed to be a Fulfulde speaking area.

there speak Fulfulde. When they start thinking of utilizing our dictionary, automatic translation into Portuguese will be necessary. The researchers just give the translation in their mother tongue or the preferred language. Since we are dreaming of a cultural dictionary with a vocabulary of several hundreds of thousands words, the manual translation will not catch up with the production of the information.

For the time being I wonder whether magnetic tapes of bilingual and trilingual dictionaries are commercially available. We feel the necessity of collaboration between institutions of different specialities.

#### The Cloth Patterns of the Ewe Tribe

Besides texts there are ethnological materials awaiting computer processing, which might be closely related to the text data. Textile designs probably belong to this category. The number of wefts and warps, the color of the strings, the inserted designs can be interpreted in terms almost like a linguistic grammar. This grammar differs according to the ethnicity or tradition. Typical examples of such textile are found in so-called *kente* cloth in West Africa. Fig. 5 shows a *kente* cloth woven by the Ewe tribe. An experimental study of the Ewe cloth from a linguistic approach is planned.

#### Musical Research and the Computer

It is well known that a certain tune represents a certain tradition. It may be possible for this ethnicity or distinct feature of music to be defined quantitatively.

#### The Preparation of Motif Index

The database of the motifs used for the description of all kinds of folktales in

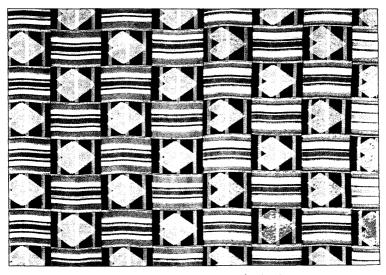


Figure 5. Ewe Kente Cloth Woven in Azahoun, Togo

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the world should be prepared. Stith Thompson's Motif-Index [Thompson 1975] is too inconvenient for researchers to handle. It is too heavy. Besides the weight there are so many changes of numbers and signs. By using the computer these demerits will be overcome. Probably errors and irregularities will be found by means of KWIC and other processing. This database will contribute greatly to folklore research.

#### COMPUTER-ASSISTED FIELD WORK

### Computer in the Field

As a field researcher I am looking for the possibility of introducing a new computer method which would combine the field and home laboratory. At present, a researcher goes to the field and makes field notes, returns home, and rewrites the contents of the field notes into *inputtable* forms. He then inputs the data and analyzes the result.

Traditional field work required only notebooks, pencils, and a few other tools, such as a camera, a tape measure, etc. If one can use a handy computer terminal, and input the information in analyzable form, it will not take long before the publication of the result back at home. In our case dictionary and text information can be easily treated in this way.<sup>10)</sup>

At present, slides and negative films cannot be easily organized after a long period of field research. By introducing an electronic camera and a minicomputer to keep such information as date, place, title and notes on each shot, organization and data retrieval will be much easier.

#### Computer for Data Retrieval

Thanks to the development of communication, even from the interior Africa one can telephone anywhere in the world, instantly through satellite. This has increased the possibility for a fieldworker to communicate with the host computer at home. He can easily refer to the data already collected.

Again I would like to mention the necessity of collaboration between computer scientists at home and fieldworkers. If there is prior discussion on the object of the field work, and the format to be prepared in the field, the already processed data can be retrieved without much trouble.

<sup>10)</sup> For ten months in 1984, 1985, and 1986 I tried to experiment in field work without paper by using an ordinary commercial handheld computer NEC PC-8201 in the dusty savanna of West Africa. It was very successful and proved very useful. The only trouble I had at the end was the bad contact between the keyboard and inner circuit. A few characters disappeared, and I was not able to input the texts. I understand it was caused by almost invisible dusts which blew from the Sahara during the wintertime. This may be prevented by using a plastic cover. After coming home all the data were transferred into the main system, and then processed. For transferring data from the handheld computer to the main system, an interface had to be developed. This again was solved very easily by the help of the *computer ethnologists* and computer specialists of the museum.

#### HUMAN INTERFACE AND JOINT RESEARCH11)

#### **Human Interface**

The Computer Ethnology division of the National Museum of Ethnology has established the following principles of how the staff members of this division contribute in the field of ethnology:

- (1) They should be the human interface between the computer and the researchers.
- (2) They create the field called computer ethnology.

The researchers in this division are all specialists on hardware and can handle all the machines in the museum. They know the usage. On the contrary most of the researchers in the museum do not have the knowledge to make full use of the machines, although they are interested in the use of computer for research. At the same time, the computer specialists do not have a comprehensive knowledge of ethnology or ethnography. At present, materials for analysis for their experiments are limited mostly to those inside the museum. The best solution to this situation is cooperation between the computer specialists and fieldworkers.

The researcher, who brings back materials from the field, supplies the fresh information on his ethnic group. He then discuss all the possibilities of computer application for the analysis. The computer specialists present the possibility.

#### The Need for Joint Research

Thus, this situation creates the need for a human interface between the field-workers and the computer specialists. Close cooperation will open the way to computer ethnology.

Of course the results of the research should be published in the names of both the researchers in both specialities. Sometimes a single paper might list several authors.

There has been a tendency for researchers to carry out their research without assistance or cooperation. They have to change their mentality.

The existence of such joint research helps ordinary ethnology researchers economize on the huge amount of time spent on learning computer programming and understanding the nature of different useful machines.

#### Routine Work and Menus

Although we need the establishment of human interface, it may be possible to deal with most of the operations required by researchers from the computer using ready-made programs.<sup>12)</sup> There should be easy access to all these programs.

<sup>11)</sup> The idea of human interface was proposed by Prof. S. Sugita [Sugita 1983]. According to his definition human interface means those who know computer systems very well and can understand the need of other researchers' in processing their data.

<sup>12)</sup> The preparation of the KWIC's of any proposed texts became almost a routine work. A researcher may propose any material for computer input. If the computer committee authorizes it, it will be inputted and processed according to the researcher's plan. One of the routine kinds of processing is KWIC.

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Of course we may assume that each case requires some modification. Either someone from *human interface* or a well-trained technician would be sufficient for program modification.

So-called *end users* require guidance and program manuals with which they can study the possibility of introducing computer into their study, and solve their problems. This manual should consist of two parts; menu and remedy.

#### **CONCLUSION**

Text and linguistic data, and other similar data are materials which can be treated with computer. Although we mentioned some possibilities of utilization of the computer, ordinary researchers need not know the complicated programming and the mechanism of computers and the machines surrounding the host computer. Collaboration between computer specialists and fieldworkers will increase the productivity of *computer ethnology*. The introduction of a computer in one's research is not a problem of knowledge of computer or programming, but rather a *social* problem of whether there is adequate research organization.

The new science of *computer ethnology* will be developed through joint research between people in two different fields. This again is a human problem of how these people can collaborate with each other. From this point of view *computer ethnology* will have great possibilities in the future if people can discard traditional ideas, and, above all, their selfishness or *closedness* in the shelter of the ivory tower.

#### **BIBLIOGRAPHY**

DALBY, David

1977 Language Map of Africa and the Adjacent Islands. London: International African Institute.

Sugita, Shigeharu

1983 Computer Applications in Ethnological Studies. Proceedings of the XXXI International Congress of Human Sciences in Asia and North Africa, Tokyo: The Tōhō Gakkai, pp. 1034–1035.

THOMPSON, Stith (ed.)

1975 Motif-Index of Folk-Literature: A Classification of Narrative Elements in Folktales, Ballads, Myths, Fables, Mediaeval Romances, Exempla, Fabliaux, Jest-Books, and Local Legends. Bloomington and London: Indiana University Press.

DE TRESSAN, Lavergne

1935 Inventaire linguistique de l'Afrique Occidentale Française et du Togo. Ifan, Dakar.

Umesao, Tadao (梅棹忠夫)

1969 『知的生産の技術』岩波書店。