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## **D5.3 Final public release with updated online resource for documentation**

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### Statement of originality:

This deliverable contains original unpublished work except where clearly indicated otherwise. Acknowledgement of previously published material and of the work of others has been made through appropriate citation, quotation or both.

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## 1. Executive Summary

The following deliverable D5.3 contains the public release of the Europeana Newspaper METS ALTO Profile (ENMAP). Part of the deliverable are also real world examples from several newspaper issues showcasing how the format can be used in enriching historical newspapers with structural metadata. A part of the deliverable is also STRUCTIFY, a tool which can be used to view ENMAP files as well as to generate them.

The focus of ENMAP has been laid to the question of “how to deal with structural metadata” since it turned out during the project that this task is of the highest importance to many libraries which are now facing the challenge to deal with millions of newspaper pages.

As a matter of fact the “deep structuring” of newspapers is just at the very beginning and has not reached a mature status so that it would be too early to actually release a comprehensive standard model. In contrast, we believe that the considerations provided below, together with the examples and a highly flexible software tool are the cornerstones for a standard profile which would cover the complex situation of historical newspapers and be accepted by a large majority of libraries.

## 2. Introduction

### 2.1. General purpose

ENMAP was designed to meet two main requirements:

1. To support the ingestion of digitised newspapers so that they can be displayed and searched in a newspaper browsing application. The main challenge herein was that a solution had to be found which fits to all the libraries of the *Europeana Newspaper Project* (ENP). This task was completed with the release of ENMAP (simple) after year 1 of the project. All the data produced in the project are following this format.
2. To provide a comprehensive format that supports a deeper structuring of newspapers. For this purpose, ENMAP advanced was drafted and a first version was released in year 2 of the project<sup>1</sup>. The format was introduced to the public at various information days and events and also discussed in-depth at two workshops organised as part of work package 5.

The current paper is a follow-up of the first release and takes into account the feedback and various suggestions gathered during this phase.

### 2.2. ENMAP vs. EDM

The *Europeana Newspapers METS ALTO Profile* (ENMAP) which is subject of this report was developed in the *Europeana Newspapers: A Gateway to European Newspapers Online Project* (ENP). Though “Europeana” appears in the title of the format, ENMAP must not be mixed up with the *Europeana Data Model* (EDM).

EDM was designed to support the ingestion of metadata for the *Europeana* portal. The general focus is therefore on descriptive metadata which are collected from a variety of objects such as books, manuscripts, newspapers, images, video- and audio files, and many other types.

In contrast, ENMAP is a format which was developed specifically for digitised newspapers. Also in contrast to EDM, the main objective of ENMAP is to define an *Information Package* which consists of administrative and structural data and includes content files, such as images and text. ENMAP can be seen as an “experimental” format showcasing how

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<sup>1</sup> <http://www.europeana-newspapers.eu/wp-content/uploads/2014/08/D5.2-Europeana-Newspapers-METS-ALTO-Profile-ENMAP-DRAFT.pdf>

Europeana may deal with rich digital objects in the future – but it is not an “official” format as it is the case with the Europeana Data Model.

### **2.3. ENMAP - simple**

Within the *Europeana Newspaper Project* it was necessary to manage the enrichment and delivery of a large set of already digitised newspapers from more than 10 partner libraries. The German company CCS GmbH (CCS) and the University of Innsbruck (UIBK) acted as technical providers and were responsible to enrich 2 million page images (CCS) respectively 8 million page images (UIBK).

In order to set up an effective workflow it was necessary to provide a metadata schema that could support the main objective of the project which was to deliver enriched newspaper pages to a repository and viewing application, the “Newspaper Browser”. This application was developed by *The European Library* (TEL).

The workflow for integrating newspaper files into Europeana respectively into the Newspaper Browser is described in detail in Deliverables 4.5-7<sup>2</sup>.

Libraries who are interested to deliver their digitised newspapers to the Newspaper Browser are requested to follow ENMAP simple in order to make the integration as simple and smooth as possible.

### **2.4. ENMAP - extended**

During the course of the project it became obvious that one of the main desiderata with respect to digitised newspapers is less “yet-another” METS profile, but a comprehensive and detailed description of the structural metadata of historical newspapers.

The structural map is the heart of a METS document. It outlines a hierarchical structure for the digital library object, and links the elements of that structure to content files and metadata that pertain to each element<sup>3</sup>.

In contrast to books or journals where the Structural Map is more or less straightforward, this is different with newspapers. Newspapers often run over decades or even centuries, they

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<sup>2</sup> <http://www.europeana-newspapers.eu/public-materials/deliverables/>

<sup>3</sup> Cf. Library of Congress. METS An Overview & Tutorial.  
<http://www.loc.gov/standards/mets/METSOverview.v2.html>

consist of dozens or even hundreds of single pieces and their layout is often complex and comprises several elements.

A main goal was therefore to find a simple but nevertheless comprehensive description schema which could be applied to any newspaper published in Europe between the 17<sup>th</sup> and the 20<sup>th</sup> century. This process is called “deep structuring” and it implies that a “full informational capture”<sup>4</sup> can be carried out. “Full informational capture” means in this context that the information, which is necessary to fully understand the message of the newspaper, can be recorded with the concepts provided by the ENMAP schema.

Due to the fact that a “deep structuring” was not foreseen in the *Europeana Newspapers* project, it was not possible to actually apply the ENMAP extended model to the digitised newspapers of the project except for some sample issues and pages which are part of the online documentation of this deliverable. However, in order to provide more than just the theoretical model, a software tool (STRUCTIFY) has been developed which can be used for several purposes. One of them is to manually generate an ENMAP data structure. Therefore some “real world” example data could be provided which can be used to demonstrate in which way the ENMAP model can be applied to a large number of digitised newspapers.

## **2.5. Manual and automated enrichment**

It is important to understand that the deep structuring of newspapers can hardly be done manually but that it will require support of state-of-the-art methods from computer science. On the other hand the manual intervention will always be the start and end-point of deep structuring. Therefore it was the ambition to provide clear and simple rules which are not only reserved to experts but can also be understood and used by other user groups, such as computer scientists, humanities scholars and volunteers. Their input will be necessary to cope with the immense task of a deep structuring of the European Newspapers collection.

As already indicated, manual structuring serves as the starting point for any project dedicated to deep structuring in two ways:

(1) Layout Analysis, Natural Language Processing and Document Understanding are some of the fields which can be exploited for this task. Independently if expert systems are used or

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<sup>4</sup> Stephen Chapman and Anne R. Kenney (1996): Digital Conversion of Research Library Materials. A Case for Full Informational Capture, D-Lib Magazine, October 1996 ISSN 1082-9873 Online: <http://www.dlib.org/dlib/october96/cornell/10chapman.html>.

if the algorithms and tools are relying on machine learning methods, in both cases a significant number of reference data (Ground Truth) are an essential prerequisite for the development of powerful tools. In other words: If a tool shall be able to detect e.g. “series novels” in historical newspapers it will need a significant number of examples as training and evaluation data. Obviously these training data need to be at least partly generated by hand and shall come in a standardised format, so that both the training data, as well as the output of the tools can be used across the boundaries of a single newspaper or library.

(2) Crowd-sourcing, Citizen Science or simply the involvement of volunteers play a more and more important role in data collection and data reviewing projects. Sites such as Zoomify<sup>5</sup> are allowing users to contribute to the enrichment of data – even for highly complex tasks. Though the library world is still lagging behind these developments – the National Library of Australia with its OCR correction service is one of the few exceptions<sup>6</sup> – it can be expected that this gap will be filled in the next years. Instead of “just” offering OCR text correction it can be argued that in many cases it may be more valuable in terms of improving accessibility to a digitised newspaper that users contribute to the deep structuring of the text. Again it will be necessary to have a common schema available which can be applied to different newspapers.

ENMAP and STRUCTIFY are designed to serve as a common basis which will ease the cooperation between technology providers and libraries, but also between libraries and volunteers by providing a comprehensive metadata schema as well as a tool to generate it.

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<sup>5</sup> <http://www.zoomify.com/>

<sup>6</sup> <http://trove.nla.gov.au/>

### 3. Use-Cases for ENMAP

#### 3.1. General considerations

Currently there are mainly two ways how digitised newspapers are treated: Either newspapers are scanned, ordered on issue level and enriched with full-text on page level. Or the structuring is done on “article level” which means that all articles are separated and structured. Whereas the first method does not require any manual processing and is therefore rather cost efficient, the second one requires automated processing and manual correction and can therefore be regarded as cost and labour intensive.

The “Chronicling America” project with currently (March 2015) nearly 10 million newspaper pages available online is a perfect example of the first case. The user is able to search in the full-text and may refine his search according to the publication place and publication date. This is actually the same approach as supported by the Europeana Newspaper Browser and the ENMAP simple format.

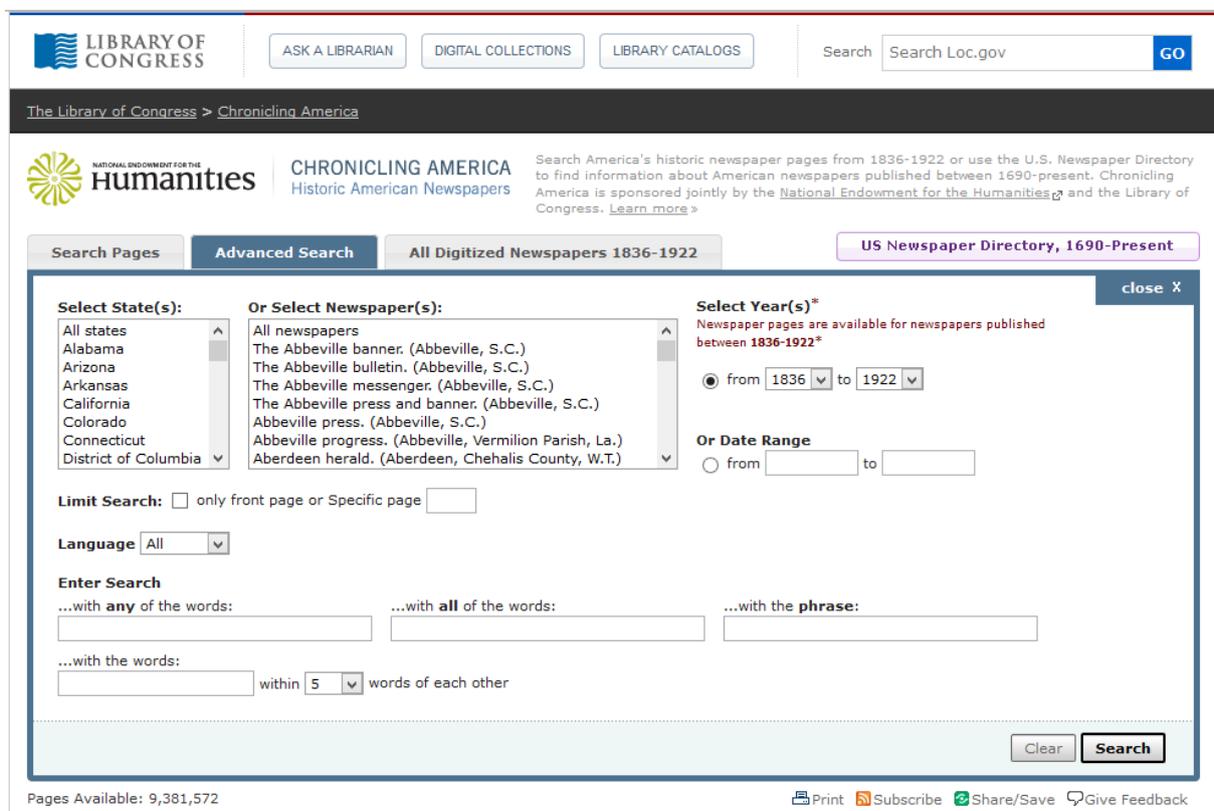


Figure 1: Chronicling America Website

The other pole is represented by the Australian Newspaper project (Trove). Here some structuring is done on “article level” and with some classification: articles, family notices, classified advertisement and similar.



Figure 2: Australian National Library: Trove Digitised Newspapers and more

The Australian Newspaper site offers currently more than 16 million digitised pages and claims to make 151 million articles available to the user.

From UIBK’s point of view these two approaches should be complemented with what we call “granularity levels of deep structuring”. This approach would allow handling the structuring in a flexible way so that it can be adapted to the availability of a newspaper search and browsing interface, or the user involvement, the budget of a library and the advances in computer science and technology. The levels which are described below shall demonstrate some of the options for structuring newspapers – it is obvious that there are many other ways one could think of.

By all means deep structuring should be seen as an ongoing process which will come to an end only if the overall goal of “full informational capture” has been reached.

### 3.2. Basic enrichment: full-text, physical layout analysis

This use-case has already been described above. It requires a simple structuring of the newspaper images on a physical level (days, editions) as well as the processing of the images with Optical Character Recognition (OCR). The main challenge in this case is that

the basic Layout Analysis as it is part of any OCR engine may be erroneous. E.g. distinct columns might be merged into one, large newspaper titles may be recognised as image instead of text, or the reading order may be confused. The effect on the full-text itself will be marginal, but the effect on more advanced use scenarios will be high as it is shown by the experiments carried out by the University of Salford and which are described in Deliverables D3.5-6<sup>7</sup>. It might therefore be a good idea to invest into an improved layout analysis so that the physical structure of the page is correctly represented as text and image blocks, and maybe also tables and charts.

### 3.3. *Light enrichment: noise reduction, running titles and pictures*

Within every newspaper issue some elements can be found which are not directly part of the content but are only included for providing some basic information to the user. These elements are mainly the title section, the running title and the imprint.

Here is an example for an early title section from 1750 containing the issue number, the date, the title, the publication place, the name of the publisher and the rights statement (permission from the emperor):



Figure 3: Example of a Title section within Wiener Zeitung, 1750

From the point of view of information retrieval all three elements can be regarded as noise. Nearly all of the information such as the title of the newspaper, the editor, the date, the edition, the page number, the issue number, etc. are not only repeated in every issue, but are also recorded in the newspaper catalogue, respectively in the basic structuring of the newspaper on day (and edition) level. To reduce the full-text (and the structural map) from these elements can be regarded as a basic clean up. The following example shows the

<sup>7</sup> <http://www.europeana-newspapers.eu/public-materials/deliverables/>

negative effect of the title section on the display of the full-text and the structure. Since the title section is very heterogeneous (regarding layout, font type and size) the OCR quality is often very bad. Unfortunately it is in many cases the first impression of a user who looks at the issue of a historical newspaper. The full-text of the example above starts in the following way:

*Kum. 14. Mittwoch den 18. kebrusrii«. 1750.  
Mit?hrerRšmisch-Raiserl., auch zu Hungar«, »nd BZHe!mRömgl. Maj. Freyheic  
Zn dem neuen Michaeler-HauS/ bey Zoh. Peter v. Ghelen.*

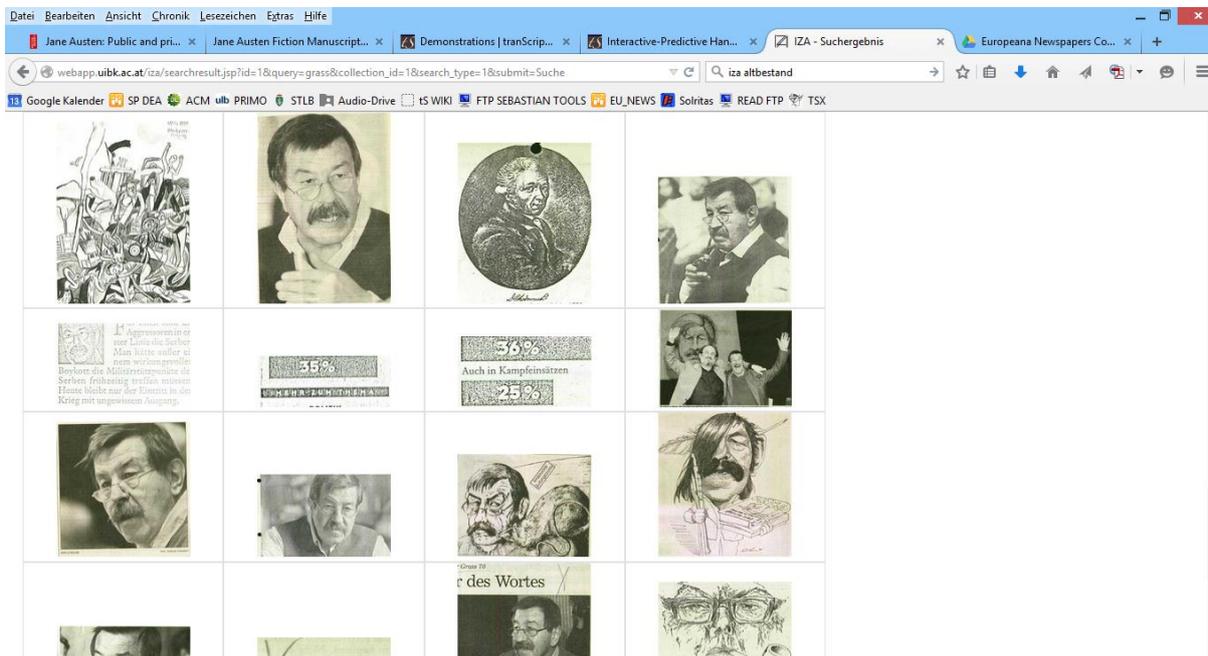
It has to be taken into account that this effect can be seen at about 3.5 million enriched issues within the Europeana Newspaper project.

From the point of view of pattern recognition one can imagine that it is a rather trivial task to detect such title sections, either based on specific rules (e.g. title sections always appear at the top of the first page and are repeated every issue with only minor changes) or by machine learning (e.g. one could tag some hundreds of title sections and use them as input for a learning algorithm).

Similar observations can be made for running titles which may contain some extra information, such as a “section heading” or “rubric”. A closer look on this subject will be provided at the next granularity level.

Though the “imprint” is in most cases hidden within the running text of an issue it consists for many years of the same or very similar piece of text which again can be used as input for a pattern recognition system which utilises not only features based on layout information, but also on textual information.

With the improvement of printing technologies, newspapers started to include photographs during the first decades of the 20<sup>th</sup> centuries. The basic layout analysis as it is included in OCR engines distinguishes automatically between text and pictures. This information, which is usually stored in the ALTO file (or a similar XML output from the OCR engine), can easily be utilised to enrich digitised newspapers with this kind of information. This will improve browsing capabilities (“Show me all photographs of this issue”), but also search features (“Show me all pictures where a specific keyword can be found “nearby”), i.e. some dozens of words above and below to the picture. The following screenshot shows the implementation of such a search query which is also rather similar to the image search of Google:



**Figure 4: Example of a full-text search taking into account the illustrations of newspapers**

The overall effect of this noise reduction, cleaning and simple enrichment may not be tremendous but one has to see that it will have a positive effect on information retrieval and user friendliness especially compared with the limited effort which is required to realise this granularity level.

### 3.4. *Advanced enrichment: sections*

If we look at historical newspapers we can easily see that their main principle of structuring the content was to indicate from where the news were coming from and therefore to list the news according to their place of origin. E.g. the page below is taken again from 1750 from the “Wiener Zeitung”:

**Aus Niederland.**  
**Haag 4. Febr.**  
Vorgestern nahm der Prinz Statthalter die wiederum zugerichtete Stückgießerey den Herrn Krank in Augenschein, und bezeugete sowol über den guten Stand derselben, als über die in dessen Gegenwart gegossene Stücke ein besonderes Vergnügen.

**Aus Preussen.**  
**Danzig 31. Jan.**  
Der Schiffer von dem Schiffe, genannt, Vivat Augustus Tertius Rex Poloniae, geführt durch Valentin Stemming, hat mit seinen Leuten 4. Stunden lang eine heldenmäßige Gegenwehr gethan, welche denen Türken 160. Mann Todte, und dem Schiffer Stemming 5. Mann Todte und 7. Verwundete gekostet hat, letztere haben noch mit dem Degen in der Faust gekochten, wie schon über 100. Türken am Boord gewesen, endlich sich ergeben müssen, dann die Türken haben sie mit 4. armirten und 1200. Mann besetzten Fahrzeugen überfallen, dabei noch das Unglück gehabt, daß die Luft ganz still gewesen, daß das Schiff weder sich wenden noch segeln können, sonst wäre es noch wohl entkommen, es ist dieses Schiff mit denen auferlesensten Waaren, Krumholz und Piepenstäbe beladen, auch in vielen Jahren solches großes Schiff hier nicht gewesen.

**Aus Teutschland.**  
**Cöln 5. Febr.**  
Vorgestern Abend beobachtete man am hiesigen Horizont ein Phänomenon, welches überaus Anmerkungs-würdig ware, dann dasselbe zertheilte sich manchmal in mehrere Stücke,

Figure 5: Wiener Zeitung, 1750

The news are ordered according to: “News from the Netherlands, Prussia and Germany”.

So the same headings appear over decades and it took until the 19<sup>th</sup> century before single content pieces were also indicated with a specific title and more information was added, such as sub-titles, or the detailed name of the information source. The structuring of newspapers into sections is therefore one of the basic layout principles of every newspaper and is still utilised until today.

From a technical point of view these sections can be exploited for automated structuring: Since the section headings remain the same and appear often in every issue (“Aus Teutschland”, ...) it will be possible to detect them in an automated way, even if the amount of OCR errors may be significant.

Moreover, from the very beginning of newspaper publishing, specific sections are reserved for content which may not be seen as “classical news”, e.g. official announcements and classified advertisements. Examples are “Lists of decedents” or “New books arrived” – all

these news are also put into sections and are repeated over decades and centuries. Again an early example from 21 February 1750 of a “List of persons who died in Vienna”:

**Lista deren Verstorbenen zu Wien in und vor der Stadt.**  
**Den 18. Februarii.**  
**In der Stadt.**

Dem (Tit.) Hrn. Joh. Baptista Volta, Kaiserl. Königl. Geh. Hof-Directorit Tapz-Regenhandl., f. H. Maria Anna geb. v. Gruber, bey denen 5. Kron. am Hof, alt 88. J.

Dem Leop. Ant. Zepher, Bürgerl. Wäcker-Schneid., f. K. Franz, in der Schmitzen am Salzgrub, alt 5. J.

Jacob Herz, gew. Tobak-Wand-Leffic, im Kusler-schm. H. in der Nagler-gas, alt 75. J.

**Vor der Stadt.**

Gottfr. Schwatz, Weg-Maut-Einnehmer. am St. Marxer Poß, alda, alt 44. J.

Dem Joh. Wobigler, Bürgerl. Schuh-mach., f. K. Theres, im Kärntner Markt, in der Hofgasse, 6. v. J.

Dem Emanuel Fritsch, Tischl., f. T. Rosina, bey dem gold. Hut am Neuhof, alt 12. J.

Dem Michael St. Ladner, f. K. Eva, im Schwärzler H. auf der Wied., alt 7. J.

Der Juliana Schwarzbergerin, Wittwe, ihr T. Theres, im Schwärzler H. zu Sumpfenbaur, alt 15. J.

Dem Joh. Seppl, Ledigen, f. K. Peregrin, im Sankt-Andreas H. auf der Wied., alt 5. v. J.

Andr. Klabal, Fisch-auftrag, bey dem gold. Löwen in der Leopoldst., alt 22. J.

Dem Christian Perlinger, Strauß, f. W. Regina, im Altpantl. Gart. außer der Hofgasse, alt 42. J.

**Summa 11. Personen / darunter 4. Kinder.**  
**Den 19. Februarii.**  
**In der Stadt.**

Dem Hoch- und Wol-geb. Hrn. Hof. Sen. v. St. Julian, des P. K. K. Grafen von und zu Waldsee, 2c. der K. K. Majestät Kammerherrn, f. H. Gemahlin, Fr. Carolina, geb. Gräfin von Terezi, 2c. im Brennerst. H. in der Klein-Dorothee-gas, alt 41. J.

Dem Wol-Edel-geb. Hrn. Edmund Eden v. Tat, Kaiserl. Königl. Land-Rath in Oesterreich ob der Enns, f. H. Maria Leopoldina, geb. Adlerin von Ehrenreichstern, im Raben-hof in der Kärntnerst., alt 20. J.

Der Wol-Ehew. P. Andreas, Ord. S. Franc. deren Capuciner, bey Maria deren Ungeln, alt 65. J.

Georg Kraft, Comdi-Cassier, bey dem gold. Pflauren am Kärntner-Thor, alt 44. J.

**Vor der Stadt.**

Der Ehew. Hr. Franz Storg, weill. Priester, im Delfin H. am Neuhof, alt 46. J.

Dem Leop. Fortner, Bürgerl. Puter., f. K. Ignaz, im Fleisch-baderst. H. im Viechtentz, alt 5. J.

Dem Andre Dier, Bürgerl. Kuchel-gart., f. K. Josef, in f. H. auf der Landstr., alt 8. J.

Mart. Hejer, Bürgerl. Schuh-mach., bey denen 3. Sternen in der Währinger-gas, alt 15. J.

Georg Siegenbauer, Bürgerl. Wein-web., bey dem grün. Köffel im Viechtentz, alt 69. J.

Dem Andre Schreiner, Seidn-Wirt., f. K. Anna, bey denen 3. Hof. ober dem Neuhof, alt 4. J.

Dem Barthl. Grubel, Schmied., f. W. Eva, bey der hl. Margr. im Bergler-gas, alt 47. J.

Dem Michael Bernast, Schlos., f. W. Cathar., bey dem gold. Schiff am Sporken-bübel, alt 25. J.

Lorenz Ecker, Kupf.-sn., bey dem gold. Stüb auf der Wied., alt 25. J.

Jacob R., alt. W., bey dem bl. Vogel in der Leopoldst., alt 60. J.

**Summa 14. Personen / darunter 3. Kinder.**  
**Den 20. Februarii.**  
**In der Stadt.**

Der Wol-Ehew. P. Pet. Probst, S. J. im Collegio, alt 52. J.

Dem Hrn. Joh. Lindert, Kaiserl. Hof-Kammer-dien., f. K. Maria Anna, im Raben-hof in der Kärntnerst., alt 3. J.

Dem Joh. Elemenz, Kaiserl. Leib-Zaf., f. K. Math. 2 im Subermannst. H. in der Kärntnerst., alt 8. J.

Georg Heyman, alt 70. J., und Eva Plagerin, alt 76. J., beyde im Bürger-Esthal.

**Vor der Stadt.**

Dr. Ant. Speck, gew. Subitor-Zeuten., im blauen H. in der Kolt-gas, alt 17. J.

Dem Andre Lindner, Bürgerl. Schuh-mach., f. K. Mart., in f. H. in der Leopoldst., alt 7. J.

Der Werts. Teufelin, Wittwe, ihr K. Bernh., bey denen 5. Hind. bey Maria Hülf, alt 4. J.

Dem Leop. Stramer, Maurer-gel., f. K. Eva, bey dem rot. H. an der Wied., alt 3. J.

Georg Koller, gew. Garde-zeld-schüs., im Hofnerst. H. in der Leopoldst., alt 82. J.

Margar. Hopflin, in St. Joh. Res. Spit., alt 60. J.

Franz Fölsching, alt 13. J., bey denen FF. Mil.

Georg Lechner, alt 26. J., und Cathar. Schumannin, alt 28. J., beyde im Kranken-H.

**Summa 14. Personen / darunter 5. Kinder.**

NB. Es wird den 7. April 1750. Fröhe um 9. Uhr das zu Dierhuf nächst Meukirchen liegende Haus und Hammer mit 6. Feuer samt 36. Joh. Hecker und 2. schönen Gärten des Dicedominischen Grund-holden, und zur Pfarr-Brigittin gehörigen Unterthaus Adam Fraunburger selbigen dem Weisheitenden verkauft, wer also ein Belieben trägt solchen zu kaufen, kan sich in dem Zimmer des dormaligen Besands-schmids obkennelnden Haus anmelden.

NB. Auf inkünftigen Donnerstag, als den 26. ditzes Monats Februarii, wie auch den 27. und 28. darauf, werden in der obern Wäcker-strassen in dem Groß-Michaelischen Haus im ersten Stock verschiedene Modilien, Effecten, auch von gold- und silbernen Uhren, Ta-back-dosen, Jubelen, und brillantirten Ringen, gold- und silbernen Regen, und silbernen Service öffentlich licitiret, und dem Weisheitenden verkauft werden.

NB.

Figure 6: Wiener Zeitung, 1750, List of people who died recently

If successful, the benefit of this structuring process for many applications will be high: Users may be able to access specific content stemming from “London”, “Paris”, or “Vienna”, or content from a “classified advertisement” section. The place names may be matched with geolocations so that a user may see at first glance from where the majority of news stems within a given newspaper.

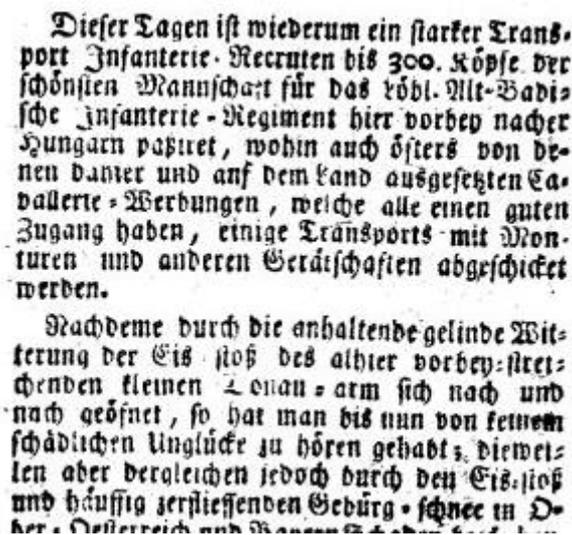
Other benefits may be realised via a faceted search where the search hits are ordered also according to their appearance in a specific section, e.g. “Show me all occurrences of my search query in ‘News from abroad’”.

Also it is to expect that users will have a high interest in customisable export functions: “Export all text from 1789 subsumed under the heading ‘Paris’ or ‘France’”. It can be assumed that especially humanities scholars will benefit from this kind of enrichment but also be willing to contribute to this task – since it can easily be explained and demonstrated.

### 3.5. Full enrichment: articles and detailed metadata

Apart from a rough structuring into sections, newspapers contain a large number of single information pieces. In early years these single pieces are often just separated by paragraphs, and are therefore hard to discriminate, whereas in later years separators and other layout features (bold, brackets, letter spacing, etc.) are used to indicate the start of a new piece.

An example from the issue above:



Dieser Tagen ist wiederum ein starker Trans-  
port Infanterie. Recruten bis 300. Köpfe der  
schönsten Mannschaft für das köhl. Mt-Badi-  
sche Infanterie - Regiment hier vorbeig nach  
Hungarn papiret, wohin auch östern von de-  
nen dantier und auf dem Land ausgefekten Ca-  
ballerie - Werbungen, welche alle einen guten  
Zugang haben, einige Transports - mit Mon-  
turen und anderen Gerätschaften abgeschickt  
werden.

Nachdeme durch die anhaltende gelinde Wit-  
terung der Eis - floß des alhier vorbeig - strei-  
henden kleinen Leuan - arm sich nach und  
nach geöffnet, so hat man bis nun von keinem  
schädlichen Unglücke zu hören gehabt; diemel-  
len aber dergleichen jedoch durch den Eis - floß  
und häufig zerfließenden Gebürg - schnee in D-  
ker - Osterreich und Bayern etc.

Figure 7: Articles separated by paragraphs

The paragraph marks two completely different news items, such as the report about a regiment and the fact that the Danube had frozen and had therefore caused problems with shipping.

With the further development of newspapers in the late 19<sup>th</sup> century, individual articles are getting more important – reflecting the fact that newspapers offer more and more information so that readers start to select the content, instead of reading an issue from the first to the last page. In order to support users in navigating through a newspaper page, individual articles are now indicated with a heading to provide the first information about the content of the news.

A rough estimation shows that the number of distinguishable content pieces within one newspaper issue increases dramatically over the years. In a newspaper of the 18<sup>th</sup> century some dozens of articles and advertisements can be found, already in the 19<sup>th</sup> century hundreds of single news can be found and at the heyday of newspapers in the 20<sup>th</sup> century even some thousand news are included in one issue. This development goes along with an enlargement of the paper size and a reduction of the font size so that more and more text can be delivered to the reader.

It is obvious that a correct separation of a digitised newspaper not only into sections, but also into individual news articles and similar contributions is the final objective of the advanced enrichment task.

## 4. Concepts

### 4.1. Introduction

The naming of the main concepts was a sophisticated process and led to a number of discussions. The main task which needs to be solved is the following: When talking about newspapers the usual concept which comes to mind is the “(news) article”: A distinct piece of content which is new and more or less independent from other content in this specific issue of a newspaper.

On the other hand, if one looks at a newspaper as a whole, there are many content pieces which can hardly be classified as an “article”, e.g. “lists of ships arrived”, or a “job offer”, or the “weather report” or a “commercial advertisement”. These pieces which are usually classified as advertisements - or in German “Anzeige” (“announcement”) - are clearly separate from “articles” and would be excluded when sticking to “article” as the overall term. UIBK tried to find a term which subsumes both names and which emphasises – from a more abstract point of view – the concept behind articles and classified advertisements.

The suggestion is to use the term “Content Unit” in order to express that a newspaper issue can be seen as a collection of distinct pieces which are separated by each other by their content. A narrative about event A can be separated from a narrative about an event B, but it is on the same level as an offer for job A and another offer for job B.

A similar problem appeared when dealing with the layout of a newspaper. Obviously there are some parts which have a very distinct layout, such as a large title or a sub-title of an article, a lead, a caption, a by-line, and several other elements. Also in this case the task was to find a term which is able to describe all heterogeneous elements. In the first version of ENMAP the expression “Structural elements” was used, but later changed – mainly to express the relationship between the concepts in the current document - into “Content Item”. Such “Content Items” are parts or elements of “Content Units”.

Finally the sections within newspapers had to be named, but in this case it was also possible to keep the usual term and call it therefore “Content Sections”.

If UIBK speaks about Content Units and Content Sections in a broader way, the term “content pieces” is used. If UIBK speaks about all structural (and partly descriptive)

metadata, the term “structural features” is used in the broadest way. The process itself is named “deep structuring”.

In short: UIBK is fully aware that – apart from Content Sections which is a common term in newspapers – the suggestions to introduce two new terms, Content Units and Content Items may lead to some discussions. On the other hand “new terms” have the advantage that they are in some way unburdened from everyday language and therefore the temptation to use them in a different way than described here may be lower.

## **4.2. Content Units**

A Newspaper Content Unit is a distinct piece of content within a newspaper often in the form of a narrative, but also appearing in other forms, such as an announcement or advertisement. E.g. it is a report about the progress of political negotiations, or about a car accident, or about a crime case at court. Single messages that can be clearly separated from others may also be found in the job announcement section, the commercial advertisements, or in the letters to the editor section. Each single job announcement and each single letter is one Content Unit. The main criteria to make a distinction between two Content Units is the content, may it be a long list of stock exchange rates, or job announcements or “ships arrived today”. A paragraph in an article, or a column in the stock exchange table are pieces of the Content Unit, but are not messages on their own – they need some context which is provided by the “rest” of the article to be fully understood.

Content Units are most often also intellectual entities in the sense that the “copyright” or the “editorial responsibility” can be clearly specified and allocated to the editorial team which may be a person or an organisation (news agency, other newspaper). In the 20<sup>th</sup> century contributors such as authors/journalists, photographers, illustrators or cartoonists, are explicitly marked in the article whereas historical newspapers do very rarely mention the actual writer.

In many cases the layout of a newspaper indicates the “borders” between Content Units. E.g. separators (lines or bullet points) are used between articles or the headline indicates the start of a “new” unit. Nevertheless the layout is only one criterion among others to classify a Content Unit, the main criteria is the content.

### **4.3. Content Sections**

Newspaper Content Sections are repeated over a period of time, and – in contrast to article series – they are, in principle, never-ending. Often their frequency is based on a strict rhythm, e.g. some sections will appear only in the Friday edition, others only on Saturday. The fact that they are repeated is the most important distinction to Newspaper Content Units, which are per se unique. Though every newspaper developed its own “vocabulary”, similar sections appear at several newspapers at a time. E.g. one can find “Local news” vs. “News from abroad”, “Death notices” and “New books” and similar sections in nearly every newspaper at a given period of time.

A Newspaper Content Section can also be seen as a collection of several Content Units. The criteria for the compilation may depend on the actual content (“Foreign affairs”, “Local news”), or on formal parameters (“Letters to the editor”, “Latest news”).

In contrast to Content Units, sections neither have a distinct message, nor are they an intellectual unit. They are a compilation of single messages where these messages are put together by some (rather arbitrary) criteria (“Latest telegrams”). Newspaper Content Sections may be better compared to the functionality of a “subject heading”, or an “indexing term” that specifies an aspect many content units share.

Newspaper Content Sections usually appear with a specific “section heading” indicating the topic of the section. Similar to Newspaper Content Units also Newspaper Content Sections are separated from each other, respectively from other Content Units by the layout. A distinctive headline, or frames and separators usually indicate the start of a particular Newspaper Content Section.

### **4.4. Content Items**

Newspaper Content Items are the third main concept of the scheme and are the single pieces which are used to build a Content Section or Content Unit. Examples are headlines, sub-headlines, leads, pictures, copyright notes, paragraphs, tables, etc.

Newspaper Content Items are defined by their functionality for structuring the content of a newspaper issue. E.g. headlines raise the attention of a reader and inform him or her about the main content of a news article. The copyright note or by-line provides the information, who, where and when an article was written, the caption explains the content of a picture, table or chart, etc.

The main role of Content Items is therefore a kind of “meta-message” for the reader. It aims mainly at supporting him or her in understanding the content and being able to navigate through the complex layout of a newspaper. Due to the fact that the repertoire of structural elements was developed over a long period of time, a specific semantics connected to the layout is associated with Content Items. E.g. even when looking at a newspaper from far away, or in a completely foreign language, the semantics of some Content Items will be understood, such as headlines, sub-titles, caption lines, etc. even without understanding a single word. It is exactly this aspect that makes structural elements so interesting for automated processing and enhancement via Optical Layout Recognition.

Content Items do not appear on their own, which means that they are always part of a larger unit, in our case part of a Newspaper Content Unit or a Newspaper Content Section.

In short: If someone were to re-edit all articles of a famous journalist as a book, he would be interested to keep the content as authentic as possible, but re-format it according to the new target media. The Newspaper Content Unit would be part of the book edition, not the actual representation or manifestation of a given article.

#### **4.5. Hierarchical Structuring**

A newspaper issue may consist of several sections which include several other sections and units. Not in all cases will it be easily possible to draw a clear line between the hierarchies.

In order to make the usage of the concepts as easy as possible, the following rules are suggested:

- (1) The basic section of a newspaper is the issue itself. Issues are repeated over a longer period and with a similar structure.
- (2) Content Sections may incorporate other Content Sections and Content Units. The same is true for Content Units, i.e. a large unit (article) may also contain other units.
- (3) Content Sections and Content Units need not to be hierarchically nested, i.e. it is not necessary that every unit is part of a section (apart from the issue itself).
- (4) Sections and units need to contain at least one Content Item, i.e. a paragraph, or text region.

## 5. General Classification of content within newspapers

### 5.1. Background

Another important aspect of the deep structuring is that one can easily observe that the content which is included in a newspaper can be rather easily classified according to several criteria.

Looking at the historical development of newspapers, an impressive differentiation process can be observed: Starting with newspapers from the 17<sup>th</sup> century which comprise just 4 or 6 pages with content that is placed at one column and structured with a few section headings, as seen already in the 18<sup>th</sup> century newspapers with 12 or more pages, with two columns, and some specific sections containing job offers, lists of published books and other classified advertisements.

In the 19<sup>th</sup> century newspapers not only the number of pages increases significantly but several new elements appear, e.g. pages are structured into several columns, the usage of sections, articles, advertisements, classified advertisements, becomes more sophisticated and complex. Finally, in the first half of the 20<sup>th</sup> century photographs are included and the layout of newspapers finds its modern form, with large headings, sophisticated layout and – especially at Saturdays – impressive amounts of pages<sup>8</sup>.

If the content is classified within this historical development one can mainly distinguish five classes: Information (news), advertisements (including classified advertisements), entertainment, opinion and in order to complete this list, the “metadata” class also has to be mentioned, i.e. all the content pieces which are just dedicated to inform the user about the content of the newspaper itself, but also about the publisher, the date of publication and the price of the issue.

The main criteria which are used for this simple classification scheme is the inherent meta-message of the content which is directed towards the reader: In the case of “information” the user will get some news, in the case of “entertainment” the user will be emotionally affected, in the case of “opinion” the user may decide to follow or to reject the message, in the case of “metadata” the user gets some information about the newspaper itself.

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<sup>8</sup> Cf. <http://lab.softwarestudies.com/2012/03/visualizing-newspapers-history-hawaiian.html>

It is important to note that UIBK is interested in the obvious message of a content item. A newspaper article may be perceived by many readers as “entertainment”, but the main focus is “information”. Such cases may appear in the “Society” section of a newspaper where the actual “news value” is rather low, compared to the entertainment effect.

Moreover, UIBK used a historical perspective for applying this classification, not current measures. If e.g. a news article about the political situation at the beginning of the First World War may appear to the (current) mind not to be “information”, but rather aiming at motivating the readers to approve the war, then this article still would be classified as “information” and not as “opinion”. It is the historical perspective which shall be reconstructed, not today’s point of view.

## **5.2. Information**

The information category is the core concept within a newspaper. Newspapers were established exactly to provide news on all aspects of daily live. Therefore news in many forms and formats are summarised under “information”. Since newspapers are published nearly every day, the latest news on events or persons typical fall into this category.

From the point of view of the user this means that ideally the user shall “know more” or better understand the complex reality after having read a news article. In general the ambition is to provide the information in an objective way so that news articles are centred around facts.

For the self-conception of the newspaper as being the fourth pillar in a democratic society, the criteria to provide independent, reliable, well-investigated and truly unique news became fundamental and still is the dominant attitude – though with the advent of the internet, new independent publishing (blogs, social media) and the economic crisis of printed newspapers, this concept may need some revision.

## **5.3. Advertisement**

Together with the first category, advertisements are from a historical perspective the second important building block for the content of newspapers. In contrast to information, where the news are created and edited by the editorial team, advertisements are external content and

usually redacted by a person or institution which is not directly responsible for the editing process of a newspaper, e.g. the printer.

Advertisements play a substantial role for the business model since their content is usually paid content and one of the main sources of income for the newspaper publisher – another clear distinction to the edited content which forms the “information” category.

Official announcements from administrative or political bodies, commercial advertisements and classified advertisements appear from the beginning of newspaper publishing and are also one criterion to distinguish newspapers from regular commercial or diplomatic reports which are also providing news on similar aspects.

Looking at the inherent message of advertisements, they typically try to motivate a user to get involved in some kind of action: to behave in a certain way (official announcements and declarations), to buy a certain product, to contact a company with regard to a job offer, to contact the owner of a flat, to attend a funeral, etc. In the best case the user will actually realise this (more or less implicit) message and act accordingly.

#### **5.4. Entertainment**

Whereas information and advertisements are the core elements of a newspaper, entertainment only appears in the mid of the 19<sup>th</sup> century. Nevertheless, for some literary genres newspapers became *the* publishing platform: E.g. writers such as Victor Hugo, Charles Dickens, Gustave Flaubert or Leo Tolstoy published many of their novels first in newspapers. A similar effect can be observed with cartoons which became popular at the beginning of the 20<sup>th</sup> century.

Entertainment can be easily separated from “Information” and “Advertisements” for several reasons. Again it is external content, not produced by the editorial team. Moreover, entertainment aims to capture the attention of readers by addressing their emotion. Typical entertainment pieces are serial novels, poems or cross word puzzles. Readers ideally enjoy a poem, escape into a fictional sphere with a series novel, or are amused with a joke or get involved with a cross-word puzzle. Obviously well written news articles and columns are a pleasure for every reader as well, but their entertainment value is usually secondary compared to their general intention – to inform or to convince.

## 5.5. *Opinion*

Also content which is directly marked as the point of view of either the editor, or a well-known person, is an innovation which appears in newspapers in the second half of the 19<sup>th</sup> century. The feuilleton is the classical example. It occupied its place at the first page of a newspaper and was clearly separated from other content. Other early examples of clearly marked opinions are book and theatre reviews, which appear frequently in the second half of the 19<sup>th</sup> century.

Opinions can be characterised as a personal expression often based on some information, but the facts are structured by the subjective viewpoint of the writer. In many cases a piece of opinion tries to convince or to persuade a reader, or at least it is an (implicit) plea to share the author's opinion. The reader needs to decide: Either to follow this opinion or to reject it. Historically, a clear distinction between "information" and "opinion" is rather new and has, for a long time, not been made as explicit as we are expecting this today from a modern newspaper. In historical newspapers a lot of content can be discovered which includes personal judgement (opinion) without explicitly marking it – but this will be subject to some opinion mining rather than deep structuring according to the overall goal of reconstructing a "full informational capture".

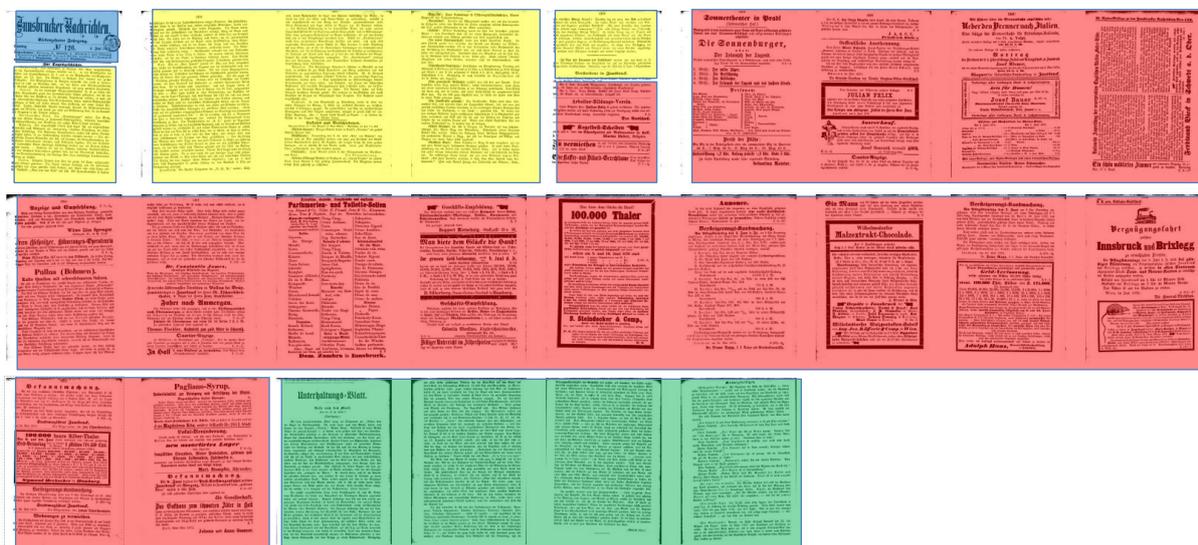
## 5.6. *Metadata*

To complete the list, content which can be classified as "metadata" also has to be mentioned. This is motivated by the fact that published content always needed a minimum of "responsibility declaration". In order to be able to publish a newspaper, the permission of the government or some legal requirements had to be fulfilled – such as who is in charge of the newspaper, where is the place of publication, the address, the price and similar information. This type of meta-information appears usually in the title section at the first page of an issue, but also in an imprint section which can be found within the issue.

A perfect example for these considerations can be seen in an edition of the Innsbrucker Nachrichten, from the 4<sup>th</sup> of June 1870.

In the figure below four of five main classes are used: Metadata (in blue) containing some information on the newspaper itself within the Title section, Information (in yellow), with the edited content (news), the advertisement section (in red) comprising not only commercial

advertisements, but also classified advertisements and official announcements (edicts, auctions) and finally the Entertainment section (in green) with a classical series novel.



**Figure 8: Metadata (blue), Information (yellow), Advertisements (red) and Entertainment (green)**

### 5.7. Text Types and Genres

In a similar way as the five main classes of newspaper content, UIBK specifies text types or genres of news which appear in nearly every newspaper. Some typical examples are the “Editorial”, a (subjective) statement of the publisher, the editor in chief with regard to a recent event or the political, economic or cultural situation in general. Another example are book reviews, which were first introduced in the early 19<sup>th</sup> century and are until today one of the classical articles in the “Feuilleton” section of a newspaper. Other examples are Death notices, or Job and Real Estate offers.

It would be a highly interesting research field to explore the similarities of these genres with the techniques of computational linguistics. In combination with the layout of a newspaper and its divisions into sections, it can be expected that good results could be achieved with automated genre attribution.

In this case, UIBK will list some of the most prominent text types, being fully aware of the fact that the list would need much more investigation and research to be regarded as a

comprehensive overview of all text types used in newspapers. This table shall therefore serve more as an example of how it could look like than an actual classification.

Category	First level	Second level	Definition
Information	News		The default class for all Newspaper Content Item in the Information category. Synonyms are “news article”, “article” or “story”.
		Lead Story	The main story, usually on the title page or on the title page of a section.
		Breaking News	The latest news.
		Background News	News that offer a wider view on a certain story, event or person.
		Reportage	Similar to background news, but written from a more personal or subjective perspective.
		Verbatim reports	
		Interviews	A news article consisting mainly of the verbatim report from an interview (with a well-known person or expert).
		Discussions	A news article consisting mainly of a verbatim report of a discussion of several persons.

	Speeches	A verbatim report from a speech (e.g. laudation or obituary).
Biographical news	Portraits	A news article about a person.
	Anniversaries	An article on the occasion of an anniversary.
	Obituaries	An article on the occasion of someone's death. Not to be mixed up with "Death notice" in the "advertisement category". There it is "paid content".
Factual news		The default category for all news that do not come as a narrative, but as lists or tables.
	Weather reports	Reports about the weather and weather forecast.
	Program news	Theatre, music hall, TV, radio programs. Most often organised as a list or table.
	Stock exchange rates	Stock exchange rates
	Railway tables	Timetables of railways, etc.
Opinion		
	Columns	A regular section of a newspaper or magazine devoted to a particular subject or written by a particular person.

## Editorials

An editorial is a special case of a column and usually written by the chief editor or a well-known author. It often expresses the “official” opinion of the editorial team of a newspaper. Most often it appears at a certain location within the newspaper or on certain days of a week or month, e.g. Saturday.

## Reviews

A review focuses on a specific literary, artistic or commercial event or product and contains usually a judgement on the value of the reviewed object. The most important reviews in historical newspapers are about books, theatre plays and concerts. Other reviews such as those about fiction books, non-fiction books, audio books, art performances, games, journals, TV plays, theatre plays, radio programs, TV programmes, conferences, concerts, operas, cinema films, etc. are not listed here

### Book review

A review about a (new) book.

### Theatre review

A review about a theatre performance.

### Concert review

A review about a concert.

## Letters to the editor

Letters to the editor are usually printed in a dedicated section and express the opinion of readers,

most often towards an issue raised in the newspaper the days before.

## Commentaries

Similar to editorials and columns commentaries are most often written by external authors, mostly experts.

## Entertainment

Entertainment can take many different forms, it might contain literary and artistic works but also cartoons or jokes or cross word puzzles. Since there are so many sub-genres which can be detected in the entertainment section of a newspaper we will not describe them in detail, but just give a short list of the main classes as they appear rather often in (historical) newspapers.

## Literary works

### Serial novels

Serial novels are one of the most important classes and can be found in many historical newspapers from the 19<sup>th</sup> century onwards.

### Poems

A literary work usually arranged in verses and strophes.

### Theatre plays

Sometimes parts of a theatre play are printed within newspapers.

### Essays

A piece of text mostly with philosophical considerations.

	Aphorism	A short piece of text expressing a sometimes surprising view on a given issue.
Graphical works	Photos	
	Cartoons	
Jokes		A piece of text to cause amusement or laughter, especially a story with a funny punch line.
Games		
	Cross word puzzles	A crossword is a word puzzle that normally takes the form of a square or a rectangular grid of white and black shaded squares.
	Riddles	A question or statement intentionally phrased so as to require ingenuity in ascertaining its answer or meaning:
Advertisement		
	Advertisements	A piece of text or a figure used to encourage, persuade, or manipulate readers or to take or continue to take some action.
	Classified advertisements	Classified advertising is a form of advertising which is particularly common in newspapers. Classified advertisements in a

newspaper are typically short, as they are charged for by the line, and one newspaper column wide. The advertisements are grouped into categories or classes such as "for sale—telephones", "wanted—kitchen appliances", and "services—plumbing", hence the term "classified".

Family notices	Short notices related to families, such as marriage, birth of child, etc.
Death notices	Short and mostly formal notice on the death of a person.
Job offers	Announcement of open jobs.
Real estate offers	Announcements of available real estate objects.

## 6. Classification of Content Items

### 6.1. *General considerations*

Content Sections and Content Units are composed by pieces of text, but also photographs, tables and figures which can be characterised by their functional value together with their typical layout. These Content Items are described here as a comprehensive list.

In order to make the list as straightforward as possible, all Content Items were left out which are recorded anyway by libraries and which will play only a minor role in the deep structuring of newspapers. E.g. the newspaper title itself, the responsibility statement or the edition statement which can be found within the title section, need not to be mentioned here explicitly since they do – at least from this point of view – not play any substantial role in the structural mark-up of a newspaper.

### 6.2. *List of Content Items*

#### 6.2.1. Title section

##### **Definition**

The first part of an issue containing metadata such as the name of the newspaper, date of publication, imprint information, issue number, etc. Usually this type of information is dependent on the legal obligations which need to be fulfilled by a newspaper publisher.

##### **Functional Value**

The title section can be regarded as a “shrunk” title page of a book. Usually the descriptive metadata contained in the title section, such as name of the newspaper, edition, publisher, issue date, etc. are captured as part of a library catalogue or in beforehand of the scanning process. As already indicated above from the point of view of structural metadata the title section is just noise for information retrieval and should therefore to be excluded from full-text search or text mining operations.

## Automated Capturing

The title section can easily be detected automatically since its location and the text itself are repeated in every issue.

## Examples

A classical title section from the “Neue Freie Presse”, 11<sup>th</sup> June 1938 and from the French newspaper “L’Intransigeant” from 1884.



**Redaktion, Administration, Druckerei:**  
L. Schuberting, Fichtegasse Nr. 9-11.  
Telephon: Redaktion und Administration  
Serie U-18-5-06.

**Berliner Redaktion:** Berlin W. 9, Eich-  
hornstraße 12, Telephon: 22-56-00.

**Londoner Büro:** Printing House Square,  
London, E. C. 4. Telephon: Central 2001.

**Römische Büro:** Via Gesù e Maria 26.  
Telephon 64-505.

**Geschäftsstelle f. d. Tschechoslowakische  
Republik:** Prag, II. Hybernska ulice 42/II.  
Telephon: 37-907, 74-9-02.

**Preis 20 Rpf**

**Bezugspreise für das Inland, inkl. Allrecht  
(Morgen- und Abendblatt):**  
Durch Versandpost oder  
per Postkreuzband per Monat..... RM 6.-  
bei Vorauszahlung  
per Vierteljahr..... RM 14.25  
per Halbjahr..... RM 27.-

**Bezugspreise für das Ausland  
(Morgen- und Abendblatt):**  
Belgien..... Lwa 174.-  
Frankreich..... fr. Francs 60.-  
Großbritannien..... £ 7.-  
Italien..... Litra 25.-  
Jugoslawien..... Dinar 80.-  
Polen..... Zloty 7.-  
Rumänien..... Lei 200.-  
Schweiz..... Franken 7.-  
Tschechoslowakei..... K. Kronen 40.-  
Ungarn..... Pengö 7.-  
Übriges Ausland..... Gegenwert von RM 6.-

**Für die an Agenten, Anstalten oder Verschiedene  
bestellten Beträge leisten wir keine Garantie!**

**Neue  
Freie Presse  
Morgenblatt**

Das redaktionelle Teil enthält keine verantwortliche Mitteilungen (mit Ausnahme des Anzeigenteils).

**Nr. 26491 M**      **Wien, Samstag, den 11. Juni**      **1938**

Figure 9: Title section, 1938



12 Vendémiaire An 90. — N° 446      Le Numéro : 10 Centimes dans toute la France.      Lundi 3 Octobre 1884

**L'INTRANSIGEANT**

**PREMIER DE L'ABONNEMENT**  
POUR TOUTE LA FRANCE  
TROIS MOIS : 40 FR. — SIX MOIS : 70 FR. — UN AN : 120 FR.

**RÉDACTEUR EN CHEF : HENRI ROCHEFORT**

**RÉDACTION et ADMINISTRATION**  
16, RUE DU CROISSANT  
LEMBRE : des St. MARIEUX et COUS, 4, place de la Bourse

Figure 10: Title section, 1884

### 6.2.2. Running title

#### Synonyms

Header, column title.

## Definition

The running title comprises typically the first top line of a newspaper page (which spans the columns) and includes often the (short) title of the newspaper, the page number, the issue number, the section heading of the page and the date of publication.

## Value

The functional value of the running title is to provide the user a quick orientation which newspaper issue he is actually reading (number, date) and maybe some information on the content of the page (e.g. if a section heading is included). The benefit of running titles for deep structuring is rather low since nearly all the information is already available and needs not to be marked on every page of a newspaper. As already mentioned the only exception can be seen if running titles contain also a subject heading indicating the content of the page (e.g. "Sports"). Then this information can be extracted and be used to detail the content of a page.

## Automated Capturing

Running titles can easily be located and extracted automatically, since they have clearly defined position within the overall layout of a newspaper page and their content can also be predicted in a rather simple way.

## Examples

The "Wiener Zeitung" introduced its first running title with the first issue of the year 1784. It contained for more than 100 years just the page number, from 1876 onwards, also the issue number, title, and date.

( 2 )  
**Heimkunft, auf Befehl des Dej, also- II sig versammelten Zudbauer, auf eine**

Figure 11: Running title with the page number only, 1784

Nr. 2.	2	Dinſtag, den 4. Jänner 1876.
denz des böhmischen Landwehr-Infanteriebataillons Theresienstadt Nr 39); zu Lieutenants: Wladimir Ritter v. Malinowski in Szmulany- wielkie, bei der galizischen Landwehr-Uhlanen-ſquadron	der k. k. Landwehr haben die nachfolgenden Be- ſtimmungen zur Richtſchnur zu dienen: Zu Art. 1 des Einführungsgesetzes. Nachdem dieſes Geſetz mit dem Tage der Kund- machung wirksam wird, ſo treten mit demſelben Tage alle hiſtorisch-kaſtenbau Mannen außer	welch' letzteres bezüglich der erſteren Gattung von Landwehr-Organen bei dem Reichs-Kriegsmini- ſterium, bezüglich der anderen aber im <b>eigenen</b> Wirkungskreiſe das Geeignete veranlaſſen wird. Nach vollzogener Prüfung und eventueller Richtig- ſtellung der angeführten Reſultate

Figure 12: Classical running title with issue number, page number and date, 1876

### 6.2.3. Heading

#### Synonyms

Head, main title, title.

#### Definition

Articles (Content Units) within a newspaper usually come with a title indicating briefly the content of the article. Large articles may have several titles, such as a top heading, a heading, a sub-heading and several inside-headings.

#### Value

The functional value of headings is twofold: First, to mark the beginning of a Content Unit by providing in some way an “eye catcher” which is in the easiest case a word in bold, or in brackets, or in later times a word with a large font size. Second, to attract the attention of a reader to actually select this article (instead of other, less important ones).

#### Automated capturing

In modern newspapers the capturing of headings can be done with good success since the different font size compared to the running text is a very good indicator. With historical newspapers the situation becomes much harder since the font size is often just a few points larger and this might not be sufficient for automated detection. Nevertheless there are several ways to detect the headline in an indirect way, by utilizing the background knowledge which is set out here. E.g. repeated section headings, the mentioning of the place and date of the news and the copyright statement may be utilized for this purpose.

#### Examples

It took until the middle of the 19<sup>th</sup> century that newspapers started to indicate the start of a news item with a specific heading. Before that time it was the place of origin (coverage note spatial) and the date of the news which was used. “Aus der Schweiz” indicates the section, “Genf 26. May. [1750]” shows from where and when the news comes. It is important to understand that “Genf 26. May” is not so much a heading, but contains metadata about the news itself.

**Aus der Schweiz.**  
**Genf 26. May.**  
 Die lezthin gemeldete Rauber - Bande übet  
 ihre Raubereyen in dem Herzogtum Savoyen  
 noch immer aus, indem sie vorwöchlichen Frey-  
 tag in einem nur 2. Meilen von hier entlegenen  
 Dorf in grosser Anzahl eingefallen, die Her-

**Figure 13: Section heading and Coverage Note spatial**

100 years later, there is still a high similarity: A section heading “Inland” indicates the start of this section, “Wien” is the place of origin, the 12<sup>th</sup> June the date, but now a (short) first sentence summarizes the content of this article: “Der Bruch im czechischen Lager” (The crash in the Czech party). This first sentence is also in spaced letters and put into brackets in order to separate it from the actual running text.

**Inland.**

**Wien, 12. Juni.** (Der Bruch im czechischen Lager.) Wenn die Jungczechen vermeinten, durch die projectirte Aufstellung einer eigenen Candidatenliste auf ihre altczechischen Gegner einen heilsamen Druck auszuüben und sie einer Versöhnung zugänglicher zu machen, so können sie heute schon sehen, daß sie sich hierin gewaltig irrten. Die

**Figure 14: Die Presse, 1874**

It takes until the 20<sup>th</sup> century that the modern form is found with a heading indicating the start of the news and a coverage note with additional information. Heading: “Das arbeitende Volk gegen die Junker”, “Berlin, 10. Februar” as additional information.

**Das arbeitende Volk gegen die Junker.**  
 Berlin, 10. Februar. Der Parteivorstand der Sozialdemokratie Deutschlands, der geschäftsführende Ausschuss der preussischen Landeskommision und die sozialdemokratische Landtagsfraktion erlassen einen Aufruf und fordern zu einem Massenbesuch der Versammlungen am kommenden Sonntag auf. Der Aufruf schließt mit den Worten:

**Figure 15: Classical start of news, Arbeiterwille, 1910**

## 6.2.4. Sub-heading

### Definition

A title that follows the main heading of an article and which provides some additional information.

### Functional Value

The value is high since the content of the news is often explained in more detail.

### Automated Capturing

Larger content items appear most frequently with a sub-heading which comes in a specific layout and can therefore be automatically captured.

### Examples

Sub-headings appear rather late in the first half of the 20<sup>th</sup> century. An example from the “Deutsche Zeitung” in Temesvar (Romania) from 12<sup>th</sup> March 1938:



Figure 16: Top heading, heading and sub-heading for extraordinary important news (annexation of Austria)

## 6.2.5. Inside-heading

### Synonyms

Sub-heading.

### Definition

Larger articles are sometimes structured with headings directly within the text body. In contrast to highlighted words or phrases which do not disturb the running text actual inside headings are distinct pieces of text and are therefore not part of the actual running text. The main function in this case is therefore to highlight the importance which is in other cases done with letters-space, bold or italic. So the decisive criteria to distinguish between pure highlighted words and actual inside headings is: If they do not interrupt the normal reading order we speak just of highlighting (expressed with a larger font size, and text styles such as bold, or letter spaced), if this piece interrupts the flow of text then it is an inside-heading.

### Functional Value

Since inside-headings are embedded particles within the text they “destroy” the running text. This may have some negative affect if the text is parsed, e.g. with natural language parsers which is a usual step in the workflow for information extraction.

### Automated capturing

Since inside-headings are not used in general but mainly by specific newspapers for a given period of time it may be possible to detect and extract them in an automated way.

### Example

In the following, a good example of a pure highlighting which may look like an inside-heading is shown.

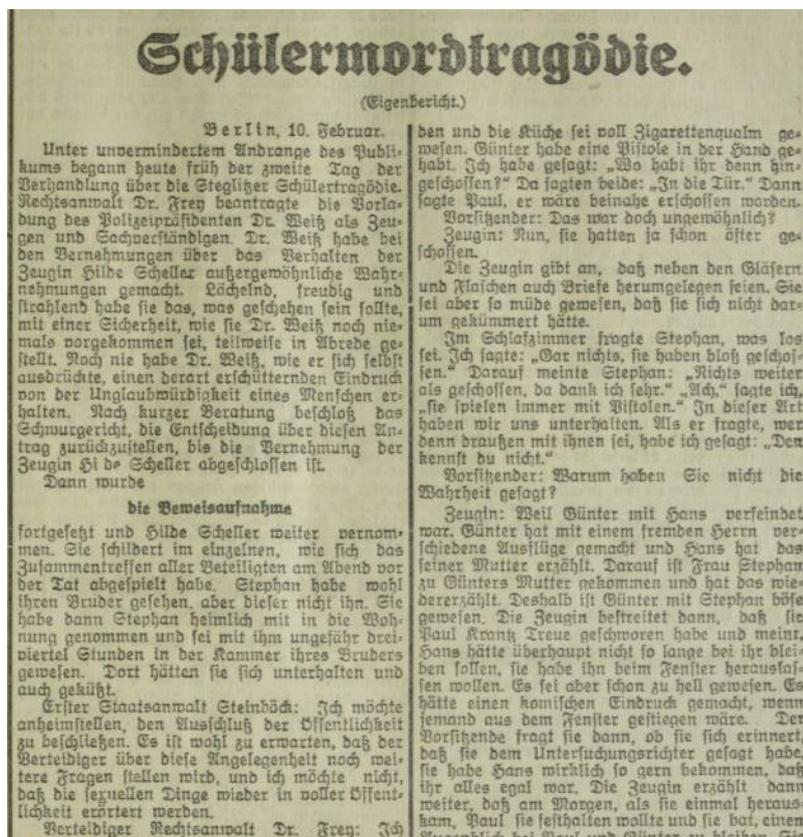


Figure 17: Arbeiterwille, 11th February 1928

## 6.2.6. Top heading

### Synonyms

Top title, roof title.

### Definition

Similar to the sub-title of an article and providing the same structural functionality, there might be a title above the main title.

### Value

The value is very similar to the sub-heading since the content is explained in more detail.

### Automated Capturing

Top titles were introduced relatively late in newspapers. They always appear above the main title and are therefore rather easy to detect automatically.

### 6.2.7. Lead

#### Synonyms

Intro, Introduction.

#### Definition

Usually the first paragraph(s) of a (larger) article providing an overview of the content of the article.

#### Functional Value

The lead is a kind of abstract of an article. It appears only within larger news articles and may therefore be used for displaying purposes. Since the lead does not break up the running text, but is part of it, its detection is less important compared to headings and other Content Items. A lead must not be mixed up with real “summaries” as they appear separately as preview of the content of a newspaper issue.

#### Automated Capturing

The lead is usually indicated by a different layout, e.g. bold, italic, or spanning the columns of a newspaper article in the same way as the main title. Nevertheless automatic detection may be tuned to individual newspapers to reach satisfying results.

### 6.2.8. Copyright note

#### Synonyms

By-line, copyright statement.

#### Definition

The copyright statement indicates who is the source of information and therefore responsible for the content of a news article.

From a historical point of view it is interesting to see that the author information becomes more and more important: Whereas for several hundred years, news articles did not carry any individual copyright statement, short acronyms for free lancers and photographers were introduced in the 20<sup>th</sup> century. Nowadays the full name of the author is usually mentioned for every news article of a newspaper.

Already in the 19<sup>th</sup> century copyright notes appear for entertainment, such as novels, poems, cartoons.

### Functional Value

The value is to inform the reader about the creator of a piece of information or entertainment. This goes together with the increased importance of individual authors as the leading voices of a newspaper.

The copyright statement may be used to increase the quality of the metadata but also for information and retrieval purposes. It might be interesting to see for humanities scholars (even if only the source of information or an abbreviation of a name is available) which news articles are stemming from whom or are written by a specific person.

Again for automated processing, copyright notes can be regarded as embedded particles and are somehow disturbing the running text which may be subject to automated processing.

### Automated Capturing

There are rather strict rules for each newspaper where these copyright notes appear and also the text itself is rather strict and follows simple rules. In the case of individual authors one can expect that a “Von” or “By” is used as suffix of this note. The chance to detect this content item automatically is therefore high.

### Examples

From “Die Presse”, 13. Mai 1905. Professor Dr. R. v. Wettstein is mentioned as the author of an article about the German School Association. A personal opinion is expressed, as in every Saturday edition at that time.



Figure 18: Copyright note, 1905

Here one can find three articles from the same issue, where the copyright statement has a slightly different but nevertheless comparable function and expresses the source of information.



Figure 19: Examples of copyright notes, Die Presse, 1905

“Meldung der Petersburger Telegraphenagentur” indicates that this news was taken from a Russian news agency, whereas the other news was investigated directly by the team of the newspaper editor (Telegramm der “Neuen Freien Presse”).

### 6.2.9. Coverage note spatial

#### Synonyms

Place name.

#### Definition

Especially news articles commonly indicate the location of a story right at the beginning of the item. Coverage notes are defining the location (or time) of a specific news and should therefore be distinguished from section headings which are indicating just in general the place of origin of the following Content Units.

#### Functional Value

The user is quickly informed from where a specific news comes and has therefore in many cases some pre-knowledge on the background of the story. The value for deep structuring is very high since this information can be found nearly from the very beginning of newspaper

publishing until today. Surprisingly it has to our knowledge not been used so far for systematic information extraction.

From the historical point of view Coverage notes spatial are very similar to section headings which are consisting just of the place name of a specific section.

### Automated Capturing

Due to the fact that coverage notes follow strict rules within one newspaper and since their repertoire is rather limited they can be automatically detected.

### Examples

Gazeta Lwowska (Lemberger Zeitung / Poland), 16. February 1821. The complete coverage note includes the place and detailed date of the event: Madrytu, and the 11<sup>th</sup> of January (!).

nie przystępy do miasta i uwięziono wielu  
mieszkańców jako współuczestników spisku przeciwko Rządowi. Uwięzieni należąć mają powiększ  
szej części do klasy niższej Lądu.

**Hiszpania.**

*Z Madrytu d. 11. Stycznia. —* Gazety  
tuteysze zaprzeczają rozsiałą wiadomość o u  
więzieniu Xięcia del Parque. Zgromadze  
nia patryjotyczne nie miewają już żadnych po  
siedzeń, tymczasem mnóstwo ludzi zbiera się  
każdego wieczora do kawiarni *la Fontana de  
oro*: przestają oni na śpiewania patryjotycznych

Figure 20: Example of a coverage note, 1821

## 6.2.10. Coverage note temporal

### Synonyms

Date, dateline.

### Definition

The exact data which is mentioned at the beginning of a newspaper article and most often part of a general coverage note which also mentions the place of the news. Coverage notes temporal appear already in the 18<sup>th</sup> century and can be found until the middle of the 20<sup>th</sup> century in very similar formats.

## Functional Value

With the coverage note temporal the reader gets detailed information about the “age” of a news. This was especially important at former times when the transportation of news took several days or – if they came from abroad – even longer. In contrast to the coverage note spatial, the information value may not be high in daily newspapers, but in newspapers which are edited only once or twice a week or in irregular intervals an exact date can be of higher value.

## Automated Capturing

Due to the fact that coverage notes follow strict rules within one newspaper and since their repertoire (numbers, days, months) is very limited, they can be automatically detected. In an indirect way, coverage notes (both spatial and temporal) could be used to detect the start of a news since their repertoire is very limited and they can therefore be matched against a list of options (place names, dates). The same is true for copyright notes, which also show a very limited number of textual variants.

## Examples

The example is taken from the Wiener Zeitung, 9. June 1848. The complete coverage note is: London, den 3. Juni (= London, 3<sup>rd</sup> June). In this example we can also see that section headings (in this case Großbritannien, Great Britain) and coverage notes have a very similar origin and are highly related to each other.

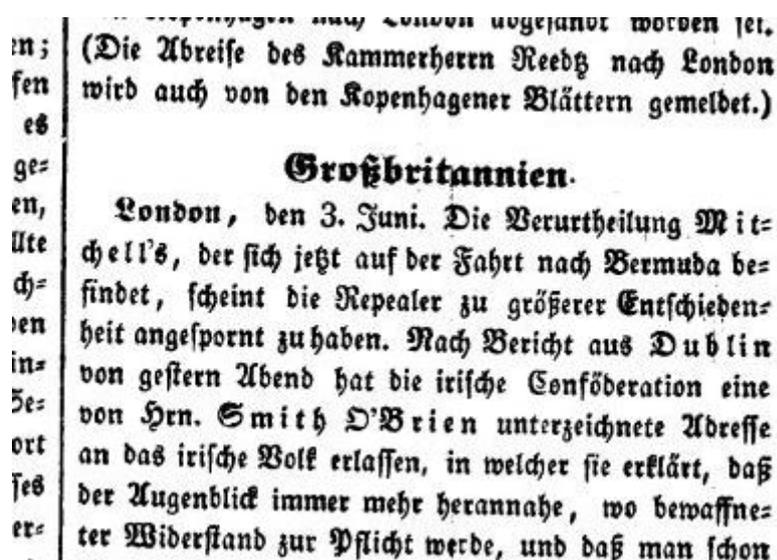


Figure 21: An example of a coverage note, 1848

## **6.2.11. Paragraph**

### **Definition**

A paragraph is the default unit of a running text and usually provides a single thought or narrative.

### **Functional Value**

The functional value of paragraphs is to structure a longer piece of text into suitable parts. Usually a paragraph covers one thought or one distinct part of the narrative or message. The value is very high, since a paragraph can be seen as a basic building block of any text. The correct separation of the text into paragraphs is important for many reasons, especially for any kind of Natural Language Processing where tree- and part-of-speech taggers are used. They will in many cases rely on the correct start and end of sentences.

### **Automated Capturing**

The automated caption of paragraphs leads to good results within larger units of running texts. Nevertheless the distinction between paragraphs and short articles might be problematic in many cases.

## **6.2.12. Illustration (photograph/picture/chart)**

### **Definition**

In an illustration the main content is expressed in a non-textual, graphical way. Typical graphical elements are photos, pictures, cartoons, charts, etc.

### **Functional Value**

Illustrations are supporting the textual message of a news item. With the development of printing technologies a significant increase of illustrations within newspapers can be seen, especially in the 20<sup>th</sup> century.

### **Automated Capturing**

As already mentioned above, illustrations can be captured with good results in an automated or semi-automated way, even on a very basic level.

### **6.2.13. Table**

#### **Definition**

A set of facts or figures systematically displayed, especially in columns and rows. Tables can be found frequently in newspapers, e.g. for displaying stock exchange rates, or TV programmes, etc.

#### **Functional Value**

Tables offer to the reader a comprehensive overview of information which would otherwise be hard to explain with pure narrative means. The value is therefore high.

#### **Automated Capturing**

Tables can in general be detected automatically but the detailed allocation of facts to rows and columns and their logical order is a serious challenge and a research field on its own. Nevertheless since some tables appear in a very similar way over years and decades in a newspaper (such as stock exchange rates) it might be possible to take benefit of this fact.

### **6.2.14. List**

#### **Definition**

A list is a number of connected items printed consecutively, typically one below the other.

#### **Functional Value**

The value may be high if the items are taken as named entities and linked to corresponding resources, such as library catalogues.

#### **Automated Capturing**

Similar to tables the automated detection and extraction of fine-grained information from lists is a sophisticated task and can probably only be done for very specific newspapers and sections.

## 6.2.15. Continuation note

### Definition

One or more words which explicitly indicate that an article is continued on another page, or in another issue. Often continuation links appear on the title page of an issue.

### Functional Value

The continuation note itself is noise from the information retrieval point of view. The value of the link between two parts (continuation) is rather high though, since it will connect dislocated pieces of a single item.

### Automated Capturing

Automatic detection of continuation notes is difficult since newspapers handle them very individually. Nevertheless, within any given newspaper the same text phrases are always used to indicate a continuation.

## 6.2.16. Summary

### Synonyms

Preview, billboard.

### Definition

A summary of the content of a newspaper issue. Often provided as an extra section or on the last page. UIBK includes also billboards and previews under this category, since they have a very similar purpose.

### Functional Value

With the increasing complexity of newspapers it became convenient to provide already a preview or summary of the content at special sections. Again the main value is to guide the user in navigating through a complex newspaper issue.

The value in terms of information structuring is rather low: Content is either referenced or repeated and therefore we can regard these pieces mainly as “emphasiser” that this content was regarded to be important, but no additional facts or figures are provided with regard to the main content which is presented in another place.

## Automated Capturing

Summaries, previews and billboards usually appear as sections with repeated headings and at well-defined places. They can therefore be handled in the same way as sections. For previews to single articles, usually a “Continuation Note” is included as well which may be used to identify the summary.

### 6.2.17. Verbatim quote

#### Definition

An explicit record of someone’s (verbal) expressions. In most cases explicit quotations come with a quotation mark. Verbatim quotes were often part of historical newspapers, mainly when speeches or proclamations of high political representatives are cited within the newspaper.

#### Functional Value

In order to emphasise the importance of the message of a person or an institution a piece of text was included as a verbatim quote. They are usually marked with their layout.

#### Automated Capturing

Verbatim quotes are very specifically handled by each newspaper editor and are therefore hard to detect and extract in an automated way. Nevertheless for some newspapers this might be possible on the basis of very distinct rules.

#### Examples

A good example of a verbatim quote as a regular means to structure content within a newspaper can be found e.g. in “Die Presse” from February, 1890. Here the address of the German emperor Wilhelm II. at the German Reichstag is cited and indicated in the layout with quotation marks and a smaller font size compared to the default font size of the running text.



Figure 22: Verbatim note, indicated by smaller font size, 1890

### 6.3. Representation in MODS

Content Items are on the one hand used to support the user in navigating through a newspaper issue, but they are also containing some “meta-information” which can be regarded as “descriptive metadata”. If the Content Items are separated into two main groups, those which directly belong to the running text of a news and those which provide additional information but are not part of the running text, one gets a meaningful compilation.

Content Items forming the main part of the running text	Content items which provide additional information
Paragraphs	Title section
Illustrations, tables, charts	Running title
Captions	Headings (including sub-heading, top-heading, inside heading)
Verbatim	Copyright note
Lead	Coverage notes (spatial and temporal)

	Continuation note
--	-------------------

Looking at those Content Items which provide additional “meta-information”, a simple match can be made between the MODS schema and the list of Content Items. In this way, a detailed representation of all newspaper Content Units and Content Sections within the MODS schema is obtained.

Content Item	Type of Metadata	Representation in MODS
Title section	<p>The title section contains a lot of metadata which are recorded in a library catalogue, such as issue number, name of the newspaper, publication place, etc.</p> <p>But as discussed above, it will not be necessary to represent and capture Title sections in detail, since there is information anyway in beforehand.</p>	Not applicable.
Running title	<p>The same is true with running titles, with one exception: If the running title also includes a “subject heading” indicating the content of the page. E.g. “Sports”.</p>	MODS Subject.

<p>Headings of Content Sections</p>	<p>Since headings of content sections are repeated across issues they can be seen as “subject” headings, indicating that the Content Units within the section fall under a specific category. E.g. all news under the heading “News from abroad”. In many cases MODS Subject – Topic could be used, also “Geographical” and “Temporal”.</p>	<p>MODS Subject</p>
<p>Headings of Content Units</p>	<p>Headings of Content Units are unique and individual and go therefore under the “Title Info” of the MODS schema.</p>	<p>MODS Title</p>
<p>Copyright note</p>	<p>The copyright note indicates the source of information and can therefore go under “Name”. MODS allows here also to record if it is an individual creator or a corporate one, which will be useful for cases where just the newspaper is mentioned as copyright holder.</p>	<p>MODS Name</p>
<p>Coverage notes (spatial and temporal)</p>	<p>Coverage notes indicate the subject (similar to content sections) and can be recorded as MODS Subject,</p>	<p>MODS Subject</p>

	Geographical and Temporal.	
Continuation note	<p>The continuation note may be regarded as a distinct part of a news, than the two items could be linked together with the MODS Part element. Or – which will be in many cases more appropriate – the continuation note will not be recorded at all since it does in many cases not provide any additional information.</p>	MODS Part

In addition to this table it is obvious that for recording text types, the MODS Genre field could be used, e.g. “Book review”.

## 7. STRUCTIFY

### 7.1. *General*

STRUCTIFY is a JAVA tool utilising the Standard Widget Toolkit (SWT) for displaying, rendering and configuring METS files, respectively ENMAP files and their associated image and text files. It was developed by UIBK. It is available for free for download from the FTP server of UIBK. A detailed description can be found here:

<http://dbis-halvar.uibk.ac.at/dokuwiki/doku.php?id=main:structify>

The main idea of STRUCTIFY is to display images and the full-text of digitized newspapers (and other formats).

One of the main features of STRUCTIFY is its flexibility which is based on a sophisticated “handler” system. In this way it can be adapted to all kinds of METS and ALTO formats with a minimum of effort. For example, there is a handler to open the ENMAP simple and one for the ENMAP extended version. Moreover, a handler which supports the CCS output format was developed in year 3 to give the libraries the opportunity to view the results from the OLR process of CCS. Since some libraries may also be interested to use the ABBYY FineReader XML format for storing textual data, there is also a handler to work with these XML files. In addition it is also possible to work without any initial METS at all – and just import images plus OCR files. This way someone could use Structify to create ENMAP (simple or extended) with the help of the tool and use the output as a specification for e.g. a service provider or internal discussions.

Apart from the handler system, also several widgets have been introduced to shorten some workflow steps. Again the wizard system is designed in a generic way, so that specific tasks can be supported easily.

### 7.2. *ENMAP Viewer*

A first and very simple purpose of STRUCTIFY is to use it as a simple viewer program for the files produced in the Europeana Newspaper project. It is able to directly load the ENMAP METS together with the image and ALTO files and to display regions and text. It has also

been adapted to work with the METS and ALTO profile from CCS GmbH (Content Conversion Specialist) which is slightly different from the ENMAP enhanced format.<sup>9</sup>

Several libraries, among them the British Library and the Bibliothèque nationale de France, are now using STRUCTIFY for (visual) quality control of METS files.

### **7.3. Ground Truth and Quality Assessment**

One of the key factors for successful digitisation and enrichment projects is to translate the demands of libraries and humanities scholars into technical requirements which need to be fulfilled by service providers. Usually such requirements come in a written form and may be rather vague. Since the final end-product delivered by the service providers are highly complex and – for human beings – rather hard to understand XML files, a direct evaluation of the results is often only possible with the tools provided by the service providers themselves.

This “translation process” can be significantly simplified if the requirements are already exposed in the final format and are visually accessible to those people who have the domain knowledge about the content of historical newspapers. All the detailed decisions which need to be made if a library wants to follow above suggestions for a “deep structuring” can be laid out directly with STRUCTIFY by non-technical people. In this way the tool may play an important role as a “communication” tool between libraries/humanities scholars and technology providers.

Due to the fact that STRUCTIFY provides the exact ENMAP output, also technical people are able to directly understand how the encoding shall take place.

Strongly connected with the generation of Ground Truth STRUCTIFY can also be used as a quality assessment tool. Assuming that – based on Ground Truth produced by a library – a service provider will deliver large amounts of structured newspapers, a defined quality assessment process may take place. In contrast to the OCR assessment tools from USAL which were developed in Work Package 3 there is currently no automated process included in STRUCTIFY which would allow a direct evaluation of the delivered product against reference data. On the other hand, based on some random samples, a library may organise such a quality assessment process in a rather simple way, by just viewing some files and

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<sup>9</sup> The main reason for this inconsistency is that in the work plan it was neither foreseen nor possible to adapt the CCS METS format according to the ENMAP enhanced profile.

recording errors either with a separate tag (as it can be defined in STRUCTIFY) or in an external list.

## **7.4. Training Data**

As already mentioned deep structuring of newspapers will only be possible with the strong support of technologies from Pattern Recognition, Natural Language Processing and similar research fields. Most of these algorithms are based on machine learning techniques which require so-called “training data”. As a rule of thumb it can be stated that the more training data are available, the better the results will be. In fact, the progress achieved in similar pattern recognition tasks, such as Speech Recognition, Computer Vision or Online Handwritten Text Recognition are mainly based on the improved availability and quantity of said training data. The drawback of this approach is that the generation of training data is cumbersome and requires a lot of manual labour.

When taking these considerations into account, a project plan for the deep structuring of a large amount of newspapers may look like this:

1. Set up requirements  
Based on STRUCTIFY and ENMAP, several examples are produced for all structural features (Content Sections, Units and Items, Text Types, etc.) which shall be detected in an automated process.
2. Use expert system for generating basic data  
By a rule-based approach, expert and domain knowledge can be heavily utilised to automatically detect all structural features as they were defined in the first step. It can be expected that in some cases this rule based approach will lead to rather good results (e.g. the detection of title sections, in other cases it may be very erroneous).
3. Training Data Generation  
The actual generation of training data may take place in this third round and is based on the results produced by the (rule based) expert systems. Only the errors of the expert system need to be corrected - which can also be done with STRUCTIFY. In this way a large number of data will be available for the next step.
4. Machine Learning Approaches  
Based on a significant number of data, machine learning methods may now be applied. It can be expected that if indeed all the structural features which are mentioned above shall be detected in an automated way, some ten-thousands of reference pages will be necessary and therefore several iterations may be applied. These iterations may be continued as long as there are significant improvements in the accuracy.

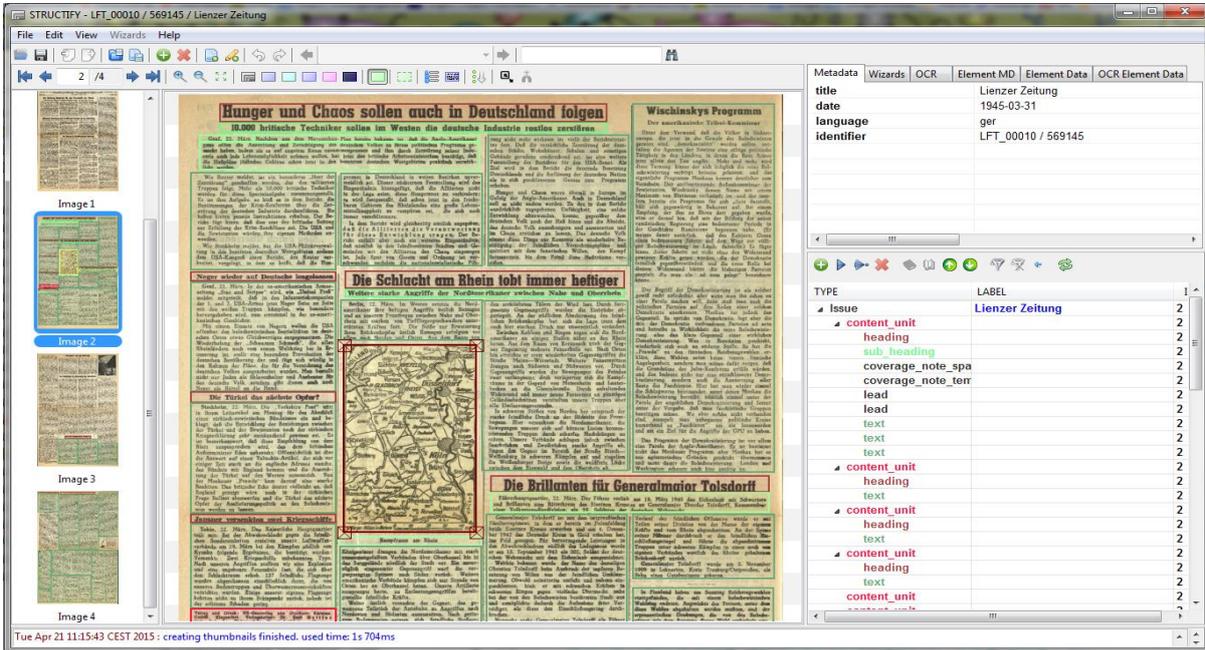
## **7.5. Digital Humanities Tool**

Independently of the fact how good the actual results of the automated processing for deep structuring will be – they never will be perfect. Therefore the need for some final correction process will always remain. Given the large number of newspaper pages it is illusionary to believe that the complete process of deep structuring may be carried out or be financed by libraries. The involvement of user groups who are interested in receiving improved results is by all means necessary on the long term. It is therefore expected that not only the correction of OCR text will be done by volunteers and humanities scholars, but also the correction of structural features. Whereas the correction may be done on the basis of web-interfaces for simple features, such as applying text types to Content Units, for operations which will require a more complex rendering of the data, again STRUCTIFY may play a significant role.

## **7.6. STRUCTIFY Screenshot**

In order to provide a short impression of the tool, a screenshot of the tool is provided here. The tool consists of five main areas.

1. The menu bar on top
2. A thumbnail view of the document on the very left hand side.
3. An image canvas in the centre of the screen where the actual page and the raw segmentation (coming from the OCR engine) as well as the logical structure of the document is displayed.
4. A tree map at the bottom right hand side displaying the Structural Map of the METS file and therefore showing the actual structuring.
5. A metadata area on the top right hand side where on the one hand parts of the descriptive metadata section of the METS file are displayed as well as specific wizards can be utilised to speed up the tagging process.



STRUCTIFY - LFT\_00010 / 569145 / Lienzer Zeitung

File Edit View Wizards Help

2 / 4

**Hunger und Chaos sollen auch in Deutschland folgen**  
 10.000 britische Techniker sollen im Westen die deutsche Industrie reaktivieren

**Wischinsky Programm**  
 Das amerikanische Militär-Kommando...

**Die Schlacht am Rhein tobt immer heftiger**  
 Weitere starke Angriffe der Nordrhein-erzischen Nahe und Oberhalb...

**Die Brillanten für Generalmajor Tolstorf**  
 Einbrennen...

**Metadaten** | Wizards | OCR | Element MD | Element Data | OCR Element Data

title	Lienzer Zeitung
date	1945-03-31
language	ger
identifier	LFT_00010 / 569145

TYPE LABEL  
 Issue Lienzer Zeitung 2  
 content\_unit 2  
 heading 2  
 sub\_heading 2  
 coverage\_note\_spa 2  
 coverage\_note\_term 2  
 lead 2  
 text 2  
 text 2  
 text 2  
 text 2  
 text 2  
 content\_unit 2  
 heading 2  
 text 2

Tue Apr 21 11:15:43 CEST 2015 : creating thumbnails finished. used time: 1s 704ms

Figure 23: STRUCTIFY Screenshot

## 8. Summary

A short summary of the most important concepts, rules and mappings which are provided in the following section:

### Deep Structuring

- Full informational capture of structural features of a newspaper issue
- Granular approach

### Content Units

- The classical entity of newspapers, such as articles, advertisements, classified advertisements
- Clearly distinguishable from neighbouring pieces by its content
- May include other Content Units if it is a complex or large piece of text

### Content Sections

- Sections provide a rough structure of a newspaper issue
- Sections serve as placeholders for content units falling under a given category
- Sections are always repeated in various issues and can therefore only be identified across the borders of a single newspaper issue

### Content Items

- Content Items are the building blocks of Content Units and Content Sections
- They are mainly defined by their functional value and their layout
- Content Items are important for the internal structure of the content.
- Content Items also contain some very specific descriptive metadata which can be exploited for metadata recording

### Classification of Content Items into classes

- Main classes are: Title section, running title, headings (top-, sub-, inside-heading), copyright note, coverage note (spatial and temporal), continuation note, paragraph, illustration, table, list, caption, lead, verbatim note and summaries

### Classification of content into five main classes

- Information (news)
  - o The classical news content with text (and illustrations) about recent events built around the five "Ws": Who, What, Where, When and Why
- Advertisement, including classified advertisement
  - o External content ranging from official announcements to commercial advertisements
- Entertainment
  - o All kinds of arts and literature. Prominent examples are the series novels in the 19<sup>th</sup> and cartoons in the 20<sup>th</sup> century
- Opinion

- A personal reflection or standpoint. Started with book reviews in the early 19<sup>th</sup> century and continued with “editorials” and “commentaries” as main examples
- Metadata
  - Some content pieces which provide information about the newspaper itself

#### Classification of Content Units into text types

- Extended list of genres

#### Matching Content Items with MODS

- Running title → Not recorded, except section heading → MODS Subject
- Headings of Sections → MODS Subject
- Headings of Units → MODS TitleInfo
- Copyright note → MODS Name
- Coverage notes (spatial and temporal) → MODS Subject (geographical, temporal)
- Continuation note → MODS Part

#### ENMAP format

- ENMAP simple: image and OCR files on page basis  
→ used to deliver information packages to the Europeana Newspapers application:  
<http://www.theeuropeanlibrary.org/tel4/newspapers>
- ENMAP enhanced → experimental format for describing mainly the structural features of historical newspapers

#### STRUCTIFY

- A free tool for displaying, rendering and generating ENMAP enhanced files on the basis of ENMAP simple

## 9. ENMAP – Profile

### 9.1. Examples

Part of this deliverable are some example issues and pages for ENMAP based on a manual tagging of content pieces. These examples are also available for download from the Europeana Newspapers website and can be displayed with STRUCTIFY.

### 9.2. ENMAP Profile

This section provides a detailed XML profile description of ENMAP (Europeana Newspaper METS ALTO Profile). It describes how to use the elements and attributes from the Metadata Encoding and Transmission Standard for the purpose of digitised newspapers.

Note: METS Elements and Attributes not covered by this document are currently not used and therefore not mentioned in this profile description.

#### The XML Prolog

Defines the used XML Version and the used character encoding, the preferred XML Version is 1.0 and the preferred encoding is UTF-8.

#### The METS-Root Element: mets

**Namespace:** <http://www.loc.gov/METS/>

**Description:** This is the main container and contains all other metadata sections (METS header, descriptive metadata, administrative metadata, file section, structure map) and all the namespace definitions for all the used metadata standards.

**Repeatable:** no

**content/childs:** [metsHdr](#), [dmdSec](#), [amdSec](#), [fileSec](#), [structMap](#)

**Attributes:**

xmlns:mets	Defines the namespace of the METS container <a href="http://www.loc.gov/METS/">http://www.loc.gov/METS/</a>	REQUIRED
------------	--	----------

xmlns:xsi	The XML-Schema-Instance namespace definition, needed for XML validation  <a href="http://www.w3.org/2001/XMLSchema-instance">http://www.w3.org/2001/XMLSchema-instance</a>	REQUIRED
xmlns:mix	The National Information Standards Organization namespace. NISO mix is used to store administrative metadata for the contained files  <a href="http://www.loc.gov/mix/v20">http://www.loc.gov/mix/v20</a>	REQUIRED
xmlns:mods	Namespace of the used descriptive metadata standard MODS  <a href="http://www.loc.gov/mods/v3">http://www.loc.gov/mods/v3</a>	REQUIRED
xmlns:xlink	XLink Namespace, used and referenced by the METS Schema  <a href="http://www.w3.org/1999/xlink">http://www.w3.org/1999/xlink</a>	REQUIRED
PROFILE	Used to determine the XML profile as an European Newspaper METS/ALTO Profile, always set to:  ENMAP	REQUIRED
OBJID	Contains an unique identifier for the dataset, value can be any string	OPTIONAL

## The METS Header Element: metsHdr

**Namespace:** <http://www.loc.gov/METS/>

**Description:** The METS Header contains the records status and the modification dates, as well as a list of agent and their role assigned to this Mets document.

**Repeatable:** no

**content/childs:** [agent](#)

**Attributes:**

RECORDSTATUS	Contains a String representing the actual state, e.g.:  <b>SUBMITTED</b>	REQUIRED
CREATEDATE	Contains the date on which the METS document was created. Used format is a XMLDateTime  <b>2014-02-18T12:28:21</b>	REQUIRED
LASTMODDATE	Holds the last date on which the document was modified. Used format is a XMLDateTime  <b>2014-02-18T12:28:21</b>	REQUIRED

**The METS agent-Element: agent**

**Namespace:** <http://www.loc.gov/METS/>

**Description:** defines an agent and its role on this newspaper issue

**Repeatable:** yes

**Content/childs:** [name](#)

**Attributes:**

ROLE	Defines the role of the agent, valid values are adopted from the METS Schema e.g.  <b>CREATOR, CUSTODIAN, ....</b>	REQUIRED
TYPE	Determines the agent type  <b>ORGANIZATION, INDIVIDUAL or OTHER</b>	REQUIRED



## The METS agent name-element: name

**Namespace:** <http://www.loc.gov/METS/>

**Description:** contains the agent name

**Repeatable:** no

**Content/childs:** a string (TextNode) to identify the agent

## The METS descriptive metadata section-element: dmdSec

**Namespace:** <http://www.loc.gov/METS/>

**Description:** each descriptive metadata section contains exactly one metadata set which can be referenced from the structure map. The ENMAP Profile awaits at least one record set referenced from the structMap root div, which should contain metadata about the whole newspaper or newspaper issue.

**Repeatable:** yes

**Content/childs:** [mdWrap](#)

**Attributes:**

ID	XML ID used by the structMap to reference this metadata set.	REQUIRED
----	--	----------

## The METS administrative metadata section element: amdSec

**Namespace:** <http://www.loc.gov/METS/>

**Description:** the administrative metadata section contains a list of metadata sets which are referenced from the file section to hold additional image metadata like width, height, compression schema and others.

**Repeatable:** no

**Content/childs:** [techMD](#)

**Attributes:**

ID	XML ID used to define this section as a technical metadata section  <b>TECHMD</b>	REQUIRED
----	---	----------

**The METS technical metadata-element: techMD**

**Namespace:** <http://www.loc.gov/METS/>

**Description:** this element is referenced from the file section and holds image metadata

**Repeatable:** yes

**Content/childs:** [mdWrap](#)

**Attributes:**

ID	XML ID used from the file section to reference this metadata set	REQUIRED
----	--	----------

**The METS metadata wrapper-element: mdWrap**

**Namespace:** <http://www.loc.gov/METS/>

**Description:** used to specify the type of the wrapped metadata set.

**Repeatable:** no

**Content/childs:** [xmlData](#)

**Attributes:**

MDTYPE	defines the metadata type, in case of descriptive metadata <b>MODS</b> is used, and in case of administrative metadata <b>NISOIMG</b> is used	REQUIRED
--------	---	----------



## The METS xml data wrapper-element: xmlData

**Namespace:** <http://www.loc.gov/METS/>

**Description:** used to specify the type of the wrapped metadata set as a XML fragment.

**Repeatable:** no

**Content/childs:** [mods](#), [mix](#)

## MODS

### The MODS Root-Element: mods

**Namespace:** <http://www.loc.gov/mods/v3>

**Description:** root element of the MODS xml record.

**Repeatable:** no

**Content/childs:** all MODS root-childs are allowed here, for a complete list see <http://www.loc.gov/standards/mods/>

Below are some important MODS elements which are used in ENMAP profile in the simple as well as the extended version. These elements were valuable for later data processing and hence recommended as best practice.

### The MODS titleInfo-Element: titleInfo

**Namespace:** <http://www.loc.gov/mods/v3>

**Description:** provides the title information

**Repeatable:** yes

**Content/childs:** [title](#)

titleInfo		REQUIRED
-----------	--	----------

## The MODS titleInfo title-Element: title

**Namespace:** <http://www.loc.gov/mods/v3>

**Description:** contains the newspaper title

**Repeatable:** yes

**Content/childs:** a string (TextNode) as title representation

title	Title of the newspaper	REQUIRED
-------	------------------------	----------

## The MODS originInfo-Element: originInfo

**Namespace:** <http://www.loc.gov/mods/v3>

**Description:** used to hold the origin information

**Repeatable:** no

**Content/childs:** [dateIssued](#)

## The MODS originInfo dateIssued-Element: dateIssued

**Namespace:** <http://www.loc.gov/mods/v3>

**Description:** contains the publication date of the issue

**Repeatable:** no

**Content/childs:** a string (TextNode) to show the date

**Attributes:**

encoding	<i>w3cdtf</i> - This value is used for the profile of ISO 8601 that specifies the following date pattern: YYYY-MM-DD	REQUIRED
keyDate	yes - This value is used so that a particular date may be distinguished among several dates. Thus for example, when sorting MODS records by date, a date with	REQUIRED

	keyDate="yes" would be the date to sort on. It should occur only for one date at most in a given record.	
--	--	--

## The MODS language-Element: language

**Namespace:** <http://www.loc.gov/mods/v3>

**Description:** used to hold the language and script type information

**Repeatable:** yes

**Content/childs:** [languageTerm](#), [scriptTerm](#)

## The MODS language languageTerm -Element: languageTerm

**Namespace:** <http://www.loc.gov/mods/v3>

**Description:** contains the language

**Repeatable:** yes

**Content/childs:** a string (TextNode) to identify the language

**Attributes:**

type	Type is either code or text	REQUIRED
authority	Enumeration of different language codes, eg. iso639-2b, rfc4646	REQUIRED

## The MODS language scriptTerm -Element: scriptTerm

**Namespace:** <http://www.loc.gov/mods/v3>

**Description:** contains the script type

**Repeatable:** yes

**Content/childs:** a string (TextNode) to identify the script

**Attributes:**

type	Type is either code or text	REQUIRED
authority	Enumeration of different script codes, eg. iso15924	REQUIRED

**The MODS identifier-Element: identifier**

**Namespace:** <http://www.loc.gov/mods/v3>

**Description:** contains external identifiers

**Repeatable:** yes

**Content/childs:** a string (TextNode) to identify (external) representations of the same dataset

**Attributes:**

type	The identifier type	REQUIRED
------	---------------------	----------

**The MODS accessCondition-Element: accessCondition**

**Namespace:** <http://www.loc.gov/mods/v3>

**Description:** contains access information

**Repeatable:** yes

**Content/childs:** a string (TextNode) to define the access condition

**Attributes:**

type	The access type resp. access authority	REQUIRED
------	--	----------

## NISO

### The NISO MIX Root-Element: mix

**Namespace:** <http://www.loc.gov/mix/v20>

**Description:** root element of the NISO MIX xml record.

**Repeatable:** no

**Content/childs:** all MIX root-childs are allowed here, for a complete list see <http://www.loc.gov/standards/mix>

### The METS file section element: fileSec

**Namespace:** <http://www.loc.gov/METS/>

**Description:** The file section contains all files assigned to this newspaper, ordered into specified groups.

**Repeatable:** no

**content/childs:** [fileGrp](#)

### The METS file group element: fileGrp

**Namespace:** <http://www.loc.gov/METS/>

**Description:** file groups are used to keep track on the different file types assigned to a digitized newspaper issue. Groups can again contain groups. Following file grouping is foreseen for ENMAP documents:

- **ImageGroup**
  - **OCRMasterFiles:** contains the original scans/images
  - **ViewingFiles:** this group can contain downscaled images used for fast displaying
- **TextGroup**
  - **ALTOFiles:** group containing all ALTO OCR files
  - **ABBYFiles:** group containing all ABBYY OCR files

**Repeatable:** yes

**content/childs:** [fileGrp](#), [file](#)

**Attributes:**

ID	XML ID that specifies also the type of the file group as described above	REQUIRED
USE	Determine the use of the given file group. Possible values are:  <b>Preservation, Viewing, Content</b>	REQUIRED

### The METS file-element: file

**Namespace:** <http://www.loc.gov/METS/>

**Description:** Every single image, ocr-xml, etc. that is part of the newspaper issue, is represented by a single file element and is assigned to its respective file group

**Repeatable:** yes

**Content/childs:** [FLocat](#)

**Attributes:**

ID	XML Identifier	REQUIRED
ADMID	Id reference to administrative metadata section, see amdSec	OPTIONAL
MIMETYPE	specifies the content of the file (RFC2616)	OPTIONAL
SEQ	can be used for reading order representation	OPTIONAL
CHECKSUMTYPE	Specifies the type of checksum used	OPTIONAL
CHECKSUM	Checksum of given file itself	OPTIONAL

## The METS file location-Element: FLocat

**Namespace:** <http://www.loc.gov/METS/>

**Description:** the FLocat element is used to hyper reference the files using an URL

**Repeatable:** no

**Content/childs:** none

**Attributes:**

LOCTYPE	Specifies the type of reference as URL	REQUIRED
xlink:href	URL to the file	REQUIRED

## The METS structure map-element: structMap

**Namespace:** <http://www.loc.gov/METS/>

**Description:** every ENMAP document contains a physical structure map, listing all files of the issue and can be used to store a page type map and the pagination. Beside that an ENMAP document can contain several logical structure maps. The simple ENMAP contains only the physical structure map.

**Repeatable:** yes

**Content/childs:** [div](#)

**Attributes:**

TYPE	Specifies the type of the structure map. <i>physical_structmap, logical_structmap</i>	REQUIRED
ID	XML Identifier	REQUIRED

## The METS div-element: div

Namespace: <http://www.loc.gov/METS/>

### Description:

- 1) In case of a physical structMap the div-elements should be used to create correlations to the single pages of the document.
- 2) In a logical structure map the div elements are used to build the hierarchical structure of the document. The types 'content section' and 'content unit' are used to create the structure tree nodes, where content sections are used to group together content units and can contain further content sections. Content units can contain other content units or 'content items', which are the leaves of the structure tree and are used for the physical representation. Content item values are taken from the list provided above.

Repeatable: yes

Content/childs: [div](#), [fptr](#)

### Attributes:

ID	XML Identifier	REQUIRED
DMDID	XML IdRef to the descriptive metadata section, see <a href="#">dmdSec</a>	OPTIONAL
ADMID	Id reference to administrative metadata section, see <a href="#">amdSec</a>	OPTIONAL
LABEL	can contain the title of a content section or a content unit	OPTIONAL
TYPE	In case of a physical structMap it can contain the page type, so far 3 types are foreseen, but that list can be extended:  <b>titlepage, contentpage, lastpage</b>  in case of a logical structMap it contains the logical type:  <b>content section, content unit, or one of the content</b>	REQUIRED

	item types	
ORDER	Is used on top of the hierarchical order to represent the reading order	REQUIRED
ORDERLABEL	Is used in the physical structure map to represent the pagination	OPTIONAL

### The METS fptr-Element: fptr

**Namespace:** <http://www.loc.gov/METS/>

**Description:** The fptr-element contains different possibilities to create physical references to the actual div-element/structural element

**Repeatable:** yes, where every new repeat equates to one derivative.

**Content/childs:** [area](#), [seq](#)

### The METS seq-Element: seq

**Namespace:** <http://www.loc.gov/METS/>

**Description:** The seq-element can be used to group two or more physical representations for one content item.

**Repeatable:** no

**Content/childs:** area

### The METS area-Element: area

**Namespace:** <http://www.loc.gov/METS/>

**Description:** Finally the area-element is used to reference a certain area onto one page.

**Repeatable:** only when wrapped by a seq-Element

**Content/childs:** none

**Attributes:**

FILEID	A XML-Identifier referencing a file from the file section	REQUIRED
COORDS	A string with 4 Integer values separated by an empty space, referencing a certain rectangular area in a file by the top left and bottom right vertices	OPTIONAL
CONTENTIDS	A list of Id-references of the content file	OPTIONAL

## ENMAP Examples

These and some other examples and corresponding result packages are downloadable via the Europeana Newspapers homepage. The examples can be viewed with the developed STRUCTIFY tool. The download link of the tool is available via the homepage as well. On the download page a HOWTO guideline helps to open the ENMAP examples and ENMAP deliveries from UIBK as well as from CCS produced during this project.

### *ENMAP Example Simple:*

Example Issue: LFT\_00006\_BZZ\_19150201

```
<?xml version="1.0" encoding="UTF-8"?>
<METS:mets TYPE="Newspaper" PROFILE="ENMAP" OBJID="LFT_00006_BZZ_19150201"
  xsi:schemaLocation="http://www.loc.gov/METS/ http://www.loc.gov/standards/mets/version191/mets.xsd
  http://www.loc.gov/mods/v3 http://www.loc.gov/standards/mods/mods.xsd http://www.loc.gov/mix/v20
  http://www.loc.gov/standards/mix/mix20/mix20.xsd"
  xmlns:METS="http://www.loc.gov/METS/" xmlns:mix="http://www.loc.gov/mix/v20"
  xmlns:mods="http://www.loc.gov/mods/v3" xmlns:xlink="http://www.w3.org/1999/xlink"
  xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xmlns:mets="http://www.loc.gov/METS/">
  <mets:metsHdr CREATEDATE="2013-03-11T11:16:17" LASTMODDATE="2013-03-11T11:16:17"
  RECORDSTATUS="SUBMITTED">
    <mets:agent ROLE="OTHER" OTHERROLE="OWNER">
      <mets:name>LFT</mets:name>
    </mets:agent>
    <mets:agent ROLE="CREATOR" TYPE="ORGANIZATION">
      <mets:name>UIBK</mets:name>
    </mets:agent>
    <mets:agent ROLE="CREATOR" TYPE="OTHER" OTHERTYPE="SOFTWARE">
      <mets:name>DEA METS Engine</mets:name>
    </mets:agent>
  </mets:metsHdr>
  <mets:dmdSec ID="MODS_ISSUE_BZZ_19150201">
    <mets:mdWrap MDTYPE="MODS">
      <mets:xmlData>
        <mods:mods>
          <mods:titleInfo>
```

```
<mods:title>Bozner Zeitung</mods:title>
</mods:titleInfo>
<mods:typeOfResource>text</mods:typeOfResource>
<mods:genre>Newspaper Issue</mods:genre>
<mods:originInfo>
  <mods:dateIssued encoding="w3cdtf" keyDate="yes">1915-02-01</mods:dateIssued>
</mods:originInfo>
<mods:language>
  <mods:languageTerm type="code" authority="iso639-2b">ger</mods:languageTerm>
  <mods:scriptTerm type="code" authority="iso15924">Goth</mods:scriptTerm>
</mods:language>
<mods:identifier type="ENP">LFT_00006</mods:identifier>
<mods:identifier type="CatalogueIdentifier">486622</mods:identifier>
<mods:accessCondition type="Europeana viewer">2 - Snippet view</mods:accessCondition>
<mods:recordInfo>
  <mods:recordContentSource>LFT</mods:recordContentSource>
</mods:recordInfo>
</mods:mods>
</mets:xmlData>
</mets:mdWrap>
</mets:dmdSec>
<mets:amdSec ID="TECH_MD">
  <mets:techMD ID="FID-1915_02_0001-OCRMMASTER-TECHMD">
    <mets:mdWrap MDTYPE="NISOIMG">
      <mets:xmlData>
        <mix:mix>
          <mix:BasicDigitalObjectInformation>
            <mix:Compression>
              <mix:compressionScheme>COMPRESSION_CCITTFAX4</mix:compressionScheme>
            </mix:Compression>
          </mix:BasicDigitalObjectInformation>
          <mix:BasicImageInformation>
            <mix:BasicImageCharacteristics>
              <mix:imageWidth>3436</mix:imageWidth>
              <mix:imageHeight>4835</mix:imageHeight>
            </mix:BasicImageCharacteristics>
          </mix:BasicImageInformation>
        </mix:mix>
      </mets:xmlData>
    </mets:mdWrap>
  </mets:techMD>
</mets:amdSec>
```

```

<mix:ImageAssessmentMetadata>
  <mix:SpatialMetrics>
    <mix:samplingFrequencyPlane>object plane</mix:samplingFrequencyPlane>
    <mix:samplingFrequencyUnit>in.</mix:samplingFrequencyUnit>
    <mix:xSamplingFrequency>
      <mix:numerator>300</mix:numerator>
      <mix:denominator>1</mix:denominator>
    </mix:xSamplingFrequency>
    <mix:ySamplingFrequency>
      <mix:numerator>300</mix:numerator>
      <mix:denominator>1</mix:denominator>
    </mix:ySamplingFrequency>
  </mix:SpatialMetrics>
  <mix:ImageColorEncoding>
    <mix:BitsPerSample>
      <mix:bitsPerSampleValue>1</mix:bitsPerSampleValue>
      <mix:bitsPerSampleUnit>integer</mix:bitsPerSampleUnit>
    </mix:BitsPerSample>
    <mix:samplesPerPixel>1</mix:samplesPerPixel>
  </mix:ImageColorEncoding>
</mix:ImageAssessmentMetadata>
</mix:mix>
</mets:xmlData>
</mets:mdWrap>
</mets:techMD>
<mets:techMD ID="FID-1915_02_0002-OCRMMASTER-TECHMD">
  <mets:mdWrap MDTYPE="NISOIMG">
    <mets:xmlData>
      <mix:mix>
        <mix:BasicDigitalObjectInformation>
          <mix:Compression>
            <mix:compressionScheme>COMPRESSION_CCITTFAX4</mix:compressionScheme>
          </mix:Compression>
        </mix:BasicDigitalObjectInformation>
        <mix:BasicImageInformation>
          <mix:BasicImageCharacteristics>
            <mix:imageWidth>3198</mix:imageWidth>
  
```

```

    <mix:imageHeight>4693</mix:imageHeight>
  </mix:BasicImageCharacteristics>
</mix:BasicImageInformation>
<mix:ImageAssessmentMetadata>
  <mix:SpatialMetrics>
    <mix:samplingFrequencyPlane>object plane</mix:samplingFrequencyPlane>
    <mix:samplingFrequencyUnit>in.</mix:samplingFrequencyUnit>
    <mix:xSamplingFrequency>
      <mix:numerator>300</mix:numerator>
      <mix:denominator>1</mix:denominator>
    </mix:xSamplingFrequency>
    <mix:ySamplingFrequency>
      <mix:numerator>300</mix:numerator>
      <mix:denominator>1</mix:denominator>
    </mix:ySamplingFrequency>
  </mix:SpatialMetrics>
  <mix:ImageColorEncoding>
    <mix:BitsPerSample>
      <mix:bitsPerSampleValue>1</mix:bitsPerSampleValue>
      <mix:bitsPerSampleUnit>integer</mix:bitsPerSampleUnit>
    </mix:BitsPerSample>
    <mix:samplesPerPixel>1</mix:samplesPerPixel>
  </mix:ImageColorEncoding>
</mix:ImageAssessmentMetadata>
</mix:mix>
</mets:xmlData>
</mets:mdWrap>
</mets:techMD>

...

</mets:amdSec>
<mets:fileSec>
  <mets:fileGrp ID="ImageGroup">
    <mets:fileGrp ID="OCRMasterFiles" USE="Preservation">
      <mets:file ID="FID-1915_02_0001-OCRMMASTER" ADMID="FID-1915_02_0001-OCRMMASTER-
TECHMD" MIMETYPE="image/tiff" SEQ="1" CHECKSUMTYPE="MD5" CHECKSUM="2F-0F-DD-DE-
E6-EB-4F-6B-9A-A4-08-30-E8-97-BE-A6">
        <mets:FLocat LOCTYPE="URL" xlink:href="file:///./OCRMaster/1915_02_0001.tif"/>

```

```
</mets:file>
<mets:file ID="FID-1915_02_0002-OCRMMASTER" ADMID="FID-1915_02_0002-OCRMMASTER-
TECHMD" MIMETYPE="image/tiff" SEQ="2" CHECKSUMTYPE="MD5" CHECKSUM="12-1A-C4-68-
3B-48-E3-1C-EF-3E-54-4B-08-1E-66-3D">
  <mets:FLocat LOCTYPE="URL" xlink:href="file:///./OCRmaster/1915_02_0002.tif"/>
</mets:file>
<mets:file ID="FID-1915_02_0003-OCRMMASTER" ADMID="FID-1915_02_0003-OCRMMASTER-
TECHMD" MIMETYPE="image/tiff" SEQ="3" CHECKSUMTYPE="MD5" CHECKSUM="B0-82-E2-8A-
28-E6-69-17-72-4C-25-81-69-92-4C-B0">
  <mets:FLocat LOCTYPE="URL" xlink:href="file:///./OCRmaster/1915_02_0003.tif"/>
</mets:file>
<mets:file ID="FID-1915_02_0004-OCRMMASTER" ADMID="FID-1915_02_0004-OCRMMASTER-
TECHMD" MIMETYPE="image/tiff" SEQ="4" CHECKSUMTYPE="MD5" CHECKSUM="10-88-E4-B8-18-
47-FA-EF-16-33-62-53-C6-34-36-6A">
  <mets:FLocat LOCTYPE="URL" xlink:href="file:///./OCRmaster/1915_02_0004.tif"/>
</mets:file>
<mets:file ID="FID-1915_02_0005-OCRMMASTER" ADMID="FID-1915_02_0005-OCRMMASTER-
TECHMD" MIMETYPE="image/tiff" SEQ="5" CHECKSUMTYPE="MD5" CHECKSUM="A6-EF-85-EF-
C2-4E-64-B5-C8-39-04-E0-6D-F3-F7-02">
  <mets:FLocat LOCTYPE="URL" xlink:href="file:///./OCRmaster/1915_02_0005.tif"/>
</mets:file>
<mets:file ID="FID-1915_02_0006-OCRMMASTER" ADMID="FID-1915_02_0006-OCRMMASTER-
TECHMD" MIMETYPE="image/tiff" SEQ="6" CHECKSUMTYPE="MD5" CHECKSUM="2A-88-BF-28-
E5-88-4A-AE-32-DA-42-E9-FB-31-A0-77">
  <mets:FLocat LOCTYPE="URL" xlink:href="file:///./OCRmaster/1915_02_0006.tif"/>
</mets:file>
<mets:file ID="FID-1915_02_0007-OCRMMASTER" ADMID="FID-1915_02_0007-OCRMMASTER-
TECHMD" MIMETYPE="image/tiff" SEQ="7" CHECKSUMTYPE="MD5" CHECKSUM="45-D4-47-BE-
69-6C-DB-80-3F-83-92-6F-54-2A-7D-3F">
  <mets:FLocat LOCTYPE="URL" xlink:href="file:///./OCRmaster/1915_02_0007.tif"/>
</mets:file>
<mets:file ID="FID-1915_02_0008-OCRMMASTER" ADMID="FID-1915_02_0008-OCRMMASTER-
TECHMD" MIMETYPE="image/tiff" SEQ="8" CHECKSUMTYPE="MD5" CHECKSUM="86-24-EE-52-7E-
E1-68-10-8B-9F-0B-68-13-14-F1-97">
  <mets:FLocat LOCTYPE="URL" xlink:href="file:///./OCRmaster/1915_02_0008.tif"/>
</mets:file>
</mets:fileGrp>
```

```
</mets:fileGrp>
<mets:fileGrp ID="TextGroup">
  <mets:fileGrp ID="ALTOFiles" USE="Content">
    <mets:file ID="FID-1915_02_0001-ALTO" SEQ="1" CHECKSUMTYPE="MD5" CHECKSUM="A1-
64-D9-77-DF-E7-7F-5B-7D-69-BB-15-01-5D-CF-0B">
      <mets:FLocat LOCTYPE="URL" xlink:href="file:///./alto/1915_02_0001.xml"/>
    </mets:file>
    <mets:file ID="FID-1915_02_0002-ALTO" SEQ="2" CHECKSUMTYPE="MD5" CHECKSUM="E8-10-
7A-B7-0C-A6-EC-00-5D-0A-C2-2A-0E-80-27-86">
      <mets:FLocat LOCTYPE="URL" xlink:href="file:///./alto/1915_02_0002.xml"/>
    </mets:file>
    <mets:file ID="FID-1915_02_0003-ALTO" SEQ="3" CHECKSUMTYPE="MD5" CHECKSUM="06-4C-
C8-AC-C5-CB-02-0C-A9-1B-CC-D0-92-EE-53-FC">
      <mets:FLocat LOCTYPE="URL" xlink:href="file:///./alto/1915_02_0003.xml"/>
    </mets:file>
    <mets:file ID="FID-1915_02_0004-ALTO" SEQ="4" CHECKSUMTYPE="MD5" CHECKSUM="09-39-
F9-DF-8B-61-7C-48-76-33-3C-16-D6-82-FC-1B">
      <mets:FLocat LOCTYPE="URL" xlink:href="file:///./alto/1915_02_0004.xml"/>
    </mets:file>
    <mets:file ID="FID-1915_02_0005-ALTO" SEQ="5" CHECKSUMTYPE="MD5" CHECKSUM="43-18-
81-80-C6-EC-52-00-CA-DD-5A-59-6D-61-BD-CC">
      <mets:FLocat LOCTYPE="URL" xlink:href="file:///./alto/1915_02_0005.xml"/>
    </mets:file>
    <mets:file ID="FID-1915_02_0006-ALTO" SEQ="6" CHECKSUMTYPE="MD5" CHECKSUM="A9-
73-84-AA-B2-30-E6-6D-F4-A6-18-4C-E4-71-9D-FD">
      <mets:FLocat LOCTYPE="URL" xlink:href="file:///./alto/1915_02_0006.xml"/>
    </mets:file>
    <mets:file ID="FID-1915_02_0007-ALTO" SEQ="7" CHECKSUMTYPE="MD5" CHECKSUM="4F-49-
22-8D-62-E1-89-31-1E-0A-84-54-47-82-55-FE">
      <mets:FLocat LOCTYPE="URL" xlink:href="file:///./alto/1915_02_0007.xml"/>
    </mets:file>
    <mets:file ID="FID-1915_02_0008-ALTO" SEQ="8" CHECKSUMTYPE="MD5" CHECKSUM="18-16-
4E-D0-71-E9-9F-BE-10-6E-E0-6A-CB-AC-35-E6">
      <mets:FLocat LOCTYPE="URL" xlink:href="file:///./alto/1915_02_0008.xml"/>
    </mets:file>
  </mets:fileGrp>
</mets:fileGrp>
```

```
</mets:fileSec>
<mets:structMap LABEL="Physical Structure" TYPE="PHYSICAL">
  <mets:div ID="phys0" LABEL="BZZ_19150201" TYPE="physSequence"
DMDID="MODS_ISSUE_BZZ_19150201">
  <mets:div ID="phys1" ORDER="1" ORDERLABEL="1" TYPE="page">
    <mets:fptr FILEID="FID-1915_02_0001-OCRMMASTER"/>
    <mets:fptr FILEID="FID-1915_02_0001-ALTO"/>
  </mets:div>
  <mets:div ID="phys2" ORDER="2" ORDERLABEL="2" TYPE="page">
    <mets:fptr FILEID="FID-1915_02_0002-OCRMMASTER"/>
    <mets:fptr FILEID="FID-1915_02_0002-ALTO"/>
  </mets:div>
  <mets:div ID="phys3" ORDER="3" ORDERLABEL="3" TYPE="page">
    <mets:fptr FILEID="FID-1915_02_0003-OCRMMASTER"/>
    <mets:fptr FILEID="FID-1915_02_0003-ALTO"/>
  </mets:div>
  <mets:div ID="phys4" ORDER="4" ORDERLABEL="4" TYPE="page">
    <mets:fptr FILEID="FID-1915_02_0004-OCRMMASTER"/>
    <mets:fptr FILEID="FID-1915_02_0004-ALTO"/>
  </mets:div>
  <mets:div ID="phys5" ORDER="5" ORDERLABEL="5" TYPE="page">
    <mets:fptr FILEID="FID-1915_02_0005-OCRMMASTER"/>
    <mets:fptr FILEID="FID-1915_02_0005-ALTO"/>
  </mets:div>
  <mets:div ID="phys6" ORDER="6" ORDERLABEL="6" TYPE="page">
    <mets:fptr FILEID="FID-1915_02_0006-OCRMMASTER"/>
    <mets:fptr FILEID="FID-1915_02_0006-ALTO"/>
  </mets:div>
  <mets:div ID="phys7" ORDER="7" ORDERLABEL="7" TYPE="page">
    <mets:fptr FILEID="FID-1915_02_0007-OCRMMASTER"/>
    <mets:fptr FILEID="FID-1915_02_0007-ALTO"/>
  </mets:div>
  <mets:div ID="phys8" ORDER="8" ORDERLABEL="8" TYPE="page">
    <mets:fptr FILEID="FID-1915_02_0008-OCRMMASTER"/>
    <mets:fptr FILEID="FID-1915_02_0008-ALTO"/>
  </mets:div>
</mets:div>
```



</mets:structMap>

</METS:mets>

### ENMAP Example with structure:

Example issue: LFT\_00010\_LZ\_19450331

```
<?xml version="1.0" encoding="UTF-8"?>
<METS:mets OBJID="#OBJID#" PROFILE="ENMAP" TYPE="unknown"
xmlns:METS="http://www.loc.gov/METS/" xmlns:mets="http://www.loc.gov/METS/"
xmlns:mix="http://www.loc.gov/mix/v20"
xmlns:mods="http://www.loc.gov/mods/v3" xmlns:xlink="http://www.w3.org/1999/xlink"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
xsi:schemaLocation="http://www.loc.gov/METS/ http://www.loc.gov/standards/mets/version191/mets.xsd
http://www.loc.gov/mods/v3 http://www.loc.gov/standards/mods/mods.xsd http://www.loc.gov/mix/v20
http://www.loc.gov/standards/mix/mix20/mix20.xsd">
  <mets:metsHdr CREATEDATE="2014-02-18T12:28:21" LASTMODDATE="2014-02-18T12:28:21"
RECORDSTATUS="SUBMITTED">
    <mets:agent ROLE="CREATOR" TYPE="ORGANIZATION">
      <mets:name>UIBK</mets:name>
    </mets:agent>
    <mets:agent ROLE="CREATOR" TYPE="OTHER">
      <mets:name>run</mets:name>
    </mets:agent>
  </mets:metsHdr>
  <mets:dmdSec ID="MODS_1">
    <mets:mdWrap MDTYPE="MODS">
      <mets:xmlData>
        <mods:mods>
          <mods:titleInfo>
            <mods:title>Lienzer Zeitung</mods:title>
          </mods:titleInfo>
          <mods:identifier>LFT_00010 / 569145</mods:identifier>
          <mods:originInfo>
            <mods:dateIssued>1945-03-31</mods:dateIssued>
          </mods:originInfo>
          <mods:language>
```

```
<mods:languageTerm>ger</mods:languageTerm>
</mods:language>
</mods:mods>
</mets:xmlData>
</mets:mdWrap>
</mets:dmdSec>
<mets:dmdSec ID="DMD_LS41">
  <mets:mdWrap MDTYPE="MODS">
    <mets:xmlData>
      <mods:mods>
        <mods:subject>
          <mods:topic>serial novel</mods:topic>
        </mods:subject>
        <mods:name>
          <mods:namePart>Rudolf Eichthal</mods:namePart>
          <mods:role>
            <mods:roleTerm>creator</mods:roleTerm>
          </mods:role>
        </mods:name>
        <mods:originInfo>
          <mods:place>
            <mods:placeTerm>Salzburg</mods:placeTerm>
          </mods:place>
        </mods:originInfo>
        <mods:language>
          <mods:languageTerm>ger</mods:languageTerm>
        </mods:language>
      </mods:mods>
    </mets:xmlData>
  </mets:mdWrap>
</mets:dmdSec>
<mets:dmdSec ID="DMD_LS46">
  <mets:mdWrap MDTYPE="MODS">
    <mets:xmlData>
      <mods:mods>
        <mods:subject>
          <mods:topic>verbatim reports</mods:topic>
```

*This metadata section belongs to the content unit with DMDID=MD\_LS41 in the logical structmap and was enriched with several MODS elements.*

```
</mods:subject>
<mods:name>
  <mods:namePart>Dr. med. Kurt Oxenius</mods:namePart>
  <mods:role>
    <mods:roleTerm>creator</mods:roleTerm>
  </mods:role>
</mods:name>
<mods:language>
  <mods:languageTerm>ger</mods:languageTerm>
</mods:language>
</mods:mods>
</mets:xmlData>
</mets:mdWrap>
</mets:dmdSec>
<mets:dmdSec ID="DMD_LS51">
  <mets:mdWrap MDTYPE="MODS">
    <mets:xmlData>
      <mods:mods>
        <mods:subject>
          <mods:topic>poems</mods:topic>
        </mods:subject>
        <mods:name>
          <mods:namePart>Sepp Raneburger</mods:namePart>
          <mods:role>
            <mods:roleTerm>creator</mods:roleTerm>
          </mods:role>
        </mods:name>
        <mods:language>
          <mods:languageTerm>ger</mods:languageTerm>
        </mods:language>
      </mods:mods>
    </mets:xmlData>
  </mets:mdWrap>
</mets:dmdSec>
<mets:dmdSec ID="DMD_LS62">
  <mets:mdWrap MDTYPE="MODS">
    <mets:xmlData>
```

```
<mods:mods>
  <mods:subject>
    <mods:topic>advertisement</mods:topic>
  </mods:subject>
</mods:mods>
</mets:xmlData>
</mets:mdWrap>
</mets:dmdSec>
<mets:dmdSec ID="DMD_LS66">
  <mets:mdWrap MDTYPE="MODS">
    <mets:xmlData>
      <mods:mods>
        <mods:subject>
          <mods:topic>verbatim reports</mods:topic>
        </mods:subject>
      </mods:mods>
    </mets:xmlData>
  </mets:mdWrap>
</mets:dmdSec>
<mets:fileSec>
  <mets:fileGrp ID="TextGroup">
    <mets:fileGrp ID="OCRMasterFiles" USE="Preservation">
      <mets:file ID="FID-00000001-OCRMMASTER" SEQ="1">
        <mets:FLocat LOCTYPE="URL" xlink:href="file:///OCRmaster/LZ_19450331_26_01.JPG"/>
      </mets:file>
      <mets:file ID="FID-00000002-OCRMMASTER" SEQ="2">
        <mets:FLocat LOCTYPE="URL" xlink:href="file:///OCRmaster/LZ_19450331_26_02.JPG"/>
      </mets:file>
      <mets:file ID="FID-00000003-OCRMMASTER" SEQ="3">
        <mets:FLocat LOCTYPE="URL" xlink:href="file:///OCRmaster/LZ_19450331_26_03.JPG"/>
      </mets:file>
      <mets:file ID="FID-00000004-OCRMMASTER" SEQ="4">
        <mets:FLocat LOCTYPE="URL" xlink:href="file:///OCRmaster/LZ_19450331_26_04.JPG"/>
      </mets:file>
    </mets:fileGrp>
  </mets:fileGrp>
</mets:fileGrp>
```

```
<mets:fileGrp ID="ALTOFiles" USE="Content">
  <mets:file ID="FID-00000001-ALTO" SEQ="1">
    <mets:FLocat LOCTYPE="URL" xlink:href="file:///./alto/LZ_19450331_26_01.xml"/>
  </mets:file>
  <mets:file ID="FID-00000002-ALTO" SEQ="2">
    <mets:FLocat LOCTYPE="URL" xlink:href="file:///./alto/LZ_19450331_26_02.xml"/>
  </mets:file>
  <mets:file ID="FID-00000003-ALTO" SEQ="3">
    <mets:FLocat LOCTYPE="URL" xlink:href="file:///./alto/LZ_19450331_26_03.xml"/>
  </mets:file>
  <mets:file ID="FID-00000004-ALTO" SEQ="4">
    <mets:FLocat LOCTYPE="URL" xlink:href="file:///./alto/LZ_19450331_26_04.xml"/>
  </mets:file>
</mets:fileGrp>
</mets:fileGrp>
</mets:fileSec>
<mets:structMap LABEL="Physical Structure" TYPE="PHYSICAL">
  <mets:div DMDID="MODS_1" ID="phys1" ORDER="1" TYPE="physSequence">
    <mets:div ID="phys2" ORDER="1" ORDERLABEL="1" TYPE="page">
      <mets:fptr FILEID="FID-00000001-OCRMMASTER"/>
      <mets:fptr FILEID="FID-00000001-ALTO"/>
    </mets:div>
    <mets:div ID="phys3" ORDER="2" ORDERLABEL="2" TYPE="page">
      <mets:fptr FILEID="FID-00000002-OCRMMASTER"/>
      <mets:fptr FILEID="FID-00000002-ALTO"/>
    </mets:div>
    <mets:div ID="phys4" ORDER="3" ORDERLABEL="3" TYPE="page">
      <mets:fptr FILEID="FID-00000003-OCRMMASTER"/>
      <mets:fptr FILEID="FID-00000003-ALTO"/>
    </mets:div>
    <mets:div ID="phys5" ORDER="4" ORDERLABEL="4" TYPE="page">
      <mets:fptr FILEID="FID-00000004-OCRMMASTER"/>
      <mets:fptr FILEID="FID-00000004-ALTO"/>
    </mets:div>
  </mets:div>
</mets:structMap>
<mets:structMap ID="logical_structmap_1" TYPE="logical_structmap">
```

```
<mets:div DMDID="MODS_1" ID="LS1" LABEL="Lienzer Zeitung" ORDER="1" TYPE="Issue">
  <mets:div ID="LS2" ORDER="1" TYPE="content_unit">
    <mets:div ID="LS3" ORDER="1" TYPE="heading">
      <mets:fptr>
        <mets:area COORDS="238 64 2462 176" FILEID="FID-00000002-OCRMAS-
        TER"/>
      </mets:fptr>
      <mets:fptr>
        <mets:area COORDS="238 64 2462 176" FILEID="FID-00000002-ALTO"/>
      </mets:fptr>
    </mets:div>
    <mets:div ID="LS32" ORDER="3" TYPE="content_unit">
      <mets:div ID="LS33" ORDER="1" TYPE="text">
        <mets:fptr>
          <mets:area COORDS="2616 64 3432 2398" FILEID="FID-
          00000002-OCRMAS-
          TER"/>
        </mets:fptr>
        <mets:fptr>
          <mets:area COORDS="2616 64 3432 2398" FILEID="FID-
          00000002-ALTO"/>
        </mets:fptr>
      </mets:div>
    </mets:div>
    <mets:div DMDID="DMD_LS41" ID="LS41" LABEL="Das Wundermädchen von Südtirol" ORDER="6"
    TYPE="content_unit">
      <mets:div ID="LS42" ORDER="1" TYPE="heading">
        <mets:fptr>
          <mets:area COORDS="47 3442 869 3565" FILEID="FID-00000002-OCRMAS-
          TER"/>
        </mets:fptr>
        <mets:fptr>
          <mets:area COORDS="47 3442 869 3565" FILEID="FID-00000002-ALTO"/>
        </mets:fptr>
      </mets:div>
      <mets:div ID="LS43" ORDER="2" TYPE="copyright_note">
        <mets:fptr>
          <mets:area COORDS="47 3585 869 3664" FILEID="FID-00000002-OCRMAS-
          TER"/>
        </mets:fptr>
      </mets:div>
```

DMD\_LS41 is the reference to the dmdSec. This content unit is composed of heading, copyright note and several text blocks. These are some of the possible content item types defined before.

```
<mets:area COORDS="47 3585 869 3664" FILEID="FID-00000002-ALTO"/>
</mets:fptr>
</mets:div>
<mets:div DMDID="DMD_LS46" ID="LS46" LABEL="Muss das Neugeborene hungern?" ORDER="7"
TYPE="content_unit">
<mets:div ID="LS47" ORDER="1" TYPE="heading">
<mets:fptr>
<mets:area COORDS="1184 3908 2283 4028" FILEID="FID-00000003-OCRMAS-
TER"/>
</mets:fptr>
<mets:fptr>
<mets:area COORDS="1184 3908 2283 4028" FILEID="FID-00000003-ALTO"/>
</mets:fptr>
</mets:div>
<mets:div DMDID="DMD_LS62" ID="LS62" ORDER="11" TYPE="content_unit">
<mets:div ID="LS63" ORDER="1" TYPE="text">
<mets:fptr>
<mets:area COORDS="27 4628 592 5266" FILEID="FID-00000004-OCRMAS-
TER"/>
</mets:fptr>
<mets:fptr>
<mets:area COORDS="27 4628 592 5266" FILEID="FID-00000004-ALTO"/>
</mets:fptr>
</mets:div>
<mets:div ID="LS64" ORDER="2" TYPE="text">
<mets:fptr>
<mets:area COORDS="602 3996 2298 5264" FILEID="FID-00000004-OCRMAS-
TER"/>
</mets:fptr>
<mets:fptr>
<mets:area COORDS="602 3996 2298 5264" FILEID="FID-00000004-ALTO"/>
</mets:fptr>
</mets:div>
<mets:div ID="LS65" ORDER="3" TYPE="text">
<mets:fptr>
<mets:area COORDS="2309 2791 3446 5267" FILEID="FID-00000004-OCRMAS-
TER"/>
</mets:fptr>
<mets:fptr>
<mets:area COORDS="2309 2791 3446 5267" FILEID="FID-00000004-ALTO"/>
</mets:fptr>
```



```
</mets:div>
</mets:div>
<mets:div DMDID="DMD_LS66" ID="LS66" ORDER="12" TYPE="content_unit">
  <mets:div ID="LS67" ORDER="1" TYPE="text">
    <mets:fptr>
      <mets:area COORDS="612 2795 2304 3972" FILEID="FID-00000004-OCRMASER"/>
    </mets:fptr>
    <mets:fptr>
      <mets:area COORDS="612 2795 2304 3972" FILEID="FID-00000004-ALTO"/>
    </mets:fptr>
  </mets:div>
</mets:div>
</mets:div>
</mets:div>
</mets:structMap>
</METS:mets>
```

Example Issue: ONB\_00004\_18700520

```
<?xml version="1.0" encoding="UTF-8"?>
<METS:mets OBJID="#OBJID#" PROFILE="ENMAP" TYPE="unknown"
  xmlns:METS="http://www.loc.gov/METS/"
  xmlns:mets="http://www.loc.gov/METS/"
  xmlns:mix="http://www.loc.gov/mix/v20"
  xmlns:mods="http://www.loc.gov/mods/v3"
  xmlns:xlink="http://www.w3.org/1999/xlink"
  xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance"
  xsi:schemaLocation="http://www.loc.gov/METS/ http://www.loc.gov/standards/mets/version191/mets.xsd
  http://www.loc.gov/mods/v3 http://www.loc.gov/standards/mods/mods.xsd http://www.loc.gov/mix/v20
  http://www.loc.gov/standards/mix/mix20/mix20.xsd">
  <mets:metsHdr CREATEDATE="2014-02-18T12:28:21"
    LASTMODDATE="2014-02-18T12:28:21" RECORDSTATUS="SUBMITTED">
    <mets:agent ROLE="CREATOR" TYPE="ORGANIZATION">
      <mets:name>UIBK</mets:name>
    </mets:agent>
    <mets:agent ROLE="CREATOR" TYPE="OTHER">
      <mets:name>run</mets:name>
    </mets:agent>
  </mets:metsHdr>
```

```
<mets:dmdSec ID="MODS_1">
  <mets:mdWrap MDTYPE="MODS">
    <mets:xmlData>
      <mods:mods>
        <mods:titleInfo>
          <mods:title>Innsbrucker Nachrichten</mods:title>
        </mods:titleInfo>
        <mods:subject>
          <mods:topic>news</mods:topic>
        </mods:subject>
        <mods:originInfo>
          <mods:dateIssued>1870-05-20</mods:dateIssued>
        </mods:originInfo>
      </mods:mods>
    </mets:xmlData>
  </mets:mdWrap>
</mets:dmdSec>
<mets:dmdSec ID="DMD_LS2">
  <mets:mdWrap MDTYPE="MODS">
    <mets:xmlData>
      <mods:mods>
        <mods:subject>
          <mods:topic>news</mods:topic>
        </mods:subject>
      </mods:mods>
    </mets:xmlData>
  </mets:mdWrap>
</mets:dmdSec>
<mets:dmdSec ID="DMD_LS15">
  <mets:mdWrap MDTYPE="MODS">
    <mets:xmlData>
      <mods:mods>
        <mods:subject>
          <mods:topic>classified advertisement</mods:topic>
        </mods:subject>
      </mods:mods>
    </mets:xmlData>
```

```
</mets:mdWrap>
</mets:dmdSec>
<mets:dmdSec ID="DMD_LS19">
  <mets:mdWrap MDTYPE="MODS">
    <mets:xmlData>
      <mods:mods>
        <mods:subject>
          <mods:topic>obituaries</mods:topic>
        </mods:subject>
      </mods:mods>
    </mets:xmlData>
  </mets:mdWrap>
</mets:dmdSec>
<mets:dmdSec ID="DMD_LS33">
  <mets:mdWrap MDTYPE="MODS">
    <mets:xmlData>
      <mods:mods>
        <mods:subject>
          <mods:topic>stock exchange</mods:topic>
        </mods:subject>
      </mods:mods>
    </mets:xmlData>
  </mets:mdWrap>
</mets:dmdSec>
<mets:dmdSec ID="DMD_LS36">
  <mets:mdWrap MDTYPE="MODS">
    <mets:xmlData>
      <mods:mods>
        <mods:subject>
          <mods:topic>imprint</mods:topic>
        </mods:subject>
      </mods:mods>
    </mets:xmlData>
  </mets:mdWrap>
</mets:dmdSec>
<mets:fileSec>
  <mets:fileGrp ID="TextGroup">
```

```
<mets:fileGrp ID="OCRMasterFiles" USE="Preservation">
  <mets:file ID="FID-00000001-OCRMMASTER" SEQ="1">
    <mets:FLocat LOCTYPE="URL" xlink:href="file:///./OCRMaster/00000001.tif"/>
  </mets:file>
  <mets:file ID="FID-00000002-OCRMMASTER" SEQ="2">
    <mets:FLocat LOCTYPE="URL" xlink:href="file:///./OCRMaster/00000002.tif"/>
  </mets:file>
  <mets:file ID="FID-00000003-OCRMMASTER" SEQ="3">
    <mets:FLocat LOCTYPE="URL" xlink:href="file:///./OCRMaster/00000003.tif"/>
  </mets:file>
  <mets:file ID="FID-00000004-OCRMMASTER" SEQ="4">
    <mets:FLocat LOCTYPE="URL" xlink:href="file:///./OCRMaster/00000004.tif"/>
  </mets:file>
  <mets:file ID="FID-00000005-OCRMMASTER" SEQ="5">
    <mets:FLocat LOCTYPE="URL" xlink:href="file:///./OCRMaster/00000005.tif"/>
  </mets:file>
  <mets:file ID="FID-00000006-OCRMMASTER" SEQ="6">
    <mets:FLocat LOCTYPE="URL" xlink:href="file:///./OCRMaster/00000006.tif"/>
  </mets:file>
  <mets:file ID="FID-00000007-OCRMMASTER" SEQ="7">
    <mets:FLocat LOCTYPE="URL" xlink:href="file:///./OCRMaster/00000007.tif"/>
  </mets:file>
  <mets:file ID="FID-00000008-OCRMMASTER" SEQ="8">
    <mets:FLocat LOCTYPE="URL" xlink:href="file:///./OCRMaster/00000008.tif"/>
  </mets:file>
</mets:fileGrp>
</mets:fileGrp>
<mets:fileGrp>
  <mets:fileGrp ID="ALTOFiles" USE="Content">
    <mets:file ID="FID-00000001-ALTO" SEQ="1">
      <mets:FLocat LOCTYPE="URL" xlink:href="file:///./alto/00000001.xml"/>
    </mets:file>
    <mets:file ID="FID-00000002-ALTO" SEQ="2">
      <mets:FLocat LOCTYPE="URL" xlink:href="file:///./alto/00000002.xml"/>
    </mets:file>
    <mets:file ID="FID-00000003-ALTO" SEQ="3">
      <mets:FLocat LOCTYPE="URL" xlink:href="file:///./alto/00000003.xml"/>
    </mets:file>
  </mets:fileGrp>
</mets:fileGrp>
```

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</mets:file>
<mets:file ID="FID-00000004-ALTO" SEQ="4">
  <mets:FLocat LOCTYPE="URL" xlink:href="file:///./alto/00000004.xml"/>
</mets:file>
<mets:file ID="FID-00000005-ALTO" SEQ="5">
  <mets:FLocat LOCTYPE="URL" xlink:href="file:///./alto/00000005.xml"/>
</mets:file>
<mets:file ID="FID-00000006-ALTO" SEQ="6">
  <mets:FLocat LOCTYPE="URL" xlink:href="file:///./alto/00000006.xml"/>
</mets:file>
<mets:file ID="FID-00000007-ALTO" SEQ="7">
  <mets:FLocat LOCTYPE="URL" xlink:href="file:///./alto/00000007.xml"/>
</mets:file>
<mets:file ID="FID-00000008-ALTO" SEQ="8">
  <mets:FLocat LOCTYPE="URL" xlink:href="file:///./alto/00000008.xml"/>
</mets:file>
</mets:fileGrp>
</mets:fileGrp>
</mets:fileSec>
<mets:structMap LABEL="Physical Structure" TYPE="PHYSICAL">
  <mets:div DMDID="MODS_1" ID="phys1" ORDER="1" TYPE="physSequence">
    <mets:div ID="phys2" ORDER="1" ORDERLABEL="1" TYPE="page">
      <mets:fptr FILEID="FID-00000001-OCRMMASTER"/>
      <mets:fptr FILEID="FID-00000001-ALTO"/>
    </mets:div>
    <mets:div ID="phys3" ORDER="2" ORDERLABEL="2" TYPE="page">
      <mets:fptr FILEID="FID-00000002-OCRMMASTER"/>
      <mets:fptr FILEID="FID-00000002-ALTO"/>
    </mets:div>
    <mets:div ID="phys4" ORDER="3" ORDERLABEL="3" TYPE="page">
      <mets:fptr FILEID="FID-00000003-OCRMMASTER"/>
      <mets:fptr FILEID="FID-00000003-ALTO"/>
    </mets:div>
    <mets:div ID="phys5" ORDER="4" ORDERLABEL="4" TYPE="page">
      <mets:fptr FILEID="FID-00000004-OCRMMASTER"/>
      <mets:fptr FILEID="FID-00000004-ALTO"/>
    </mets:div>
  </mets:div>
</mets:structMap>
```

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<mets:div ID="phys6" ORDER="5" ORDERLABEL="5" TYPE="page">
  <mets:fptr FILEID="FID-00000005-OCRMMASTER"/>
  <mets:fptr FILEID="FID-00000005-ALTO"/>
</mets:div>
<mets:div ID="phys7" ORDER="6" ORDERLABEL="6" TYPE="page">
  <mets:fptr FILEID="FID-00000006-OCRMMASTER"/>
  <mets:fptr FILEID="FID-00000006-ALTO"/>
</mets:div>
<mets:div ID="phys8" ORDER="7" ORDERLABEL="7" TYPE="page">
  <mets:fptr FILEID="FID-00000007-OCRMMASTER"/>
  <mets:fptr FILEID="FID-00000007-ALTO"/>
</mets:div>
<mets:div ID="phys9" ORDER="8" ORDERLABEL="8" TYPE="page">
  <mets:fptr FILEID="FID-00000008-OCRMMASTER"/>
  <mets:fptr FILEID="FID-00000008-ALTO"/>
</mets:div>
</mets:div>
</mets:structMap>
<mets:structMap ID="logical_structmap_1" TYPE="logical_structmap">
  <mets:div DMDID="MODS_1" ID="LS1" LABEL="Zur Tagesgeschichte"
    ORDER="1" TYPE="Issue">
    <mets:div DMDID="DMD_LS2" ID="LS2" LABEL="Zur Tagesgeschichte"
      ORDER="1" TYPE="content_section">
      <mets:div ID="LS3" ORDER="1" TYPE="content_unit">
        <mets:div ID="LS4" ORDER="1" TYPE="heading">
          <mets:fptr>
            <mets:area COORDS="488 1078 1039 1141" FILEID="FID-00000001-OCRMMASTER"/>
          </mets:fptr>
          <mets:fptr>
            <mets:area COORDS="488 1078 1039 1141" FILEID="FID-00000001-ALTO"/>
          </mets:fptr>
        </mets:div>
        <mets:div ID="LS5" ORDER="2" TYPE="text">
          <mets:fptr>
            <mets:area COORDS="72 1143 1442 2227" FILEID="FID-00000001-OCRMMASTER"/>
          </mets:fptr>
          <mets:fptr>

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<mets:area COORDS="72 1143 1442 2227" FILEID="FID-00000001-ALTO"/>
</mets:fptr>
</mets:div>
<mets:div ID="LS6" ORDER="3" TYPE="text">
<mets:fptr>
<mets:area COORDS="154 -4 1515 2176" FILEID="FID-00000002-OCRMAS-
TER"/>
</mets:fptr>
<mets:fptr>
<mets:area COORDS="154 -4 1515 2176" FILEID="FID-00000002-ALTO"/>
</mets:fptr>
</mets:div>
<mets:div ID="LS7" ORDER="4" TYPE="text">
<mets:fptr>
<mets:area COORDS="73 107 1437 2228" FILEID="FID-00000003-OCRMAS-
TER"/>
</mets:fptr>
<mets:fptr>
<mets:area COORDS="73 107 1437 2228" FILEID="FID-00000003-ALTO"/>
</mets:fptr>
</mets:div>
<mets:div ID="LS8" ORDER="5" TYPE="text">
<mets:fptr>
<mets:area COORDS="145 62 1522 1831" FILEID="FID-00000004-OCRMAS-
TER"/>
</mets:fptr>
<mets:fptr>
<mets:area COORDS="145 62 1522 1831" FILEID="FID-00000004-ALTO"/>
</mets:fptr>
</mets:div>
</mets:div>
</mets:div>
<mets:div DMDID="DMD_LS9" ID="LS9"
LABEL="Lokales und Verschiedenes" ORDER="2" TYPE="content_section">
<mets:div ID="LS10" ORDER="1" TYPE="content_unit">
<mets:div ID="LS11" ORDER="1" TYPE="heading">
<mets:fptr>
<mets:area COORDS="473 1844 1214 1905" FILEID="FID-00000004-OCRMAS-
TER"/>
</mets:fptr>
<mets:fptr>
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<mets:area COORDS="473 1844 1214 1905" FILEID="FID-00000004-ALTO"/>
</mets:fptr>
</mets:div>
<mets:div ID="LS12" ORDER="2" TYPE="text">
  <mets:fptr>
    <mets:area COORDS="145 1903 1522 2191" FILEID="FID-00000004-OCRMAS-
  </mets:fptr>
  <mets:fptr>
    <mets:area COORDS="145 1903 1522 2191" FILEID="FID-00000004-ALTO"/>
  </mets:fptr>
</mets:div>
<mets:div ID="LS13" ORDER="3" TYPE="text">
  <mets:fptr>
    <mets:area COORDS="80 73 1462 2194" FILEID="FID-00000005-OCRMAS-
  </mets:fptr>
  <mets:fptr>
    <mets:area COORDS="80 73 1462 2194" FILEID="FID-00000005-ALTO"/>
  </mets:fptr>
</mets:div>
<mets:div ID="LS14" ORDER="4" TYPE="text">
  <mets:fptr>
    <mets:area COORDS="140 85 1510 623" FILEID="FID-00000006-OCRMAS-
  </mets:fptr>
  <mets:fptr>
    <mets:area COORDS="140 85 1510 623" FILEID="FID-00000006-ALTO"/>
  </mets:fptr>
</mets:div>
</mets:div>
</mets:div>
<mets:div DMDID="DMD_LS15" ID="LS15" LABEL="Verlosungen" ORDER="3"
TYPE="content_section">
  <mets:div ID="LS16" ORDER="1" TYPE="content_unit">
    <mets:div ID="LS17" ORDER="1" TYPE="heading">
      <mets:fptr>
        <mets:area COORDS="579 650 1088 702" FILEID="FID-00000006-OCRMAS-
      </mets:fptr>
      <mets:fptr>
```

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<mets:area COORDS="579 650 1088 702" FILEID="FID-00000006-ALTO"/>
</mets:fptr>
</mets:div>
<mets:div ID="LS18" ORDER="2" TYPE="text">
  <mets:fptr>
    <mets:area COORDS="145 701 1511 1208" FILEID="FID-00000006-OCRMMASTER"/>
  </mets:fptr>
  <mets:fptr>
    <mets:area COORDS="145 701 1511 1208" FILEID="FID-00000006-ALTO"/>
  </mets:fptr>
</mets:div>
</mets:div>
</mets:div>
<mets:div DMDID="DMD_LS19" ID="LS19"
  LABEL="Verstorbene in Innsbruck" ORDER="4" TYPE="content_section">
  <mets:div ID="LS20" ORDER="1" TYPE="content_unit">
    <mets:div ID="LS21" ORDER="1" TYPE="heading">
      <mets:fptr>
        <mets:area COORDS="450 1241 1170 1304" FILEID="FID-00000006-OCRMMASTER"/>
      </mets:fptr>
      <mets:fptr>
        <mets:area COORDS="450 1241 1170 1304" FILEID="FID-00000006-ALTO"/>
      </mets:fptr>
    </mets:div>
    <mets:div ID="LS22" ORDER="2" TYPE="text">
      <mets:fptr>
        <mets:area COORDS="146 1307 1505 1552" FILEID="FID-00000006-OCRMMASTER"/>
      </mets:fptr>
      <mets:fptr>
        <mets:area COORDS="146 1307 1505 1552" FILEID="FID-00000006-ALTO"/>
      </mets:fptr>
    </mets:div>
  </mets:div>
</mets:div>
</mets:div>
<mets:div DMDID="DMD_LS23" ID="LS23" ORDER="5" TYPE="content_section">
  <mets:div ID="LS24" ORDER="1" TYPE="content_unit">
    <mets:div ID="LS25" ORDER="1" TYPE="heading">
```

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<mets:fptr>
  <mets:area COORDS="141 1579 1482 1641" FILEID="FID-00000006-OCRMAS-
  TER"/>
</mets:fptr>
<mets:fptr>
  <mets:area COORDS="141 1579 1482 1641" FILEID="FID-00000006-ALTO"/>
</mets:fptr>
</mets:div>
<mets:div ID="LS26" ORDER="2" TYPE="text">
  <mets:fptr>
    <mets:area COORDS="139 1639 1491 1989" FILEID="FID-00000006-OCRMAS-
    TER"/>
  </mets:fptr>
  <mets:fptr>
    <mets:area COORDS="139 1639 1491 1989" FILEID="FID-00000006-ALTO"/>
  </mets:fptr>
</mets:div>
<mets:div ID="LS27" ORDER="3" TYPE="text">
  <mets:fptr>
    <mets:area COORDS="135 2007 1489 2180" FILEID="FID-00000006-OCRMAS-
    TER"/>
  </mets:fptr>
  <mets:fptr>
    <mets:area COORDS="135 2007 1489 2180" FILEID="FID-00000006-ALTO"/>
  </mets:fptr>
</mets:div>
</mets:div>
</mets:div>
<mets:div DMDID="DMD_LS28" ID="LS28" ORDER="6" TYPE="content_section">
  <mets:div ID="LS29" ORDER="1" TYPE="content_unit">
    <mets:div ID="LS30" ORDER="1" TYPE="text">
      <mets:fptr>
        <mets:area COORDS="146 68 1399 2144" FILEID="FID-00000007-OCRMAS-
        TER"/>
      </mets:fptr>
      <mets:fptr>
        <mets:area COORDS="146 68 1399 2144" FILEID="FID-00000007-ALTO"/>
      </mets:fptr>
    </mets:div>
  </mets:div>
</mets:div>
```

```
<mets:div DMDID="DMD_LS31" ID="LS31" ORDER="7" TYPE="content_section">
  <mets:div ID="LS32" ORDER="1" TYPE="text">
    <mets:fptr>
      <mets:area COORDS="142 75 1503 1566" FILEID="FID-00000008-OCRMAS-TER"/>
    </mets:fptr>
    <mets:fptr>
      <mets:area COORDS="142 75 1503 1566" FILEID="FID-00000008-ALTO"/>
    </mets:fptr>
  </mets:div>
</mets:div>
<mets:div DMDID="DMD_LS33" ID="LS33" ORDER="8" TYPE="content_section">
  <mets:div ID="LS34" ORDER="1" TYPE="content_unit">
    <mets:div ID="LS35" ORDER="1" TYPE="heading">
      <mets:fptr>
        <mets:area COORDS="141 1570 1494 2067" FILEID="FID-00000008-OCRMAS-TER"/>
      </mets:fptr>
      <mets:fptr>
        <mets:area COORDS="141 1570 1494 2067" FILEID="FID-00000008-ALTO"/>
      </mets:fptr>
    </mets:div>
  </mets:div>
</mets:div>
<mets:div DMDID="DMD_LS36" ID="LS36" ORDER="9" TYPE="content_unit">
  <mets:div ID="LS37" ORDER="1" TYPE="text">
    <mets:fptr>
      <mets:area COORDS="142 2083 1498 2191" FILEID="FID-00000008-OCRMAS-TER"/>
    </mets:fptr>
    <mets:fptr>
      <mets:area COORDS="142 2083 1498 2191" FILEID="FID-00000008-ALTO"/>
    </mets:fptr>
  </mets:div>
</mets:div>
</mets:div>
</mets:structMap>
</METS:mets>
```