

Text processing and encoding. Indology and computer philology

Matthias H. Ahlborn
University of Würzburg

2014-07-23 Mi

Outline

Pratijñāyaugandharāyaṇa

“Bhāsa-Project”

Current/Future

Internals

Dissertation 2007

"Pratijñāyaugandharāyaṇa.

Digitalisierte Textkonstitution, Übersetzung und Annotierung",
Ahlborn 2007.

Critical Edition

Different kinds of text:

- Sanskrit
- Prakrit
- verses
- prose
- speaker
- stage directions
- German translation

Example: Pratijñāyaugandharāyaṇa

Pratijñāyaugandharāyaṇa

(*sthāpanā* (2.3))

0 (tataḥ pravisi t̄ yaugandharāyaṇaḥ sīlakena saha(2.4))

(Dann tritt YAUGANDHARAYĀNA mit SĀLAKA auf.)

yaugandharāyaṇah — sālaka sajjas tvam(2.5)
[SĀLAKA, bist du bereit?]

sālakah — ayā aha im(2.6)
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yaugandharāyaṇah — hanta yasyati balavān *yasya sahārthah* (2.8) *kutah* (2.10)
[Jawohl! Kraftvol[er] schreitet voran, wer einen Gleichgesinnten hat! Warum?]!

3 snigdhesv āṣayā karma yad duskaram syād
yo vā vijñāta sat-kṛtiṇiḥ gunāṇām|
kṛtiṇi samarthyāṇyasya tasya kramepa

2.6 ārya atha kim (6)

2.8 mahatānena sacheināryam upatīṣṭe (8)

13 athā kṛteḥ wörtlich: „Was nun?“ im Sinn von „Ja, ich bin bereit, was gibt es jetzt zu tun?“

14 bēhū im Sinn von: „Du sagst zwar, du bist bereit, aber du musst ...“

15 Mit *smita* (Liebe, Loyalität) ist hier ein zentrales Thema des Dramas angesprochen; dieses wird im folgenden Vers ausführlicher dargestellt.

16 Wörtlich: „als ein Starke“.

17 WS: „A strong man or a devoted man will go far.“ [Best mit z sahārdam, das aber nur im dort sehr unleserlichen Ms zu finden ist].

2.3 *sthāpanī* LBNEQC: āśukham [TF7: TFR%] || TF: c equibj/mr d an]

Zwischen liegt hier an dieser Stelle eine endentliche Aufteilung der Ms vor, aber diese findet keine Bestätigung im restlichen Text: im Normalfall folgt C den Ms MFBD, und nicht der Gruppe TFPNQ.

2.6 ayā N: om. [EFwo EFvo-] | EF: n/-q]

Interessanterweise steht hier in dem ayā, das bei N (nach dem sich nominalerweise B richtet) fehlt.

2.8 ayā P: om. [TFZH TFWo- TFVo-] | TF: dia/mc e c mbl/-q]

2.8 *gaya* MR: aspa [EFze-] | EF: mk/-q]

— *sahārthah* GKZ: *sahārdam* BL: [sahat!] | EFwo% / EFwo% / EF: mk/hl/-q]

M könnte zu *sahārdam* verbessert sein.

2.10 *kutah* P: om. [EFwo- EFpo-] | EF: t/-q]

kutah vor einem Vers variiert sehr häufig. An manchen Stellen steht es nur in einem Ms., an anderen geht die Verteilung quer durch die Mamskrifte. Leider ist auch innerhalb eines bestimmten



Critical Edition

Different kinds of footnotes:

- chāyā (Sanskrit translation of Prakrit)
- my annotations
- variant readings

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2.8 *ayya* FbA: om. [TFZH TFWo-] | EF: m/-k]

2.8 *ayya* MR: *ayya* [EFvo-] | EF: m/-k]

— *sahārthah* GKZ: *sahārdam* BL: *[sahat!]* [EFwo% / EFwo%] | EF: nk/hl/-q]

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Critical Edition

Different kinds of numbers:

- footnote numbers
- verse numbers
- sentence numbers

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2.8 ayya P: om. [TFZH TFwo- TFvo-] | TF: m/a/mc e mbl/-q]

2.8 *yaugā* M: *ayya* [EFvo-] | EF: m/-q]

— *sahārthah* GK: *sahārdam* BL: *[sahat!]* [EFwo% / EFwo%] | EF: nk/hl/-q]

M könnte zu *sahārdam* verbessert sein.

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Index

Features

- lists every wordform
- in “pausa-form”
- Sanskrit and Prakrit
- has information about kind of text:
 - “skt” = Sanskrit (prose)
 - “cha” = Chāyā
 - “v” = Sanskrit verse
 - “rz” = regie, zentered
 - “pra” = Prakrit (prose)
 - ...

Example

prekṣasva *prati1 cha,13,12; cha,15,21; prati3
cha,1,33; cha,1,33;*
prekṣitum *prati1 cha,17,2;*
prekṣiṣye *prati3 cha,0,11;*
prekṣe *prati3 cha,0,2; cha,0,17; cha,1,22; prati4
cha,0,2;*
prekṣya *prati1 cha,8,5; cha,16,5; prati2 cha,6,9;
prati3 cha,1,34;*
pretya *prati1 v,14;*
presayati *prati1 vf,2; prati2 skt,5,6;*
presayitum *prati1 cha,1,10;*
presayiṣyāmi *prati1 v,2;*
presita *prati2 cha,10,9;*
presitah *prati2 skt,9,5;*
prodbhāsitābhyaṁ *prati1 cha,6,36;*
phalaka *prati4 rz,5,20;*
phalakā *prati4 skt,24,6;*
phalanti *prati1 v,18;*
phalam *prati1 skt,5,9; v,12;*
phenā *prati3 pra,1,26;*
phenāamāpa *prati3 pra,0,26;*



Textual Criticism

Stemma

bl	22,0
mf	13,4
eq	1,6
nbl	4,9
mfr	1,0
mfrcd	1,7
eqnbl	1,6

Tabelle 5.1.: Stemma-These S1

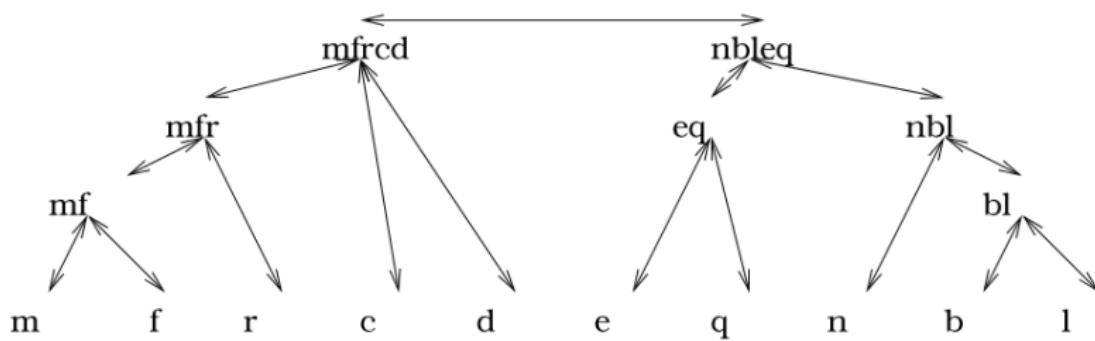


Abbildung 5.1 · Stemma-These S2

"Bhāsa-Project"

Multimediale Datenbank zum Sanskrit-Schauspiel:
Texte und Aufführungen

- DFG Förderung 2004–2008
- Projektleitung: Prof. Dr. Heidrun Brückner
- Mitarbeiter:
 - Dr. Heike Moser
 - Dr. Matthias Ahlborn
 - Dr. Anna Aurelia Esposito

Text in HTML

www.bhasa.indologie.uni-wuerzburg.de/PY_1.html

The screenshot shows a web browser window with the URL www.bhasa.indologie.uni-wuerzburg.de/PY_1.html in the address bar. The page content displays a Sanskrit text in a white box:

2
puruṣam preṣayaty eṣa yathā yaugandharāyaṇah

2.2 *niṣkrāntau*

2.3 *sthāpanā*

2.4 *tataḥ praviśati yaugandharāyaṇah sālakena saha*

YAUGANDHARĀYAṄAH

2.5 sālaka sajjas tvam

SĀLAKAṄAH

2.6 ayya aha iṁ

2.6b ārya atha kim

YAUGANDHARĀYAṄAH

2.7 mahān khalv adhvā gantavyaḥ

SĀLAKAṄAH

Index

www.bhasa.indologie.uni-wuerzburg.de/s/sn.html#igdheSu

snigdheṣu
AM_6 16.11;
PY_1 03.01;

snigdhaiḥ
SV_1 02.04;

snihyatā
PN_3 03.06;

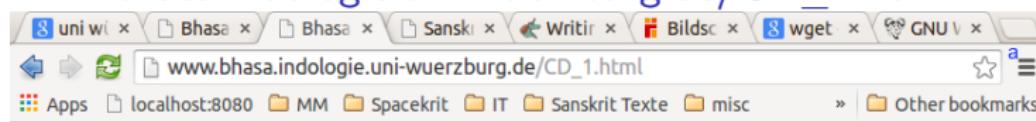
snihyati
AS_7 14.07.09;

snuṣā
PN_3 17.20;
PN_7 03.11;
PR_3 23.03;
PY_4 00.17.01 (ṇusā) ;

sneha
AN_2 19.10;
AN_6 23.10;
AS_4 17.17; 21.10.01 ;
CD_1 00.09.06 (ṇe) ;

Links to Manuscripts

www.bhasa.indologie.uni-wuerzburg.de/CD_1.html



[Home]

CĀRUDATTAM

0.1 *nāndy-ante tataḥ praviśati sūtradhāraḥ* [22848.61.a.4][17622.70.a.][4.97.b.]

SŪTRADHĀRAḥ

0.2 kiṁ ḥu khu ajja paccūsa evva gehādo ḥikkhantassa bubhukkhāe pukkhara-patta-paṭida-jaṭa-vindū via cañcaṭanti via me akkhīṇi [22848.61.a.5][17622.70.a.2][4.97.b.2]

0.2b kiṁ ḥu khalv adya pratyūṣa eva gehān niṣkrāntasya bubhukṣayā puṣkara-patra-patita-jala-bindū iva cañcalāyete iva me 'kṣiṇī

0.3 *parikramya*

0.4 jāva gehāṛ gacchia jāṇāmi kiṁ ḥu khu saṃvidhā vihidā ḥa ve^tti [4.97.b.3]

0.4b yāvat gehāṛ gatvā jānāmi kiṁ ḥu khalu saṃvidhā vihitā na ve^ti

0.5 *parikramya*

0.6 edaṛ ahmāṇaṛ gehāṛ [17622.70.a.3]

0.7 jāva pavisāmi

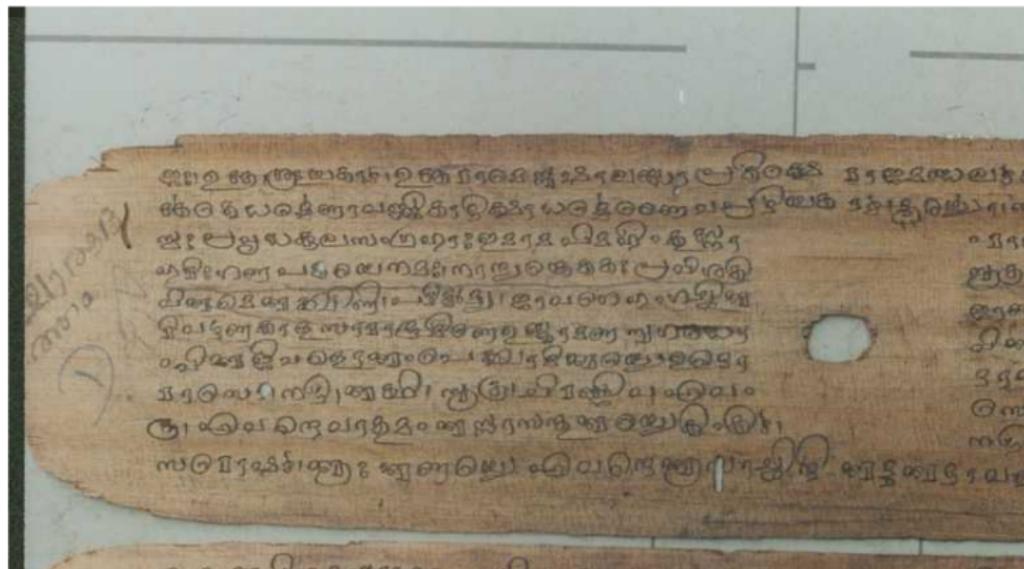
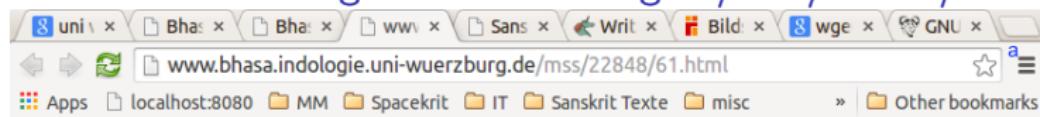
0.6b etad asmākaṛ gehāṛ

0.7b yāvat praviśāmi

0.8 *praviśvāvaloka*

Photos of Manuscripts

www.bhasa.indologie.uni-wuerzburg.de/mss/22848/61.html



त्रिवेद्युक्तिश्च अस्ति श्री रामोऽप्य एव विष्णुः
तदैव विश्वामित्रं लक्ष्मीं गुणां तदैव विश्वामित्रं लक्ष्मीं
शुभरात्रं शुभ्रात्रं शुभ्रात्रं शुभ्रात्रं शुभ्रात्रं शुभ्रात्रं
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Pictures of Kūṭiyāṭṭam performances of Bhāsa plays

www.bhasa.indologie.uni-wuerzburg.de/pix/PY_3/



Bhrāntan – Kalāmaṇḍalam
Rāma Cākyār, Valiya
Kūṭiyāṭṭam,
Killimaṅgalam: Paļuṇkil
Śivanārāyaṇakṣētram,
29.9.96 (Foto: Heike
Moser, I.96.09-07)

Everything, with “frames”

www.bhasa.indologie.uni-wuerzburg.de/rahmen.html

The screenshot shows a web browser window with several tabs open. The main content area displays a list of entries for the word "pratyūṣe". Each entry includes a code (e.g., CD_1, AN_2, BC_1, etc.), a date, and a brief description. Below this list, there is a section titled "SŪTRADHĀRAṂ" containing numbered entries (0.1 to 0.4) with corresponding codes and dates. At the bottom of the page, there is a photograph of an old, yellowed manuscript page with handwritten text in Devanagari script.

Entry	Code	Date	Description
pratyūṣe	CD_1	00.02.05	(paccusa);
	AN_2	19.04.03;	
pratyeti	BC_1	08.03.20	(paccāmī);
	AN_6	09.08;	
pratyemī			
pratham	MR_2	18.06.01;	
	AM_2	01.21;	
prathama	AS_5	19.08;	
	AS_6	08.15.06;	



Current/Future

Currently, I use a modified and expanded version of the technology of the “Bhasa-Project” for my research of the “Jīvanmukti” in the texts of Vidyāraṇya.

- Sanskrit Dramas and Philosophical Texts
- Index and Glossary
- Interactivity, dynamic creation of HTML pages (Clojure)
- Metadata

Included Sanskrit Dramas:

- By Bhāsa
 - Avimāraka;
 - Abhiṣekanṭaka;
 - Bālacaritam;
 - Cārudatta;
 - Dūtaghaṭotkaca;
 - Dūtavākyā;
 - Karṇabhāra;
 - Madhyamavyāyoga;
 - Pratimānāṭaka;
 - Pañcarātra;
 - Pratijñāyaugandharāyaṇa;
 - Svapnavāsavadatta;
 - Īrubhaṅga
- by other authors:
 - Abhijñātaśakuntala;
 - Mudrārākṣasa
 - Mattavilāsaprahasana
(work in progress)
 - Mṛcchakaṭika (work in progress)
 - Mālatīmādhava (work in progress)

New additions: Philosophical Textes

- Advaita-Vedānta

- Vyāsa: Bhagavdgītā
- Gaudapāda: Kārikā
- Śaṅkaracārya:
Brahmasūtrabhāṣya
- Śaṅkara: Upadeśasāhasrī
- Śaṅkarācārya:
Aparokṣānubhūti
- Sureśvara:
Naiṣkarmyasiddhi
- Bhāratītīrtha:
Dr̥gdṛṣyaviveka
- Vidyāraṇya:
Jīvanmuktiviveka
- Vidyāraṇya: Pañcadaśī
- Sadānand: Vedāntasāra

- Buddhist Texts

- Śāntideva:
Bodhicaryāvatāra
- Aśvaghoṣa:
Buddhacaritam
- Atīśa: Bodhipathapradīpā
- Nāgārjuna:
Mūlamadhyamakārika
- Nāgārjuna: Suhṛllekha
- Vasubandhu:
Trisvabhāvanirdeśa
- Nāgārjuna:
Vigrahavyāvartanī

Text

- Sanskrit text:
 - prose
 - verses (quotes)
 - headings
- my annotations with:
 - links to the glossary
 - links to other positions in the text / to other texts

<http://localhost:8080/t/JV2#2.3>

The screenshot shows a web browser window titled "JV2 - Chromium". The address bar displays "localhost:8080/t/JV2#2.3". The main content area shows a Sanskrit text with English translations and annotations. A yellow header bar at the top contains the text "↓ ↑ 4 DEF मनोनाशः ist निरोध des पतञ्जलि". Below this, a grey box contains the following text:

[2.3] प्रदीपज्ञालासंतानवदृतिसंतानरूपैण
परिणममाणत्वा [Besser: °am] दिदमन्तःकरणद्रव्यं
मननात्मकत्वान्मन इत्युच्यते । तस्य नाशो नाम
वृत्तिरूपं परिणामं परित्यज्य निरुद्धत्वाकारैण
परिणामः ।

Below this, a note reads: "Siehe Sprockhoff S.226. "das sich in Form einer einer Flammen-Folge gleichenden Folge von Modifikationen umwandelt" (Ahlborn)" and "मनोनाश = eine Umwandlung des Innenorgans in Form von निरुद्धत्व (= निरोधपरिणाम). [Matthias]".

Further down, another section starts with "[2.4] तथा च पतञ्जलिर्योगशास्त्रे सूत्रयामासः".

[YS3.9] व्युत्थाननिरोधसंस्कारयोरभिभवप्रारुभवौ निरोध
क्षणचित्तान्वयो निरोधपरिणाम इति ।

[YSBh3#9]

[2.5a] व्युत्थानसंस्कारा अभिभूयन्ते ; निरोधसंस्काराः

Text

- Sanskrit text:
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- my annotations with:
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<http://localhost:8080/t/JV2#2.3>

Boethling Sanskrit JV2 localhost:8080/t/JV2#2.3 Apps localhost:8080 MM Spacekrit IT Other bookmarks ↓ ↑ 4 DEF मनोनाशः ist निरोध des पतञ्जलि

[2.3] pradīpa-jvālā-saṁtāna-vad-vṛtti-saṁtāna-rūpeṇa pariṇamamāṇa-tvād [Besser: °am]idam antahkaraṇa-dravyam mananātmaka-tvān mana ity ucyate | tasya nāśo nāma vṛtti-rūpam pariṇamam parityajya niruddha-tvākareṇa pariṇāmaḥ |

Siehe Sprockhoff S.226.
"das sich in Form einer Flammen-Folge gleichenden Folge von Modifikationen umwandelt" (Ahlborn)
मनोनाश = eine Umwandlung des Innenorgans in Form von निरुद्धत्व (= निरोधपरिणाम). [Matthias]

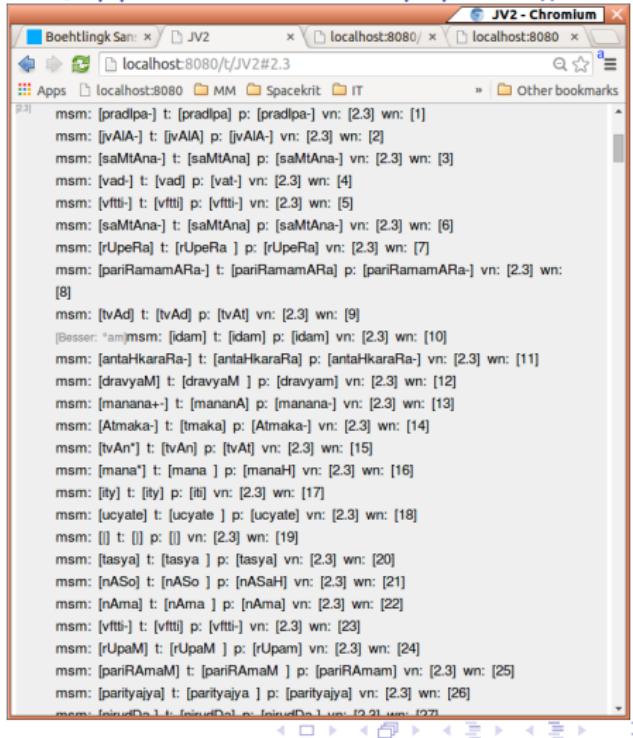
[2.4] tathā ca patañjalir yogaśāstre sūtrayāmāsa :

[YS3.9] vyutthāna-nirodha-saṁskārator
abhibhava prādurbhāvau nirodha

Text

- Sanskrit text:
 - prose
 - verses (quotes)
 - headings
- my annotations with:
 - links to the glossary
 - links to other positions in the text / to other texts

<http://localhost:8080/t/JV2#2.3>



Glossary

- my translation
- some standard relations/attributes
 - is synonymous to
 - is the opposite of
 - is a quality of
 - is an element of
 - is a cause of
 - is a result of
 - definition

<http://localhost:8080/wort/manonASA>

The screenshot shows a browser window titled "Glossar / manonāśa - Chromium". The address bar displays "localhost:8080/wort/manonASA". The main content area shows the following information:

manonāśa manonāśa #manonASA PW MW edit

Verschwinden des Denkorgans

Synonym: चित्त-उपराम; निरोध
Definition: निरोध-परिणाम des चित्त
Wirkung: Neben वासनाक्षय und तत्त्वज्ञान eines der drei Mittel für जीवन्मुक्ति

Ursache: युक्ति oder समाधि (JV3#51aff).
Zweck: MN schützt वासनाक्षय (JV3#1.1a).
Siehe: JV2#2.3.

yoga

Wort (SLP):

Navigation icons: back, forward, search, etc.

Glossary

- links to
 - the index
 - external dictionaries
 - other words in the glossary
 - texts
- keywords

<http://localhost:8080/wort/manonASA>

The screenshot shows a Chromium browser window with the title "Glossar / manonāśa - Chromium". The address bar displays "localhost:8080/wort/manonASA". The page content is as follows:

मनोनाश manonāśa #manonASA PW MW edit

Verschwinden des Denkorgans

Synonym: चित्त-उपराम; निरोध
Definition: निरोध-परिणाम des चित्त
Wirkung: Neben वासनाकाय und तत्त्वज्ञान eines der drei Mittel für जीवन्मुक्ति

Ursache: युक्ति oder समाधि (JV3#51aff).
Zweck: MN schützt वासनाकाय (JV3#1.1a).
Siehe: JV2#2.3.

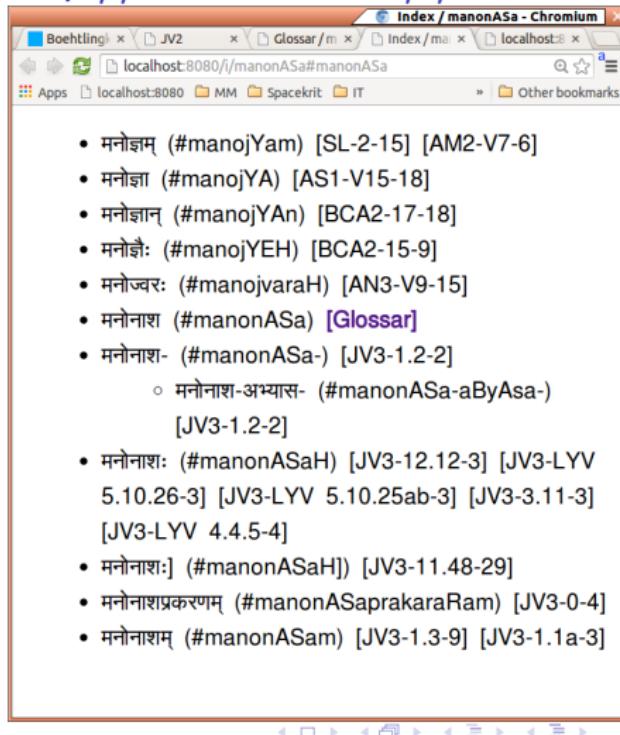
yoga

Wort (SLP):

Index

- links to
 - texts
 - glossary

<http://localhost:8080/i/manonASa#manonASa>



Used technology:

- XML
- Special marks for word-boundaries.
- Clojure (general purpose programming language),
- Webserver
- SQL database
- Emacs as XML-editor

Encoding: XML

XML is the standard to mark different parts of texts like:

- "titel" <titel1>...</titel1>
- "anmerkungen" (annotations) <anm a="Matthias">
- "prose" <pro n="1.1b">...</pro>
- etc.

Example

```
<pro n="2.3">
    pradīpa-jvālā-saṁtāna-vad-vṛtti-saṁtāna-rūpeṇa
    pariṇamamāṇa-tvād<note>Besser: °am</note>
    idam antaḥkaraṇa-dravyaṁ mananā^tmaka-tvān mana
    ity ucyate | [...]
</pro>
```

Encoding: rnc

- The grammar of these XML-tags can be easily defined, e.g. with "Relax NG"
- There are many editors available, that understand the syntax of RNC and XML; e.g.
 - Emacs + nXML mode
 - Oxygen

Example

```
Titell = element titell {TextWithNote}  
Pro = element pro { (attribute n {text})?, TextWithNote}  
Anm = element anm { (attribute a {text})?, TextWithNote}
```

Encoding: Markup of Words

XML + Sandhi separation

```
<pro n="2.3">      [...]
    idam antaḥkaraṇa-dravyam manana+-ātmaka-tvān* mana*
    ity ucyate | [...] </pro>
```

Devanagari

[2.3]

[...] इदमन्तःकरणद्रव्यं मननात्मकत्वान्मन
इत्युच्यते । [...]

Roman

[2.3]

[...] idam antaḥkaraṇa-dravyam
mananātmaka-tvān mana ity ucyate