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# Release note of the XML Journal Article Input DTD 5.0

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## 1 Introduction

In this document we describe the new Elsevier XML Journal Article DTD 5.0 which will replace the existing SGML Full-Length Article DTD 4.3. Since the “Full-Length Article” DTD was and is used to structure more than just full-length articles, we now call it the “Journal Article DTD”.

5.0.1

Changes with respect to version 2.2 of this document are indicated with “5.0.1” in the margin.

## 2 Objectives of the new DTD

Implementing a major DTD version requires much work, and therefore good business reasons are needed to release one. The following objectives were stated for the DTD release.

- The Elsevier DTDs should be in XML. — For many people, XML brought what Elsevier has had for many years: the ability to create structured, validated documents in a media-independent format. When the XML “hype” began, there was no real urgency to transform the existing DTD from SGML to XML. However, XML comes with many standards that can be adopted. It allows using XML aware editors and, most importantly, it allows processing by XSLT stylesheets and on-the-fly rendering. Existing XML technology can be leveraged.
- The Elsevier DTDs should adopt Unicode. — Unicode has become the standard for character sets. In the STIX project, Elsevier participated in order to ensure that the characters in the Elsevier Science Grid were represented in Unicode. Meanwhile, these amendments have taken place so that we can adopt Unicode. Our XML files will be in the UTF-8 encoding.
- The Elsevier DTDs should incorporate MathML. — The existing DTD possessed its own, bespoke fragment for mathematical formulae. Adopting MathML will leverage existing XML technology.
- The Elsevier DTDs should incorporate CALS tables. — CALS tables are widely used in other DTDs and software components for it are available.

- The Elsevier DTDs should follow other XML standards. — Where possible, and deemed useful, the XLink standard has been adopted, and standard attribute names such as `xml:lang` have been introduced.
- The Elsevier DTDs should be more restrictive (in other words, more precise). — The Elsevier DTD has traditionally been very loose, meaning that it allowed undesirable constructs such as tables within footnotes within the first name of an author. Such constructs are a developer’s nightmare and they were prevented by semantic rules, enforced by the SGML quality control tools. However, it is much better if these constructs cannot even be created in an editing tool to begin with. Unfortunately, we have concluded that effective restrictions can only be obtained by using exclusions — an SGML feature that is not present in XML. Yet, we have gone a long way to restricting the content models of elements.
- The Elsevier DTDs should form a new *family* of DTDs, not just for journal articles, but also for other content types: books, secondary publishing material, etc. As a consequence, the DTDs should have a modular setup. Support for these varied content types by parties upstream and downstream will be much easier with the common element pool.

The question has been raised why an XML DTD is released rather than an XML schema. It is our view that today DTDs are more suitable for structuring content than schemas. The added benefits of schemas are prominent for metadata transport, and that is where schemas will be used, e.g. to replace the EFFECT dataset delivery format.

Advocates of schemas highlight the extended possibilities of content validation. Our experience, though, is that these advocates are ignorant of the quality of our validation tool, the *Vtool*, whose ability to validate documents eclipses that of schemas — we will still need a *Vtool* to validate documents even when we release a schema. We can be certain that all documents have been validated using the *Vtool* since it produces fingerprints that allow Elsevier to verify that validation has taken place. For more information, we refer to the document *The Vtool – “V” for validation* by Jos Migchielsen, which clearly describes how superior our validation has become over the years.

### 3 About this release of JA DTD 5.0

**Note that in the context of this release note, “DTD 5.0” means the Journal Article Input DTD 5.0 with the Common Element Pool version 1.1.**

This release note belongs to the final release of DTD 5.0. It consists of the DTD; the Common Element Pool (see Section 4); MathML with Elsevier extensions (see Section 7.3); the CALS table model with Elsevier extensions (see Section 7.4.1); a first draft release of the new *Tag by Tag* documentation; example files.

It is important to use the versions of MathML, CALS and the ISO entities as supplied with the release.

Also part of the final release package are the new edition of the *Tag by Tag* documentation and a collection of sample files. Note that much additional explanation about new DTD 5.0 constructs can be found in the new *Tag by Tag* for DTD 5.0.

In the expression *input* DTD, “input” refers to input into the Electronic Warehouse. The *output* DTD will differ from the input DTD in some aspects. At the time of writing, the output DTD has not yet been finalised.

#### 4 The Common Element Pool

The journal article DTD 5.0 is the first in a family of XML DTDs for different content types: journals, books, abstracts, etc. These DTDs will share elements as much as they possibly can, and these elements are collected in the *common element pool*. The DTD itself only defines the top elements and some of its children, as well as the elements that are particular to that DTD and cannot be shared by other DTDs.

The common elements have been assigned to a separate namespace so that element names can be reused. Obviously, this XML feature has limited use in the framework of DTDs, and the most visible effect is that the common elements now have a prefix of `ce:`. An exception is the DTD fragment describing structured bibliographic references that are in a different namespace, so that we can have different elements `ce:author` and `sb:author`. The MathML elements have a prefix `mml:`. Another exception are the elements that make up the CALS table model, which has no provision to define a namespace prefix, yet these elements are considered to be in the common element pool.

Although the prefix is visible in the common elements and not in the elements particular to the DTD, processing software will recognise and require the usage of the right namespace. XSL stylesheets are an example. The namespace identifiers used in the DTD are:

- <http://www.elsevier.com/xml/ja/dtd> for the JA DTD 5.0 (no prefix in the DTD);
- <http://www.elsevier.com/xml/common/dtd> for the common element pool (prefix `ce:`);
- <http://www.elsevier.com/xml/common/struct-bib/dtd> for the structured bibliographic references within the common element pool (prefix `sb:`);
- <http://www.elsevier.com/xml/common/table/dtd> for the non-CALS elements used within table entries (prefix `tb:`);
- <http://www.elsevier.com/xml/common/cals/dtd> for the elements belonging to the OASIS Exchange Table Model (no prefix);
- <http://www.w3.org/1998/Math/MathML> for the elements belonging to MathML (prefix `mml:`).

As is common, these namespaces are abstract URIs that do not refer to an address on the Elsevier website or on any other website.

## 5 Vanished and new elements

This section lists the elements of DTD 4.3 that have disappeared in DTD 5.0 and the ones that are new or that have been renamed.

### 5.1 Vanished elements

- `a`, `ac`. The `a` element and its child `ac` were used for accent constructions in text and more general built-up constructs in formulae. The former has become obsolete due to the adoption of Unicode and the fact that documents will be created in UTF-8 encoding. The latter are now part of MathML formulae.
- `ar`, `arrow`, `box`, `cp`, `de`, `f`, `fd`, `fen`, `fr`, `lim`, `ll`, `nu`, `op`, `ov`, `ovl`, `ovr`, `rad`, `rcd`, `rdx`, `rm`, `ul`, `un`, `unl`, `unr`. These elements have become obsolete due to the adoption of MathML.
- `app`, `appm`, `bdy`, `bm`, `fm` formed the basic article structure. However, it has become more common to think of “heads” and “tails”, with content that differs from the old front- and backmatter.
- `at1`, `sbt` were abolished because these elements contained mixed content. Suitable replacements were introduced.
- `c`, `r`, `tbl`, `tblbdy`. These elements were part of the table model, and have now been replaced by CALS table elements.
- `cny`, `cty`, `other-aff`. Captured city names were unreliable and we have found no evidence that the country was used anywhere. Therefore we have abandoned the need of capturing these, with positive side effect that we solved the problem of removing the mixed content from the affiliation. The element `other-aff` was specifically created to support affiliations where city and country need not be tagged, and since this is the rule now, the element could also be dropped from the DTD.
- `intra-ref`. Usage of this element was not well understood, except for references between linked textboxes and the main document. Linked textboxes no longer exist; they are part of the main document, hence `cross-ref` can be used instead. For other purposes, only `inter-ref` remains. (Note: `intra-ref` is present in the common element pool because it is used in book DTDs.)
- `l`, `li`. These “auto-list” elements, with automatically generated labels, had been retained in the DTD for backward compatibility. The free-format `list` can be used.
- `ge`, `of`, `sc`. The *Tag by Tag* for DTD 4 stated that these elements were only allowed in math. In DTD 5, MathML provides its own construct for fraktur, open font and script.
- `upi`. This element has been replaced by `e-component`.

Table 1: Renamed elements

DTD 4.3	DTD 5.0	DTD 4.3	DTD 5.0
abs	ce:abstract	fnm	ce:given-name
acc	ce:date-accepted	index	ce:indexed-name
ack	ce:acknowledgment	inits	ce:initials
aff	ce:affiliation	it	ce:italic
art	article	jr	ce:suffix
atlfn	ce:article-footnote	kwd	ce:keyword
au	ce:author	kwdg	ce:keywords
aug	ce:author-group	misc	ce:miscellaneous
b	ce:bold	no	ce:label
bib	ce:bib-reference	p	ce:para
bibl	ce:bibliography	prs	ce:presented
caff	ce:collab-affiliation	qd	ce:displayed-quote
collab	ce:collaboration	re	ce:date-received
compound-f	ce:compound-formula	rv	ce:date-revised
cor	ce:correspondence	sec	ce:section
ded	ce:dedication	scp	ce:small-caps
degs	ce:degrees	snm	ce:surname
dl	ce:def-list	ssf	ce:sans-serif
dd	ce:def-description	st	ce:section-title
dt	ce:def-term	tblfn	ce:table-footnote
ead	ce:e-address	ty	ce:monospace
enun	ce:enunciation	vt	ce:biography
fig	ce:figure	vmk	tb:alignmark
fn	ce:footnote		

## 5.2 Renamed elements

We have taken the opportunity to change the old mnemonic element names to longer, more expressive names. DTD 4.3 had a mixture of these, and we have taken the chance of a major DTD upgrade to rename the other elements as well. See Tables 1 and 2. In the process, we have also changed some attribute names (see Table 3). Additionally, the cell border elements have been given the `tb:` prefix.

Some elements have been renamed for a different reason: the upcoming Common Element Pool from which other DTDs will also take elements.

## 5.3 Added elements

- `ce:abstract-sec` (see Section 10.3). 5.0.1
- `aid`, `ce:doctopics`, `ce:doi`, `item-info`, `jid`, `ce:pII`, `ce:document-thread`, `ce:refers-to-document` (see Section 9).
- `ce:alt-title`, `ce:alt-subtitle`, `ce:subtitle`, `ce:title` (see Section 10.1).
- `ce:alt-e-component`, `ce:e-component` (see Section 8.6).

Table 2: Renamed bibliography elements

DTD 4.3	DTD 5.0	DTD 4.3	DTD 5.0
author	sb:author	et-al	sb:et-al
authors	sb:authors	first-page	sb:first-page
bb	sb:reference	host	sb:host
book	sb:book	issue	sb:issue
book-series	sb:book-series	issue-nr	sb:issue-nr
collab	sb:collaboration	last-page	sb:last-page
comment	sb:comment	location	sb:location
conference	sb:conference	name	sb:name
contribution	sb:contribution	pages	sb:pages
date	sb:date	publisher	sb:publisher
e-host	sb:e-host	series	sb:series
edited-book	sb:edited-book	sbt	sb:subtitle
edition	sb:edition	title	sb:title
editor	sb:editor	translated-title	sb:translated-title
editors	sb:editors	volume-nr	sb:volume-nr

Table 3: Renamed attributes

Element	Attribute	New attribute
art	docsubty	docsubtype
au	vtid	biographyid
re, rv, acc	mo	month
re, rv, acc, copyright	yr	year

- ce:appendices, book-review-head, head, simple-head, simple-tail, tail (see Section 8.2).
- ce:bibliography-sec, ce:further-reading-sec, ce:glossary-sec (see Section 12.2).
- book-review, simple-article, simple-head, simple-tail (see Section 8.1).
- ce:chem (see Section 8.4).
- tb:colspec (see Section 7.4).
- ce:cross-refs, ce:inter-ref-end, ce:inter-ref-links, ce:inter-ref-title, ce:inter-refs, ce:inter-refs-text (see Section 7.5).
- ce:cross-out, ce:underline (see Section 8.8).
- ce:display, ce:floats, ce:float-anchor (see Section 8.3).
- exam, ce:exam-reference, ce:exam-questions, ce:exam-answers (see Section 8.9).
- ce:intro, ce:textbox-head, ce:textbox-body, ce:textbox-tail (see Section 11.2).

- `ce:note-para`, `ce:simple-para`, `ce:text`, `ce:textfn`, `ce:textref` (see Sections 6 and 7.1).
- `sb:collab`, `sb:isbn`, `sb:issn`, `sb:reference` (see Section 12.1).
- `ce:formula` (see Section 8.5).
- `ce:glyph` (see Section 7.2).
- Several elements present in the CALS and MathML DTDs.

## 6 Restrictive content models

In DTD 4.3, all elements that could contain data had `%data;` as their content. In our objective to make the DTD more restrictive, we have introduced a variety of replacements for `%data;`, as shown in Table 4.

Table 4: New content model entities

Parameter entity	Content
<code>%string.data;</code>	<code>#PCDATA</code>
<code>%richstring.data;</code>	<code>#PCDATA ce:glyph %text-effect; ce:inline-figure</code>
<code>%text.data;</code>	<code>%richstring.data; mml:math</code>
<code>%textfn.data;</code>	<code>%text.data; ce:footnote %cross-ref-s;</code>
<code>%textref.data;</code>	<code>%text.data; %cross-ref-s; %inter-ref-s;</code>
<code>%nondisplay.data;</code>	<code>%textref.data; ce:footnote ce:anchor</code>
<code>%note.data;</code>	<code>%textref.data; %display; %lists; ce:anchor</code>
<code>%cell.data;</code>	<code>%textref.data; %display; %lists;</code>
<code>%spar.data;</code>	<code>%textref.data; %display; %lists; ce:footnote ce:anchor</code>
<code>%par.data;</code>	<code>%textref.data; ce:float-anchor %display; %lists; ce:footnote ce:anchor</code>

Table 5 shows which elements have which parameter entity as content model.

The general-purpose elements `ce:text`, `ce:textfn` and `ce:textref` use these new content model entities also and are used as containers in former mixed-content elements.

The elements `ce:note-para` and `ce:simple-para` are variants of the paragraph element in which fewer structures are allowed. The following elements consist of simple paragraphs: `ce:abstract-sec`, `ce:biography`, `ce:caption`, `ce:legend`, `ce:note` (in the bibliography), `ce:displayed-quote`. The following elements consist of note paragraphs: `ce:article-footnote`, `ce:footnote`, `ce:table-footnote`.

## 7 Changes related to the adoption of industry XML standards

### 7.1 Removal of mixed content

The content models of several elements had to be changed to remove mixed content from the DTD, which, as the reader is aware, is only allowed in XML under certain restrictions.

Table 5: Content model of data elements

Parameter entity	Elements with that data model
%string.data;	aid, ce:copyright, ce:doi, ce:indexed-name, ce:initials, sb:isbn, sb:issn, jid, ce:pii,
%richstring.data;	ce:anchor, ce:bold, ce:cross-out, sb:date, ce:degrees, sb:edition, sb:first-page, ce:given-name, ce:inf, sb:issue-nr, ce:italic, sb:last-page, sb:location, ce:monospace, sb:name, ce:ranking, ce:roles, ce:sans-serif, ce:small-caps, ce:suffix, ce:sup, ce:underline, sb:volume-nr
%text.data;	ce:collab-aff, sb:collaboration, ce:compound-formula, ce:compound-name, sb:conference, ce:cross-ref, ce:cross-refs, ce:def-term, ce:e-address, ce:glossary-def, ce:inter-ref, ce:inter-ref-title, ce:inter-refs-text, ce:label, sb:maintitle, ce:miscellaneous, ce:salutation, sb:subtitle, ce:surname, ce:text
%textfn.data;	ce:alt-title, ce:alt-subtitle, ce:chem, ce:dedication, ce:presented, ce:subtitle, ce:textfn ce:title,
%textref.data;	ce:glossary-heading, ce:textref
%nondisplay.data;	sb:comment, ce:section-title, mml:mtext
%note.data;	ce:note-para
%cell.data;	entry
%spar.data;	ce:simple-para
%par.data;	ce:para

This is further described below. The main function of the general-purpose elements `ce:text`, `ce:textfn` and `ce:textref` is to remove mixed content from the DTD.

## 7.2 Unicode

Adopting the XML standard, means adopting Unicode. In Unicode, each character has an agreed number (code point) between zero and  $17 \times 65536$  (10FFFF hex). In practice all characters have a number between 0 and 65535, while a set of mathematical characters have a number between 65536 and twice that value (the so-called Plane One).

As a consequence we no longer need the accent construction of DTD 4.3, i.e. the `a` element, for what is called characters with native accents in the DTD 4.3 *Tag by Tag* documentation. All characters with native accents that are used in our articles are supposed to occur in a regular language, e.g. personal names, and thus to be represented in Unicode.

Unicode documents are written down in a specific encoding. An XML document declares its encoding in its leading XML processing instruction:

```
<?xml encoding="utf-8" ?>
```

In order to enhance the manageability and standardization of our document collections we do not accept any other encoding. Elsevier requires that XML articles are delivered in the UTF-8 encoding. That encoding encodes Unicode characters in sequences of 1 or more bytes. The

lower 128 code points of UTF-8 are identical with the (7-bit) ASCII code points. Therefore, any ASCII document is a UTF-8 document. However, the 8-bit accented characters in ISO Latin-1 have a different encoding in UTF-8.

5.0.1

In XML there are several ways to encode non-ASCII characters, e.g. in the word *Résumé*. One method is to use numerical character entities, `R&#xE9`; `sum&#xE9`; and another method is to use entity references (when available), `R&eacute`; `sum&eacute`; . After parsing, all three become identical, as the entities are defined to be the Unicode point. Therefore we accept all three forms in XML files.

With the adoption of Unicode, the Elsevier Science Grid has lost its function. Its role has been taken over by the Unicode standard, which assigns code points, and publishes example glyphs, descriptions and properties of characters.

Unfortunately, not all Grid symbols have been adopted by Unicode. The MathML and STIX effort has had great success for mathematical symbols, which form the majority of our grid symbols. No such effort has yet been done for chemistry and linguistics, two other scientific areas that contribute symbols to the grid. For these symbols, we must maintain a small version of the grid.

We have adopted an approach which is similar to MathML's `mglyph` element: We have created a `ce:glyph` element, which has a required name attribute. For each symbol which is not represented in Unicode we have devised a name by which it can be identified. The names are simply the DTD 4 entity names, without the prefix "z." if there was one.

```
<ce:glyph name="tbnd"/>
```

The *Tag by Tag* for DTD 5.0 contains the list of glyph names.

To aid the transition from our Grid to Unicode, we publish a separate document entitled 'Elsevier Science Grid in Unicode', which lists the translation of all the Grid symbols to Unicode and of all our DTD 4 entities to DTD 5 entities.

### 7.3 *MathML*

DTD 4.3 and earlier captured math in a way that was based on the AAP standard developed in the early 1990s. Our own features were added as required over the decade.

A new standard for math encoding was published a few years ago: MathML, and recently version 2 was released. We believe it is appropriate to join existing standards, and adopt MathML2 for math structuring.

This has advantages and disadvantages. Using standard XML fragments means that one can use existing software. For example, the two main web browsers enable viewing of a piece of MathML code directly in the browser. On the other hand, because the standard was written for

a wide range of situations, it may be more complicated than a private format. Much depends on the availability and quality of existing software.

MathML has two main parts: Content MathML and Presentational MathML. Content MathML captures the meaning of the formula; the presentation of the formula is a derivative thereof. Presentational MathML captures the presentation of the formula; math notation is such that the meaning can be derived from the presentation to some extent, but never fully so.

It is expected that Content MathML cannot be written or keyed in by humans; it will always be generated by mathematical software. Certainly in the beginning, we do not expect to receive much material in Content MathML. Conversions from mathematical typesetting formats such as  $\TeX$  will produce Presentation MathML. Therefore our articles will almost always contain Presentational MathML, at least in the years to come.

We do not exclude Content MathML. This may be seen as a burden on the recipients of our articles, who should in principle be prepared to receive and process both types of MathML. We expect that this burden will be alleviated by growing support for Content MathML when its usage will grow; this is an advantage of using a standard. We would like to note that at least one author of MathML presentation software, [the Con \$\TeX\$ t MathML module](#), believes that Content MathML is easier to parse and process, due to its strict rules.

Other than some standard modules, the MathML DTD does not provide hooks for customizations. Nevertheless, we felt the urgent need to adapt the content model of the `mml:mtext` element; we have edited the MathML DTD to allow us this freedom. As a consequence, we include our own version, with public identifier

```
-//W3C//DTD MathML 2.0 Mod ES//EN
```

The `mml:mtext` element can now contain `%nondisplay.data`; in addition to `mml:mglyph` and `mml:malignmark`.

All MathML elements have the namespace prefix `mml:`. It should be noted that working with a DTD does not allow one to redefine the prefix. The namespace declaration is a fixed attribute of the elements concerned.

MathML defines entity names for a long list of symbols. In the interest of flexibility and readability of our source documents, we require that within MathML formulae (i.e., within the element `mml:math`) any symbol for which MathML defines an entity be encoded using that entity and not the corresponding Unicode code point.

The inclusion of MathML gives an extra turn to the adoption of Unicode. MathML introduces code points on plane one, between U+1D400 and U+1D7FF. All plane-one MathML codes are variants of existing symbols, using specific fonts. Such symbols can also be encoded using MathML's `mathvariant` attribute (see the [MathML specification, section 6.2.3](#)). For example, the symbol U+1D400, mathematical bold capital A, can also be represented as

```
<mml:mi mathvariant="bold">A</mml:mi>
```

We require that all MathML plane-one characters are encoded using the `mathvariant` attribute.

Some users get parsing errors when the MathML2 DTD is included, of the form: “The following character codes fail to parse: 1D552, 1D553, etc.”. Such errors are due to the fact that existing software cannot always handle plane-one Unicode points. The updated MathML2 DTD contains updated entity files which address this problem by a parametrization. When the parameter entity `%plane1D;` is set to “&#38;#38;#x0E”, the plane-1 characters are moved into the E-block (private area) of plane 0. Another solution may be provided by using entity files containing surrogates.

5.0.1

Since we expect that MathML-capable browsers are not yet commonplace when we introduce the DTD, each MathML fragment is accompanied by a graphic representation, the *strip-in*. The `altimg` attribute of `mml:math` is used to refer to the strip-in. See Section 8.10.

#### 7.4 Extended CALS tables

DTD 4 and earlier used a private model for tables. Over the years there has been an increasing demand that we use the standard CALS table model, which would enable both creators and renderers of tables to use standard software.

During the preparation of this DTD it became clear that our own table model was more powerful than the CALS table model and its more portable derivative, the XML Exchange Table Model. If we would drop the extra options of our own table model, more tables will be delivered as images, which is a loss of information compared to the situation with DTD4. Therefore we have designed an extended CALS table model which is based upon the XML Exchange Table Model, but defines extensions to accommodate the more demanding tables in our publications. The model is such that simple tables, which are believed to be 95% of our tables, can be encoded with the XML Exchange Table Model. The extensions are placed in a separate name space, <http://www.elsevier.com/xml/common/table/dtd>, with prefix `tb:`. This makes it simple for applications to determine whether a table is a CALS table or an extended CALS table. In this way we make maximum use of the existing standard, while retaining our own more powerful features.

5.0.1

See also Section 8.10 for the so-called strip-in images that accompany an extended CALS table.

##### 7.4.1 Standard CALS tables

Over the course of the years contractors of the Department of Defense converged to a single table model, the so-called CALS Table Model (Computer-Aided Logistics Support). It became a *de facto* standard, which was used by many and supported by many software packages. OASIS published a documentation of the table elements and its attributes ([CALS Table Model Document Type Definition](#), OASIS Technical Memorandum TM 9502:1995), in order to promote a shared interpretation. It has also critically reviewed the CALS table model and the software

support for it ([TABLE INTEROPERABILITY: Issues for the CALS Table Model](#), OASIS Technical Research Paper 9501:1995). As a result it published the XML Exchange Table Model, which was a slight modification of the CALS Table Model, mainly to omit elements and attributes which were little or not supported by software ([Exchange Table Model Document Type Definition](#), OASIS Technical Resolution TR 9503:1995).

A good description of the CALS table model may be found in: Neil Bradley, *The Concise SGML Companion*, Chapter 10. CALS Tables.

We use the XML Exchange Table Model version, which is also often called the CALS Table Model. See <http://oasis-open.org/specs/soextblx.dtd>.

The CALS Table Model can be customized in the calling DTD. We have used that possibility as follows.

- The table model consists conventionally of the titles (name and caption) and the main table body. We have added a back part to the table (`%tbl.back;`), which allows one to place a legend and table footnotes there.
- The table titles (`%tbl.titles;`) consist of an optional label element and an optional caption, as in DTD 4.
- The main body of a table consists conventionally of `tgroup` elements. We added to that the `link` element, as in DTD 4. The main body of a table can thus exist of a series of `tgroup` and `link` elements.
- The content of a table entry consists conventionally of paragraph content, as specified by the `%paracon;` entity. We replaced that with our own entity `%cell.data;`, which includes textual elements, cross-references, display elements and lists.
- For namespace-aware applications, the DTD places the CALS table elements in the namespace `http://www.elsevier.com/xml/common/cals/dtd`, without a prefix. All elements that are part of `%cell.data;` are in the common namespace, with the prefix `ce`. Existing, non-namespace-aware applications will not notice the namespaces.
- We have added an attribute `alting` to the `tgroup` element (see Section 8.10).

5.0.1

It should be noted that the OASIS documentation specifies how the `frame` attribute of `table` and the `colsep` and `rowsep` attributes should be interpreted: `colsep` specifies the border at the right-hand side of the cell. `rowsep` specifies the border at the bottom of the cell. For cell borders which coincide with the border of the table the `colsep` or `rowsep` attribute has no effect. The `frame` attribute of the `table` element determines those borders of entries that coincide with the borders of the table. The caption, legend and footnotes are outside the frame.

## 7.4.2 Table extensions

For our extensions to the XML Exchange Table model we have created a new namespace, <http://www.elsevier.com/xml/common/table/dtd>, with prefix `tb:`.

To enable markup of varied borders, we have retained the border elements of DTD4: `tb:top-border`, `tb:left-border`, `tb:bottom-border`, `tb:right-border`; they are listed in the entity `%cell-borders;`. Their attributes are `type` and `style`, with the familiar values `%hline;`, `%vline;` and `%style;`. The border elements are part of the entity `%cell.data;`, so that they may be used within a table entry.

To enable markup of custom alignment, we have retained the element `tb:alignmark` of DTD4. It is part of the entity `%cell.data;`, so that it may be used within a table entry. A column which uses alignment on `tb:alignmark`, must be specified. To that end we have created the element `tb:colspec`, which is similar to the standard CALS element `colspec`, except that its `align` attribute has the fixed value `mark`.

A table which contains elements in the `tb` namespace thereby indicates that it uses our extensions on top of the XML Exchange Table Model. A table which does not contain elements in the `tb` namespace is a standard XML Exchange Table and can be processed by standard software. This can be easily checked by applications.

5.0.1

A table that contains an element with the `tb:` prefix is called an *extended* CALS table. More information about native and extended CALS tables is given in the *Tag by Tag* for DTD 5.0.

## 7.5 Cross-referencing and XLink

For cross-referencing within document instances we have decided not to adopt the XLink standards, but to stick with the `cross-ref` of DTD 4. We believe that the parser is the best validator and ID-IDREF(S) coupling is unsurpassed. It is appreciated that the one-to-many links are not easy to implement. Transformation could be to `xlink:href` where the parsed IDs are preceded by a `#`.

We have introduced a new element `ce:cross-refs` because we feel that one-to-many links warrant special treatment. This also makes it possible to demand one-to-one links at various places, e.g. in the frontmatter.

As noted above, `intra-ref` has been removed from the DTD. (It is present in the common element pool, but not accessible in the journal article DTD.)

For references to other documents, the element `ce:inter-ref`, and the new element `ce:inter-refs` have been introduced, that comply with the XLink standard.

For more information about these elements, please refer to the *Tag by Tag* documentation.

## 7.6 *Linking into the article from external documents*

New techniques are emerging to enhance linking and indexing. These techniques add information about XML documents without editing the XML documents themselves. Instead, a new document is created which contains links into the XML documents which it describes. Examples are link bases, which contain links pointing from the XML documents to various targets, and topic maps, which identify index terms or other topical information in the XML documents.

In order to prepare our XML documents for application of these techniques, we have introduced an optional ID attribute for a series of elements which are likely to be the target of such links. Suppliers need to populate these IDs only by special agreement.

These elements are: `ce:text`, `ce:textfn`, `ce:textref`, `ce:section-title`, `ce:collaboration`, `ce:author`, `ce:abstract`, `ce:section`, `ce:para`, `ce:simple-para`, `ce:note-para`, `ce:acknowledgment`, `ce:other-ref`, `ce:glossary-entry`, `ce:biography`, `ce:displayed-quote`, `ce:enunciation`, `ce:inter-ref`, `ce:inter-refs-text`, `ce:def-list`, `ce:def-term`, `ce:list`, `ce:list-item`, `ce:figure`, `ce:textbox`, `ce:e-component`, `ce:exam-test`, `ce:exam-answers`, `ce:caption`, `ce:legend`, `ce:table`.

## 8 **General structural changes**

### 8.1 *Distinguished top elements*

A careful reader of the DTD will notice that we actually publish more than one DTD: besides `article` the top elements `simple-article`, `book-review` and `exam` have been introduced. Which DTD applies should follow from the DOCTYPE declaration of the XML instance. In the future, we will more often publish a DTD that serves more than one doctype, each of which serves several publication item types.

A `simple-article` is basically the same loose element as the `art` from DTD 4.3. The new `article`, however, is much more strict. The XML validation tools will, for instance, check that for a full-length article with standard production type, the element `article` is used, and hence we can be sure that each full-length article possesses a title and author names.

### 8.2 *Introduction of head, body and tail*

DTD 4.3 and its predecessors contained a basic division into frontmatter, body and backmatter. This division was not the same as what has become practice in our different production methods, where the `article` DTD is used for full-text capturing, but also for capturing head-and-tail and contents-entries-only products. In the *Tag by Tag* the differences are outlined in special sections. For instance, an appendix is not part of a head-and-tail product, but it is part of the DTD 4.3 backmatter.

In DTD 5.0 we have introduced new elements `head`, `body` and `tail`, their looser variants `simple-head` and `simple-tail`, and `book-review-head` with an option to tag the book under review. In this respect “simple” refers to the fact that an editorial or an obituary is not as

elaborate as a full-length article or a review. Ironically, this means that the XML of an editorial or obituary needs more freedom, and can therefore be more complicated to process.

Sections and appendices are now enclosed within `ce:sections` and `ce:appendices` containers.

### 8.3 *Floating and displayed elements*

The elements `fig` (now: `ce:figure`) and `tbl` (now: `ce:table`) had `loc` attributes that determined whether the figure is floating or displayed. An important point in making the DTD more precise is to indicate whether floats are allowed in a particular content model. To this end, the elements `ce:display`, `ce:floats` and `ce:float-anchor` have been introduced.

As the name indicates, floating elements do not appear in a specific place of a document. Therefore much software collects floating elements at the beginning or end of a document. We have decided to follow this convention. We have created the `ce:floats`, which comes at the start of a document, after the `item-info`, and contains all floats of the document, which are of type `ce:figure`, `ce:table`, `ce:textbox`, or `ce:e-component`. Because it is not always true that a float is placed near its first citation, we provide the `ce:float-anchor` to mark the anchor position near which the float is to appear. It refers to the float by the mandatory attribute `refid`.

```
<ce:floats>
  <ce:figure id="fig37">
    <ce:label>Fig. 37</ce:label>
    <ce:caption>
      <ce:simple-para>Arbitrary figure.</ce:simple-para>
    </ce:caption>
    <ce:link locator="gr37"/>
  </ce:figure>
  <!-- More floats -->
</ce:floats>
```

```
See <ce:cross-ref refid="fig37">Fig. 37</ce:cross-ref>
<float-anchor refid="fig37"/>
```

The element `ce:display` acts as a wrapper around the displayed elements `ce:figure`, `ce:table`, `ce:textbox`, `ce:e-component`, `ce:formula`.

### 8.4 *Chemistry*

The use of MathML left us without an element to capture chemical structures and formulae. Investigation showed that at the moment only simple chemical structures are tagged, and that their needs are covered by the existing elements, such as `sup` and `inf`. More elaborate, structural markup will have to await the adoption of a chemical markup language that satisfies our needs.

The only new element created for chemical information is `ce:chem`. It contains a displayed chemical structure as `%textfn.data;`, within a displayed `ce:formula`. Inline chemical structures may be entered as part of the running text, without a special tag.

### 8.5 *Mathematical and chemical formulae*

A mathematical formula may in principle be tagged as `<mml:math display="block">`. But that would leave no room to tag such an important display element as the label. Therefore the element `ce:formula` is introduced, to capture the formula, the label and the `id` attribute.

A `ce:formula` may contain a `mml:math`, a `ce:chem`, or a `ce:link` element, or one or more nested `ce:formula` elements. The link element links to an image of a formula that is too complicated to be tagged.

A `mml:math` element in a `ce:formula` should not have the value `block` for the `display` attribute, but rather the default value `inline`. This is so because it is inline with respect to the containing `ce:formula` and to the formula number that the element `ce:label` generates.

When the formula contains nested formulae, the same rules apply for `id` attributes and `ce:label` elements as for DTD 4 fd elements, see the *Tag by Tag*.

Inline formulae do not require a special wrapping element.

### 8.6 *Multimedia components*

DTD 4 had the `upi` element for unprinted items. This element has never been implemented, and does not fulfill the needs of the online products.

For multimedia components, the new element `ce:e-component` has been created. It has a special subelement `ce:alt-e-component` which can be used to store an alternative caption for products that cannot contain multimedia components (e.g., the printed product) and an optional link to a figure that represents the multi-media component (e.g., a still image from a movie).

Figures that should only appear online used to be tagged as `upis`. Because they are not multimedia components, they should not be tagged as `ce:e-components`. They can be included in an online-only section, which can be created with the value `extended` of the `view` attribute (see Section 11.3).

### 8.7 *CR 143: Further abolition of generated texts*

The following elements now have a section title element `ce:section-title`, and have hence lost their generated text: `ce:abstract`, `ce:bibliography`, `ce:further-reading`, `ce:glossary`, `ce:keywords`, `ce:nomenclature`. Hence, an abstract with the heading “Abstract” will now have a `ce:section-title` containing the text “Abstract”.

The element `ce:article-footnote` also lost its automatically generated symbol, it has re-

ceived a `ce:label` element.

## 8.8 *Font changes*

The content-models of font-changing elements have been restricted, in some cases severely, modelled after the rules that were already in existence and described in the chapter “Font changes” of the *Tag by Tag*.

We have never thought of underlining, crossing out, superiors and inferiors as font changes but we appreciate that these effects are desired in running text. To this end the elements `ce:underline` and `ce:cross-out` have been added and the elements `ce:sup` and `ce:inf` have been retained (without the attribute `arrange`, though).

Elements for fraktur, open font and script are no longer present in DTD 5. In DTD 4, they were only allowed in math, and now MathML provides its own constructs.

## 8.9 *Examinations*

Harcourt Health Sciences brought a new publication item with it: Examinations. An examination may contain one or more lists of questions, and/or one or more lists of answers to previously published questions. Examinations can be published at the end of a related article, or they can be published as a separate article.

We introduce a new Publication Item Type for articles which only contain one or more Examinations: EXM.

We introduce the following elements to enable the tagging of these examinations.

- `exam` This is the document element of an article of PIT EXM. Besides `item-info` and `simple-head`, it consists of `exam-questions` and/or `exam-answers`.
- `exam-reference` This can be inserted at the end of an article, and points to a related Examination article. It consists of an `ce:inter-ref` element, which should have a PII or DOI-type of `xlink:href`.
- `ce:exam-questions` This contains a list of questions. The questions may be preceded or followed by sections with text. Therefore this element consists of sections and paragraphs (`%parsec;`). The paragraph(s) containing the actual list of questions should have the value `exam-questions` for the `class` attribute.
- `ce:exam-answers` This contains a list of answers. As in `ce:exam-questions`, the answers may be preceded or followed by sections with text. Therefore this element also consists of sections and paragraphs (`%parsec;`).

## 8.10 Strip-ins

5.0.1

Strip-ins are GIF images of hard-to-render parts of the XML file. Currently, strip-ins are generated by an application that runs at export from the Electronic Warehouse. As from DTD 5.0, the generation of strip-ins will be performed upstream by the suppliers.

The strip-ins are low-resolution GIF images (precise specs defined elsewhere). They are created for extended CALS table groups (i.e., any `tgroup` that contains elements prefixed with `tb:`), and for all MathML fragments.

To this end `tgroup` has an attribute `altimg`. This attribute is already present on `mml:math`. It contains the file name of the strip-in, inclusive extension. It is not an entity, therefore it does not need to be declared in the top of the XML file.

## 9 Changes related to the item identification and item info

### 9.1 *item-info*

Information about the item is no longer stored in the attributes of the top-level element, but in a separate element `item-info`. In alignment with other DTDs and XML schemas in use, e.g. for PTSIII, we have introduced elements for the PII, DOI, journal code, etc.

The `ce:copyright`, `ce:doctopic` and `ce:preprint` elements have moved into `item-info`.

### 9.2 *CR 200: Document topic*

The element `ce:doctopic` is now embedded in a new element `ce:doctopics`, and it can be nested to create higher-order `ce:doctopics`. To distinguish them, they have a `role` attribute. This answers the need for allowing the online reader various ways of accessing a document collection through a topic hierarchy. Documents that share the same `ce:doctopic` to a certain order are grouped together; a list of them can be presented to the reader in collapsable/expandable form, different from the ordinary table of contents of the issue or book, and also different from collections based on keywords or subject classifications.

For example, in a collection of health science documents a first-order topic could be “Cardiology”, in which a subtopic could be “Cardiac function and heart failure”.

```
<ce:doctopic>
  <ce:text>Cardiology</ce:text>
  <ce:doctopic>
    <ce:text>Cardiac function and heart failure</ce:text>
  </ce:doctopic>
</ce:doctopic>
```

This should not be confused with `ce:dochead`, which contains a heading printed on the article; the scope of that element is limited to the document itself. The `ce:doctopic`, however, is not

printed in the article; its sole purpose is to create groupings across collections of documents. In some cases, therefore, the `ce:doctopic` and the `ce:dochead` will both be populated and equal.

Also, the purpose of `ce:doctopic` is not to create the table of contents of an issue, which will be structured as a separate entity. Elements without a doctopic might not appear in a product form that is structured by topic.

### 9.3 *ce:document-thread and ce:refers-to-document*

5.0.1

The document thread, i.e. articles to which this article refers in a discussion or as an Erratum, is now listed in `ce:document-thread`, which replaces the attributes `refers-to` and `refers-to-doi`. Each article in the article thread is listed in its own `ce:refers-to-documents` element, by its PII, DOI or both.

These elements were renamed in DTD 5.0.1.

## 10 Changes in the head of the document

### 10.1 *Article title and document heading*

The document heading (`ce:dochead`) has moved into the head of the article. Higher-order document headings can be nested within the `ce:dochead`. The content model of its parent makes it more clear when titles and docheads are mandatory.

In order to remove mixed content, the main title and the subtitle of the document have been split up into `ce:title` and `ce:subtitle`. In DTD 4, there could be more than one title: one for each language. We now support alternative-language titles by separate elements `ce:alt-title` and `alt-subtitle` which have a mandatory attribute for the language.

### 10.2 *Names and affiliations*

Author names and affiliations have been cleaned up in DTD 5. A number of small changes have been applied.

In order to remove mixed content from the `ce:given-name` and `ce:surname` elements, the `ce:initials` and `ce:indexed-name` (the new name for DTD 4's `index`) can now be found within `ce:author` and `ce:collaboration` themselves.

The `aff` element (now `ce:affiliation`) also had a complicated mixed-content structure, dealing with the city and country name. Many mistakes were made in this area and the elements have little use. (A more structured address can be retrieved from, say, PTSIII.)

Cross-referencing between author names and affiliations now takes place using the `ce:cross-ref` elements of `ce:author` and `ce:collaboration`. Note that `ce:cross-ref` is now a one-to-one link. Especially in the author-affiliation coupling we think that a sequence of direct,

simple links to affiliations is more effective than one extended, one-to-many link to all affiliations.

An example highlighting the changes is given below (more complete examples will be given in the DTD 5 documentation).

Simon Pepping<sup>a,b,1</sup> and Rob Schrauwen<sup>\*,a</sup>  
<sup>a</sup> *Central Application Management, Production*  
<sup>b</sup> *Production Development Department*

\* Corresponding author.

<sup>1</sup> Expert in parse trees and real trees.

In DTD 5, this is captured as follows. Commas, or other delimiters of the footnote symbols, are still generated.

```
<!-- DTD 5.0 -->
<ce:author-group>
  <ce:author>
    <ce:given-name>Simon</ce:given-name><ce:surname>Pepping</ce:surname>
    <ce:cross-ref refid="aff1"><ce:sup>a</ce:sup></ce:cross-ref>
    <ce:cross-ref refid="aff2"><ce:sup>b</ce:sup></ce:cross-ref>
    <ce:cross-ref refid="fn1"><ce:sup>1</ce:sup></ce:cross-ref>
  </ce:author>
  <ce:author>
    <ce:given-name>Rob</ce:given-name><ce:surname>Schrauwen</ce:surname>
    <ce:cross-ref refid="cor1"><ce:sup>&ast;</ce:sup></ce:cross-ref>
    <ce:cross-ref refid="aff1"><ce:sup>a</ce:sup></ce:cross-ref>
  </ce:author>
  <ce:affiliation id="aff1">
    <ce:label>a</ce:label>
    <ce:textfn>Central Application Management, Production</ce:textfn>
  </ce:affiliation>
  <ce:affiliation id="aff2">
    <ce:label>b</ce:label>
    <ce:textfn>Production Development Department</ce:textfn>
  </ce:affiliation>
  <ce:correspondence id="cor1">
    <ce:label>&ast;</ce:label>
    <ce:text>Corresponding author.</ce:text>
  </ce:correspondence>
  <ce:footnote id="fn1">
    <ce:label>1</ce:label>
    <ce:simple-para>Expert in parse trees and real trees.</ce:simple-para>
  </ce:footnote>
</ce:author-group>
```

In comparison, the following example shows is how it would have been structured in DTD 4.3. Note the implicit assumption that the cross-references, the footnotes, the corresponding author field (and the electronic addresses, not shown here) belong to the author or collaboration that

immediately precedes the element. Moreover, note the awkward one-to-many link to the affiliations.

```
<!-- DTD 4.3 -->
<aug>
  <au>
    <fnm>Simon</fnm><snm>Pepping</snm>
  </au>
  <cross-ref refid="aff1 aff2"><sup>a,b</sup></cross-ref>
  <cross-ref refid="fn1"><sup>1</sup></cross-ref>
  <fn id="fn1">
    <no>1</no>
    <p>Expert in parse trees and real trees.</p>
  </fn>
  <au>
    <fnm>Rob</fnm><snm>Schrauwen</snm>
  </au>
  <cross-ref refid="cor1"><sup>&ast;</sup></cross-ref>
  <cross-ref refid="aff1"><sup>a</sup></cross-ref>
  <cor id="cor1">
    <no>&ast;</no>Corresponding author.
  </cor>
  <other-aff id="aff1">
    <no>a</no>Central Application Management, Production
  </other-aff>
  <other-aff id="aff2">
    <no>b</no>Production Development Department
  </other-aff>
</aug>
```

Prior to DTD 4.2, references to footnote was done from within the surname element. However, for reasons of backward compatibility we could not clean up the frontmatter even further.

### 10.3 Abstracts

The `ce:abstract` element now has a section title `ce:section-title` which contains the title of the abstract; previously the heading was generated automatically. The language attribute has been renamed according to XML conventions. Its usage remains the same: for each combination of language and class, at most one abstract may exist. The `class` attribute was implied in DTD 4.3, but the value `author` was the default value according to the documentation, therefore the default value is now specified in the DTD itself.

The following example shows the use of the new section title element (note the absence of accent constructions: the accented characters are available in UTF-8).

```
<ce:abstract>
  <ce:section-title>Abstract</ce:section-title>
  <ce:abstract-sec>
```

```

    <ce:simple-para>In this document, we introduce the new
      XML DTD.</ce:simple-para>
  </ce:abstract-sec>
</ce:abstract>
<ce:abstract xml:lang="fr">
  <ce:abstract-sec>
    <ce:section-title>Résumé</ce:section-title>
    <ce:simple-para>Dans ce document, on présente le nouveau
      DTD XML.</ce:simple-para>
  </ce:abstract-sec>
</ce:abstract>

```

An abstract now contains a sequence of `ce:abstract-sec` elements, i.e. only one level of sectioning is supported, unlike DTD 4.3. Each `ce:abstract-sec` consists of simple paragraphs, meaning that floating elements are not allowed.

The content model of `ce:abstract` now has an optional `ce:figure`. This is how from now on the graphical abstract will be captured. The `ce:figure` is only allowed for abstracts with class equal to graphical.

#### 10.4 CR 125: Keyword classes

Keyword classes are no longer taken from a fixed list enforced by the parser, but by a fixed list enforced by the Vtool. New values will require an end-to-end implementation but applications must ignore new or unknown values.

#### 10.5 CR 201: Stereochemistry abstracts

In our effort to make the DTD more precise, we have brought the rule that there must be at least a compound name or a compound formula into the DTD.

## 11 Changes in the body of the document

### 11.1 Basic structure of the body

The nomenclature element was part of `fm` in DTD 4.3, but it was stripped out of head-and-tail products. It finds a better place in the body. Similarly, appendices belonged to the backmatter in DTD 4.3, but it would be strange to expect appendices in a head-and-tail product. Therefore appendices are now captured within the element `ce:appendices`, which replaces `appm`.

The element `ce:sections` contains the main body of the article. In DTD 4.3 there was no container element available for paragraphs and sections. The parameter entity `%parsec;` replaces DTD 4.3's `%text;`, whose name is very confusing now that `ce:text` is an element containing merely `%text.data;`, while `%parsec;` is far bigger.

In our effort to make the DTD more precise, we have indicated what the rules are for the `ce:label` and `ce:section-title` of a section.

## 11.2 Textboxes

Linked textboxes were difficult to implement in DTD 4. They relied on SGML subdocuments (although we doubt that any implementation used the SGML SUBDOC technology), a feature that has been abandoned in XML. It required the complicated use of `intra-ref` to cross-reference between items in the document set. This is described in the *Tag by Tag*.

In DTD 5, we treat textboxes as floating or displayed elements. The `ce:textbox` contains the caption of the textbox, and its complete content. The content may be captured as a complete article (the linked textboxes of DTD 4), with a `ce:textbox-head`, `ce:textbox-body`, `ce:textbox-tail`, or as a block of text (the contained textboxes of DTD 4), with a `ce:textbox-body`.

Like all floats, the `ce:textbox` elements are placed in the `ce:floats` section, and they are anchored in the text by a `float-anchor` element.

Thus, rather than finding the source of a textbox in a separate file, it is stored somewhere else in the XML file. An added advantage is, that cross-referencing can be done using `ce:cross-ref` and `ce:cross-refs`.

## 11.3 CR 199: Roles and views of sections and paragraphs

The elements `ce:section`, `ce:para`, `ce:simple-para` and `ce:textbox` (like many other elements) now have a `role` attribute of type CDATA. The list of values will be enforced by the Vtool and new values will require a proper end-to-end implementation but applications must be resilient to new or unknown values. Classes are used if sections or paragraphs have a special significance.

5.0.1

Prime examples are “materials” and “methods” sections, that would have a `role` attribute so that these sections can be used in a special way. The allowed values are published in *Tag by Tag*. The element `ce:section` currently has the role `materials-methods` defined.

Another example is if sections always contain a special summary paragraph as a start. These can be displayed differently or collected for an extended table of contents.

Another example of the usage of the `role` attribute is to have a way to capture a “motto” of the article, or even a motto at a subsection, which has often been requested. Rather than incorporating a motto element at various places of the DTD, we can implement this by adding a class `motto` for the `ce:para` element.

```
<ce:para role="motto">Everything has a version number.</ce:para>
```

Several other elements also have an optional `role` attribute. Those attributes will be used after special agreements are made for individual cases.

5.0.1

The following elements possess a `view` attribute: `body`, `tail`, `simple-tail` in the JA DTD;

and in the common element pool `ce:appendices`, `ce:bibliography`, `ce:biography`, `ce:exam-answers`, `ce:exam-questions`, `ce:exam-reference`, `ce:further-reading`, `ce:glossary`, `ce:index`, `ce:para`, `ce:section`.

The values of this attribute are `standard`, `compact`, `extended` and combinations: `compact-standard`, `standard-extended`, and the default `all` (i.e., `compact`, `standard` and `extended`).

Applications can choose whether they are “compact”, “standard” or “extended”. ScienceDirect is typically an extended product. The printed version is typically a standard product. ScienceDirect would display all elements whose `view` attribute has values `all`, `standard-extended` and `extended`, i.e. all combinations that include “extended”.

Examples for views are appendices that need to appear online but not in print, and abridged versions for palmtop devices.

## 12 Changes in the tail of the document

### 12.1 Bibliography

Structured references are treated as a separate module and belong to a separate namespace. In the DTD the `sb:` prefix highlights this. We have decided to retain the deep structure of the reference lists, but we have taken the opportunity to make some changes that are not backward compatible. To begin with, deprecated elements were removed from the DTD.

The basis of structured references is that there is a “contribution” which is part of one or more “hosts”. While adding a `ce:doi` element that can be used to create direct links to the referred resource, it became apparent that a better basis is “contribution”, `host` and the position within that host. To this end, the element `sb:pages` has been moved to the `sb:host` level and out of the `sb:issue` and `sb:edited-book` level.

The content of the elements in the bibliography has been severely restricted. Most of them now have `%richstring.data`; as their content model.

The element `sb:issn` was added as optional element to `sb:series`, while `sb:isbn` was added to `sb:book` and `sb:edited-book`. This is also useful for the structured reference that can be added to a book review frontmatter.

The language attribute of `contribution` was little used, as it is rarely possible to determine the language of the referred article. However, there is a strong requirement, especially from secondary publishing, to know whether a reference is in the English language or not. This is solved by adding a new attribute `langtype` to `sb:contribution`. This attribute can have the following values: `en`, for an English-language reference, `non-en` for a certain non-English-language reference, `iso` for a specified language given in the `xml:lang` attribute or `unknown`.

## 12.2 CR 173: Sections within the backmatter elements

A feature of DTD 4 that continued to cause confusion was the fact that elements `bibl`, `further-reading`, `glossary` could appear more than once in a document, with or without a section title. Even though this was explained thoroughly in the *Tag by Tag* it conveyed the idea that multiple bibliographies were supported. Actually, however, the presence of one `bibl` meant the presence of *the* bibliography and each `bibl` was a section within the bibliography and the `st` was to be treated as a second-order heading. This has been made more clear now by the introduction of the elements `ce:bibl-sec`, `ce:further-reading-sec`, `ce:glossary-sec`. The parent elements `ce:bibliography`, `ce:further-reading` and `ce:glossary` now have their own titles, containing the first-order heading.

```
<ce:bibliography>
  <ce:section-title>References</ce:section-title>
  <ce:bibliography-sec>
    <ce:bib-reference id="bib1">...
    <ce:bib-reference id="bib2">...
  </ce:bibliography-sec>
  <ce:bibliography-sec>
    <ce:section-title>Text books</ce:section-title>
    <ce:bib-reference id="bib3">
  ...
```

## 12.3 Biography

The biography element `vt` had a nonstandard way of incorporating the photograph: a `picture` attribute. This has been changed: now the `ce:biography` (its new name) is equipped with a `ce:link` element.

### A Differences between JA DTDs 5.0.0 and 5.0.1

5.0.1

The differences between JA DTDs 5.0.0 and 5.0.1 are listed below. Note that the latter includes the Common Element Pool 1.1. Only the changes between CEP 1.0 and 1.1 that affect the JA DTD are listed here. The other changes are meant for the books DTDs, and have no bearing on the journal article DTD.

- `ce:article-thread` changed to `ce:document-thread`.
- `ce:refers-to-article` changed to `ce:refers-to-document`.
- `author-id` added to `ce:author`.
- `sb:comment` now contains `%nondisplay.data;`, i.e. it can now contain footnotes again.
- `ce:glossary` now has a `ce:intro` element (for books).
- `ce:textbox-tail` now has `ce:glossary` and `ce:biography` — this occurs in practice.

- second jnodot in the list of glyphs has been removed.
- altimg attribute added to tgroup.
- view attribute is now present on the following elements beside ce:para and ce:section: body, tail, simple-tail; ce:appendices, ce:bibliography, ce:biography, ce:exam-answers, ce:exam-questions, ce:exam-reference, ce:further-reading, ce:glossary, ce:index.
- language attribute of ce:abstract changed to take its values in the whole ISO 639 entity set.

## B Journal Article DTD 5.0

```

<!-- Elsevier Journal Article Input DTD version 5.0.1

Copyright (c) 1993-2003 Elsevier B.V.
$Id: art501.dtd,v 1.4 2003/03/12 08:34:41 rschrau Exp $
-->

<!-- Permission to copy and distribute verbatim copies of this document is granted,
provided this notice is included in all copies, but changing it is not allowed.

Documentation available at http://www.elsevier.com/locate/sgml
-->

<!-- Supported doctypes: article, simple-article, book-review, exam

Typical invocations:

<!DOCTYPE article
PUBLIC "-//ES//DTD journal article DTD version 5.0.1//EN//XML"
"art501.dtd">

<!DOCTYPE simple-article
PUBLIC "-//ES//DTD journal article DTD version 5.0.1//EN//XML"
"art501.dtd">

<!DOCTYPE book-review
PUBLIC "-//ES//DTD journal article DTD version 5.0.1//EN//XML"
"art501.dtd">

<!DOCTYPE exam
PUBLIC "-//ES//DTD journal article DTD version 5.0.1//EN//XML"
"art501.dtd">

-->

<!-- set local parameter entities -->

<!ENTITY % cross-ref      "ce:cross-ref" >
<!ENTITY % cross-refs    "ce:cross-refs" >

<!-- include the common element pool -->

<!ENTITY % common.ent
PUBLIC "-//ES//ELEMENTS common element pool version 1.1.0//EN//XML"
"common110.ent">
%common.ent;

<!-- namespaces and public identifiers -->

```

```

<!ENTITY % ESJA.xmlns      "http://www.elsevier.com/xml/ja/dtd" >

<!-- attribute type entities -->

<!ENTITY % docsubtype     "(abs|add|adv|ann|brv|cal|cnf|con|cor|dis|edb|edi|err|exm|fla|ind|lit|
                           mis|nws|ocn|pnt|prp|prv|pub|req|rev|sco|ssu)" >

<!-- attribute group entities -->

<!ENTITY % top-level.att
"xmlns          CDATA          #FIXED  %ESJA.xmlns;
 version       CDATA          #FIXED  '5.0'
 xmlns:ce      CDATA          #FIXED  %ESCE.xmlns;
 xmlns:sb      CDATA          #FIXED  %ESSB.xmlns;
 xmlns:xlink   CDATA          #FIXED  %XLINK.xmlns;
 xml:lang      %language;     'en'">

<!-- article -->

<!ELEMENT  article      ( item-info, ce:floats?, head, body?, tail? )>
<!ATTLIST  article
           %top-level.att;
           docsubtype    %docsubtype;      "fla">

<!-- simplified article, suitable for edi, cor and other pits -->

<!ELEMENT  simple-article ( item-info, ce:floats?, simple-head, body?, simple-tail? )>
<!ATTLIST  simple-article
           %top-level.att;
           docsubtype    %docsubtype;      #REQUIRED>

<!-- book review -->

<!ELEMENT  book-review  ( item-info, ce:floats?, book-review-head, body?, simple-tail? )>
<!ATTLIST  book-review
           %top-level.att;
           docsubtype    %docsubtype;      #FIXED  "brv">

<!-- examination -->

<!ELEMENT  exam          ( item-info, ce:floats?, simple-head,
                           ( ce:exam-answers | ce:exam-questions )+ )>
<!ATTLIST  exam
           %top-level.att;
           docsubtype    %docsubtype;      #FIXED  "exm">

<!-- information about the item -->

<!ELEMENT  item-info     ( jid, aid?, ce:pri, ce:doi?,
                           ce:document-thread?, ce:copyright, ce:doctopics?, ce:preprint? )>
<!ELEMENT  jid           ( %string.data; )* >
<!ELEMENT  aid           ( %string.data; )* >

<!-- article front matter -->

<!ELEMENT  head          ( ce:article-footnote*,
                           ce:dochead?, ce:title, ce:subtitle?,
                           ( ce:alt-title, ce:alt-subtitle? )*,
                           ce:presented?, ce:dedication?, ce:author-group+,
                           ce:date-received?, ce:date-revised*, ce:date-accepted?,
                           ce:miscellaneous?,
                           ce:abstract*, ce:keywords*, ce:stereochem* )>

<!ELEMENT  simple-head   ( ce:article-footnote*,
                           ( ce:title | ( ce:dochead, ce:title? ) ), ce:subtitle?,
                           ( ce:alt-title, ce:alt-subtitle? )*,
                           ce:author-group*,

```

```

        ce:date-received?, ce:date-revised*, ce:date-accepted?,
        ce:miscellaneous?,
        ce:abstract*, ce:keywords* )>

<!ELEMENT   book-review-head   ( ce:article-footnote*,
    ( ( ce:title, ce:alt-title* ) |
      ( ce:dothead, ( ce:title, ce:alt-title* )? ) ),
    ( sb:reference | ce:other-ref )+,
    ce:author-group+,
    ce:date-received?, ce:date-revised*, ce:date-accepted?,
    ce:miscellaneous? )>

<!-- article body -->

<!ELEMENT   body                ( ce:nomenclature?, ce:salutation?,
    ce:sections, ce:acknowledgment?, ce:appendices? )>
<!ATTLIST   body
    %common-view.att; >

<!-- article back matter -->

<!ELEMENT   tail                ( ce:bibliography?, ce:further-reading?,
    ce:glossary?, ce:biography*,
    ( ce:exam-answers | ce:exam-questions | ce:exam-reference )* )>
<!ATTLIST   tail
    %common-view.att; >

<!ELEMENT   simple-tail         ( ce:bibliography?, ce:further-reading? )>
<!ATTLIST   simple-tail
    %common-view.att; >

```

## C Common Element Pool 1.0

```

<!-- Elsevier Common Element Pool v1.1.0

Copyright (c) 2002-2003 Elsevier B.V.
$id: common110.ent,v 1.10 2003/03/12 08:33:57 rschrauw Exp $
-->

<!-- Permission to copy and distribute verbatim copies of this document is granted,
provided this notice is included in all copies, but changing it is not allowed.

Documentation available at http://www.elsevier.com/locate/sgml
-->

<!-- Typical invocation:
<!ENTITY % common.ent
    PUBLIC "-//ES//ELEMENTS common element pool version 1.1.0//EN//XML"
    "common110.ent">
%common.ent;
-->

<!-- namespaces and public identifiers -->

<!ENTITY % ESCE.xmlns "'http://www.elsevier.com/xml/common/dtd'">
<!ENTITY % ESSB.xmlns "'http://www.elsevier.com/xml/common/struct-bib/dtd'" >
<!ENTITY % ESTB.xmlns "'http://www.elsevier.com/xml/common/table/dtd'" >
<!ENTITY % XLINK.xmlns "'http://www.w3.org/1999/xlink'" >
<!ENTITY % CALS.xmlns "'http://www.elsevier.com/xml/common/cals/dtd'" >

<!-- notations -->

<!NOTATION TEXT PUBLIC "-//ES//NOTATION text format//EN">
<!NOTATION IMAGE PUBLIC "-//ES//NOTATION image format//EN">
<!NOTATION AUDIO PUBLIC "-//ES//NOTATION audio format//EN">
<!NOTATION VIDEO PUBLIC "-//ES//NOTATION video format//EN">

```

```

<!NOTATION APPLICATION PUBLIC "-//ES//NOTATION application format//EN">
<!NOTATION XML PUBLIC "-//ES//NOTATION XML format//EN">

<!-- element group entities -->

<!ENTITY % font-change      "ce:bold|ce:italic|ce:monospace|ce:sans-serif|ce:small-caps" >
<!ENTITY % text-effect      "%font-change;|ce:sup|ce:inf|ce:underline|ce:cross-out|ce:hsp|ce:vsp" >
<!ENTITY % lists            "ce:def-list|ce:list" >
<!ENTITY % display          "ce:display|ce:displayed-quote|ce:enunciation" >
<!ENTITY % cross-ref        "ce:cross-ref|ce:intra-ref" >
<!ENTITY % cross-refs       "ce:cross-refs|ce:intra-refs" >
<!ENTITY % cross-ref-s      "%cross-ref;|%cross-refs;" >
<!ENTITY % inter-ref-s      "ce:inter-ref|ce:inter-refs" >
<!ENTITY % cell-borders     "tb:top-border|tb:left-border|tb:bottom-border|tb:right-border" >

<!-- content entities, local variants defined in DTDs -->

<!ENTITY % local.string.data  "" >
<!ENTITY % local.richstring.data "" >
<!ENTITY % local.text.data    "" >
<!ENTITY % local.textfn.data  "" >
<!ENTITY % local.textref.data "" >
<!ENTITY % local.nondisplay.data "" >
<!ENTITY % local.note.data    "" >
<!ENTITY % local.cell.data    "" >
<!ENTITY % local.spar.data    "" >
<!ENTITY % local.par.data     "" >
<!ENTITY % string.data        "#PCDATA %local.string.data;" >
<!ENTITY % richstring.data    "#PCDATA|ce:glyph|%text-effect;|ce:inline-figure
%local.richstring.data;" >
<!ENTITY % text.data          "%richstring.data;|mml:math %local.text.data;" >
<!ENTITY % textfn.data        "%text.data;|ce:footnote|%cross-ref-s; %local.textfn.data;" >
<!ENTITY % textref.data       "%text.data;|%cross-ref-s;|%inter-ref-s; %local.textref.data;" >
<!ENTITY % nondisplay.data    "%textref.data;|ce:footnote|ce:anchor %local.nondisplay.data;" >
<!ENTITY % note.data          "%textref.data;|%display;|%lists;|ce:anchor %local.note.data;" >
<!ENTITY % cell.data          "%textref.data;|%display;|%lists;|%cell-borders;|tb:alignmark
%local.cell.data;" >
<!ENTITY % spar.data          "%textref.data;|%display;|%lists;|ce:footnote|ce:anchor
%local.spar.data;" >
<!ENTITY % par.data           "%textref.data;|ce:float-anchor|%display;|%lists;|ce:footnote|ce:anchor
%local.par.data;" >

<!-- content model entities -->

<!ENTITY % name              "( ( ce:given-name, ce:surname ) | ( ce:surname, ce:given-name? ) ),
ce:suffix?" >
<!ENTITY % parsec            "( ce:para | ce:section )+" >
<!ENTITY % titles            "( ce:title, ce:subtitle?, ( ce:alt-title, ce:alt-subtitle? )* )" >
<!ENTITY % sb.titles         "( ( sb:title, sb:translated-title? ) | sb:translated-title )" >

<!-- attribute type entities -->

<!ENTITY % abstract-class    "(author|editor|graphical|teaser)" >
<!ENTITY % copyright-type    "(full-transfer|limited-transfer|no-transfer|unknown|us-gov|crown|
society|other|joint)" >
<!ENTITY % e-address-type    "(email|url)" >
<!ENTITY % hline             "(bar|tcub|bcub|tsqb|bsqb|circ|tilde|larr|rarr|harr|lharu|rharu|
tpar|bpar)" >
<!ENTITY % language          "(de|en|es|fr|pt|ru)" >
<!ENTITY % language-type     "(en|non-en|iso|unknown)" >
<!ENTITY % loc                "(pre|post)" >
<!ENTITY % style              "(s|d|t|da|dot|b|bl|n)" >
<!ENTITY % view               "(compact|standard|extended|compact-standard|standard-extended|all)" >
<!ENTITY % vline              "(lpar|rpar|lsqb|rsqb|lcub|rcub|lang|rang|vb|sol|bsol|lceil|rceil|
lfloor|rfloor|dharr|uharr|darr|uarr|varr)" >

<!-- attribute type entities iso -->

```

```

<!-- see links at http://www.w3.org/TR/REC-xml#sec-lang-tag -->
<!ENTITY % iso639-cur      "aa|ab|af|am|ar|as|ay|az|ba|be|bg|bh|bi|bn|bo|br|ca|co|cs|cy|da|de|dz|
el|en|eo|es|et|eu|fa|fi|fj|fo|fr|fy|ga|gd|gl|gn|gu|ha|he|hi|hr|hu|hy|ia|id|ie|ik|is|it|ja|jw|ka|
kk|kl|km|kn|ko|ks|ku|ky|la|ln|lo|lt|lv|mg|mi|mk|ml|mn|mo|mr|ms|mt|my|na|ne|nl|no|oc|om|or|pa|pl|
ps|pt|qu|rm|rn|ro|ru|rw|sa|sd|sg|si|sk|sl|sm|sn|so|sq|sr|ss|st|su|sv|sw|ta|te|tg|th|ti|tk|tl|tn|
to|tr|ts|tt|tw|uk|ur|uz|vi|vo|wo|xh|yi|yo|zh|zu" >
<!ENTITY % iso639-obs     "" >
<!ENTITY % iso639        "(%iso639-cur; %iso639-obs;)" >

<!ENTITY % glyph-names    '(S|bigdot|btmli|camb|ctl|dbnd|dbnd6|dcurt|dlcorn|drcorn|ggrave|hbar|
heng|herma|hris|hriss|hrtrh|ht|jnodot|lbd2bd|lbd2td|lbond2|lbond3|lozf|lozfl|lozfr|lris|
lriiss|ncurt|nsmid|nspar|pSlash|pbdtd|pbdond|pent|phktp|ptbdbd|ptbtdt|qbnd|qbnd6|rad|rbd2bd|
rbd2td|rbond2|rbond3|refhrl|resmck|risfla|risfls|sbn|sbw|smid|spar|sqfb|sqfne|sqfsw|sqft|tbnd|
tbnd6|tcurt|trisola|trnomeg)' >

<!-- attribute group entities -->

<!-- optref: optional target for a cross-ref or intra-ref -->
<!-- reqref: target for a cross-ref or intra-ref -->
<!-- link: optional target for an external link -->
<!ENTITY % common-link.att      "id      ID      #IMPLIED" >
<!ENTITY % common-optref-link.att "id      ID      #IMPLIED" >
<!ENTITY % common-optref.att    "id      ID      #IMPLIED" >
<!ENTITY % common-reqref-link.att "id      ID      #REQUIRED" >
<!ENTITY % common-reqref.att    "id      ID      #REQUIRED" >
<!ENTITY % common-role.att      "role    CDATA    #IMPLIED" >
<!ENTITY % common-altimg.att    "altimg  CDATA    #IMPLIED" >
<!ENTITY % common-view.att      "view    %view;   'all'" >
<!ENTITY % size-info.att        "">

<!-- general purpose elements -->

<!ELEMENT ce:text                ( %text.data; )* >
<!ATTLIST ce:text                %common-link.att; >
<!ELEMENT ce:textfn              ( %textfn.data; )* >
<!ATTLIST ce:textfn              %common-link.att; >
<!ELEMENT ce:textref             ( %textref.data; )* >
<!ATTLIST ce:textref             %common-link.att; >
<!ELEMENT ce:label               ( %text.data; )* >
<!ELEMENT ce:section-title       ( %nondisplay.data; )* >
<!ATTLIST ce:section-title       %common-link.att; >

<!-- information about the item -->

<!ELEMENT ce:pri                 ( %string.data; )* >
<!ELEMENT ce:doi                 ( %string.data; )* >
<!ELEMENT ce:isbn                ( %string.data; )* >
<!ELEMENT ce:issn                ( %string.data; )* >
<!ELEMENT ce:document-thread     ( ce:refers-to-document+ ) >
<!ELEMENT ce:refers-to-document ( ce:doi | ( ce:pri, ce:doi? ) ) >
<!ELEMENT ce:copyright           ( %string.data; )* >
<!ATTLIST ce:copyright           type          %copyright-type;   #REQUIRED
year          NMTOKEN          #REQUIRED>
<!ELEMENT ce:copyright-line      ( %richstring.data; )*>
<!ELEMENT ce:doctopics           ( ce:doctopic+ )>
<!ELEMENT ce:doctopic            ( ce:text, ce:doctopic? )>
<!ATTLIST ce:doctopic            %common-role.att; >
<!ELEMENT ce:preprint            ( ce:inter-ref )>

<!-- article footnote -->

```

```

<!ELEMENT ce:article-footnote ( ce:label?, ce:note-para+ )>

<!-- article dothead, article title, alternative-language title, subtitle -->

<!ELEMENT ce:dothead ( ce:textfn, ce:dothead? )>
<!ELEMENT ce:title ( %textfn.data; )* >
<!ELEMENT ce:alt-title ( %textfn.data; )* >
<!ATTLIST ce:alt-title
    xml:lang %language; #REQUIRED>
<!ELEMENT ce:subtitle ( %textfn.data; )* >
<!ELEMENT ce:alt-subtitle ( %textfn.data; )* >
<!ATTLIST ce:alt-subtitle
    xml:lang %language; #REQUIRED>

<!-- presented by/at, dedication -->

<!ELEMENT ce:presented ( %textfn.data; )* >
<!ELEMENT ce:dedication ( %textfn.data; )* >

<!-- author group -->

<!ELEMENT ce:author-group ( ( ce:collaboration | ce:author )+,
    ce:affiliation*, ce:correspondence*, ce:footnote* )>

<!ELEMENT ce:collaboration ( ce:indexed-name?, ce:text, ce:cross-ref*, ce:collab-aff? )>
<!-- only 1-1 xrefs to affiliation,correspondence,footnote -->
<!ATTLIST ce:collaboration
    %common-link.att;
    %common-role.att; >
<!ELEMENT ce:collab-aff ( %text.data; )* >

<!ELEMENT ce:author ( ce:initials?, ce:indexed-name?, ce:degrees?, %name;, ce:degrees?,
    ce:ranking?, ce:roles?, ce:cross-ref*, ce:e-address*, ce:link? )>
<!-- only 1-1 xrefs to affiliation,correspondence,footnote -->
<!ATTLIST ce:author
    %common-link.att;
    %common-role.att;
    author-id CDATA #IMPLIED
    biographyid IDREF #IMPLIED>
<!ELEMENT ce:initials ( %string.data; )* >
<!ELEMENT ce:indexed-name ( %string.data; )* >
<!ELEMENT ce:degrees ( %richstring.data; )* >
<!ELEMENT ce:given-name ( %richstring.data; )* >
<!ELEMENT ce:surname ( %text.data; )* >
<!ELEMENT ce:suffix ( %richstring.data; )* >
<!ELEMENT ce:ranking ( %richstring.data; )* >
<!ELEMENT ce:roles ( %richstring.data; )* >

<!ELEMENT ce:correspondence ( ce:label, ce:text )>
<!ATTLIST ce:correspondence
    %common-reqref.att; >

<!ELEMENT ce:e-address ( %text.data; )* >
<!ATTLIST ce:e-address
    type %e-address-type; "email">

<!ELEMENT ce:affiliation ( ce:label?, ce:textfn ) >
<!ATTLIST ce:affiliation
    %common-optref-link.att;
    %common-role.att; >

<!-- article history -->

<!ELEMENT ce:date-received EMPTY>
<!ATTLIST ce:date-received
    day NMTOKEN #IMPLIED

```

```

        month          NMTOKEN          #REQUIRED
        year           NMTOKEN          #REQUIRED>
<!ELEMENT ce:date-revised NMTOKEN EMPTY>
<!ATTLIST ce:date-revised
        day          NMTOKEN          #IMPLIED
        month       NMTOKEN          #REQUIRED
        year        NMTOKEN          #REQUIRED>
<!ELEMENT ce:date-accepted NMTOKEN EMPTY>
<!ATTLIST ce:date-accepted
        day          NMTOKEN          #IMPLIED
        month       NMTOKEN          #REQUIRED
        year        NMTOKEN          #REQUIRED>
<!ELEMENT ce:miscellaneous ( %text.data; )* >

<!-- abstract -->

<!ELEMENT ce:abstract      ( ce:section-title?, ce:abstract-sec+, ce:figure? )>
<!ATTLIST ce:abstract
        %common-link.att;
        class          %abstract-class;  "author"
        xml:lang      %iso639;          #IMPLIED>
<!ELEMENT ce:abstract-sec ( ce:section-title?, ce:simple-para+ )>

<!-- keywords -->

<!ELEMENT ce:keywords      ( ce:section-title?, ce:keyword+ )>
<!ATTLIST ce:keywords
        class          CDATA            "keyword"
        xml:lang      %language;        #IMPLIED>
<!ELEMENT ce:keyword       ( ce:text, ce:keyword* )>

<!-- stereochemical abstracts -->

<!ELEMENT ce:stereochem    ( ce:compound-struct, ( ce:compound-formula |
        ( ce:compound-name, ce:compound-formula? ) ), ce:compound-info )>
<!ELEMENT ce:compound-struct ( ce:link )>
<!ELEMENT ce:compound-name  ( %text.data; )* >
<!ELEMENT ce:compound-formula ( %text.data; )* >
<!ELEMENT ce:compound-info  ( ce:list-item+ )>

<!-- nomenclature -->

<!ELEMENT ce:nomenclature  ( ce:section-title?, ce:def-list+ )>

<!-- article body -->

<!ELEMENT ce:salutation    ( %text.data; )* >
<!ELEMENT ce:sections      ( %parsec; )>
<!ELEMENT ce:appendices    ( ce:section+ )>
<!ATTLIST ce:appendices
        %common-view.att; >
<!ELEMENT ce:section       ( ( ( ce:section-title | ( ce:label, ce:section-title? ) ),
        %parsec; ) | ce:section+ )>
<!ATTLIST ce:section
        %common-optref-link.att;
        %common-role.att;
        %common-view.att; >
<!ELEMENT ce:para          ( %par.data; )* >
<!ATTLIST ce:para
        %common-link.att;
        %common-role.att;
        %common-view.att; >
<!ELEMENT ce:simple-para   ( %spar.data; )* >
<!ATTLIST ce:simple-para
        %common-link.att;
        %common-role.att;
        %common-view.att; >

```

```

<!ELEMENT ce:note-para ( %note.data; )* >
<!ATTLIST ce:note-para
          %common-link.att; >
<!ELEMENT ce:intro ( ce:para+ )>

<!-- acknowledgement -->

<!ELEMENT ce:acknowledgment ( ce:section-title?, ce:para+ )>
<!ATTLIST ce:acknowledgment
          %common-link.att; >

<!-- bibliography -->

<!ELEMENT ce:bibliography ( ce:section-title, ce:bibliography-sec+ )>
<!ATTLIST ce:bibliography
          %common-optref.att;
          %common-role.att;
          %common-view.att; >
<!ELEMENT ce:bibliography-sec ( ce:section-title?, ce:bib-reference+ )>
<!ATTLIST ce:bibliography-sec
          %common-optref.att;
          %common-role.att; >
<!ELEMENT ce:bib-reference ( ce:label, ( ce:note |
          ( ( sb:reference | ce:other-ref )+, ce:note? ) ) )>
<!ATTLIST ce:bib-reference
          %common-reqref-link.att; >
<!ELEMENT ce:note ( ce:simple-para+ )>

<!-- structured bibliographic reference (in name space ESSB) -->

<!ELEMENT sb:reference ( ce:label?, sb:comment?, ( sb:contribution, sb:comment? )?,
          ( sb:host, sb:comment? )+ )>
<!ATTLIST sb:reference
          %common-optref-link.att;
          xmlns:sb CDATA #FIXED %ESSB.xmlns;>

<!ELEMENT sb:contribution ( sb:authors?, (%sb.titles;)? )>
<!ATTLIST sb:contribution
          langtype %language-type; "en"
          xml:lang %iso639; #IMPLIED>
<!ELEMENT sb:host ( ( ( sb:issue, sb:pages? ) | sb:book
          | ( sb:edited-book, sb:pages? ) | sb:e-host ), ce:doi? )>

<!ELEMENT sb:comment ( %nondisplay.data; )* >

<!ELEMENT sb:authors ( ( sb:collaboration | ( sb:author, sb:et-al? ) )+ )>
<!ELEMENT sb:collaboration ( %text.data; )* >
<!ELEMENT sb:author ( %name; )>
<!ELEMENT sb:et-al EMPTY>
<!ELEMENT sb:title ( sb:maintitle, sb:subtitle? )>
<!ELEMENT sb:translated-title ( sb:maintitle, sb:subtitle? )>
<!ELEMENT sb:maintitle ( %text.data; )* >
<!ELEMENT sb:subtitle ( %text.data; )* >
<!ELEMENT sb:issue ( sb:editors?, (%sb.titles;)?, sb:conference?,
          sb:series, sb:issue-nr?, sb:date )>
<!ELEMENT sb:conference ( %text.data; )* >
<!ELEMENT sb:editors ( sb:editor+, sb:et-al? )>
<!ELEMENT sb:editor ( %name; )>
<!ELEMENT sb:series ( (%sb.titles;), sb:issn?, sb:volume-nr? )>
<!ELEMENT sb:volume-nr ( %richstring.data; )* >
<!ELEMENT sb:issue-nr ( %richstring.data; )* >
<!ELEMENT sb:date ( %richstring.data; )* >
<!ELEMENT sb:pages ( sb:first-page, sb:last-page? )>
<!ELEMENT sb:first-page ( %richstring.data; )* >
<!ELEMENT sb:last-page ( %richstring.data; )* >
<!ELEMENT sb:book ( (%sb.titles;)?, sb:edition?, sb:book-series?, sb:date+,
          sb:publisher?, sb:isbn? )>

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<!ELEMENT sb:edition ( %richstring.data; )* >
<!ELEMENT sb:publisher ( sb:name, sb:location? )>
<!ELEMENT sb:name ( %richstring.data; )* >
<!ELEMENT sb:location ( %richstring.data; )* >
<!ELEMENT sb:edited-book ( sb:editors?, (%sb.titles;)?, sb:conference?, sb:edition?,
sb:book-series?, sb:date+, sb:publisher?, sb:isbn? )>
<!ELEMENT sb:book-series ( sb:editors?, sb:series )>
<!ELEMENT sb:e-host ( ce:inter-ref?, sb:date? )>
<!ELEMENT sb:issn ( %string.data; )* >
<!ELEMENT sb:isbn ( %string.data; )* >

<!-- unstructured bibliographic reference -->

<!ELEMENT ce:other-ref ( ce:label?, ce:textref )>
<!ATTLIST ce:other-ref
%common-optref-link.att; >

<!-- further reading -->

<!ELEMENT ce:further-reading ( ce:section-title, ce:further-reading-sec+ )>
<!ATTLIST ce:further-reading
%common-optref.att;
%common-role.att;
%common-view.att; >
<!ELEMENT ce:further-reading-sec ( ce:section-title?, ( ce:para | ce:bib-reference )+ )>
<!ATTLIST ce:further-reading-sec
%common-optref.att;
%common-role.att; >

<!-- glossary -->

<!ELEMENT ce:glossary ( ce:section-title, ce:intro?, ce:glossary-sec+ )>
<!ATTLIST ce:glossary
%common-optref.att;
%common-role.att;
%common-view.att; >
<!ELEMENT ce:glossary-sec ( ce:section-title?, ce:intro?, ce:glossary-entry+ )>
<!ATTLIST ce:glossary-sec
%common-optref.att;
%common-role.att; >
<!ELEMENT ce:glossary-entry ( ce:glossary-heading, ce:glossary-def*, (%cross-ref;)*,
ce:glossary-entry* )>
<!ATTLIST ce:glossary-entry
%common-optref-link.att;
%common-role.att; >
<!ELEMENT ce:glossary-heading ( %textref.data; )* >
<!ELEMENT ce:glossary-def ( %text.data; )* >

<!-- index -->

<!ELEMENT ce:index ( ce:section-title, ce:intro?, ce:index-sec+ )>
<!ATTLIST ce:index
%common-optref.att;
%common-role.att;
%common-view.att; >
<!ELEMENT ce:index-sec ( ce:section-title?, ce:intro?, ce:index-entry+ )>
<!ATTLIST ce:index-sec
%common-optref.att;
%common-role.att; >
<!ELEMENT ce:index-entry ( ce:index-heading, ( ce:see | (%cross-ref;)+ )?,
( ce:see-also | ce:index-entry )* )>
<!ATTLIST ce:index-entry
%common-optref-link.att;
%common-role.att; >
<!ELEMENT ce:index-heading ( %textref.data; )* >

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<!ELEMENT ce:see ( %text.data; )* >
<!ATTLIST ce:see
    refid IDREF #REQUIRED>

<!ELEMENT ce:see-also ( %text.data; )* >
<!ATTLIST ce:see-also
    refid IDREF #REQUIRED>

<!-- index flag -->

<!ELEMENT ce:index-flag ( ce:index-flag-term, ce:index-flag-see?,
    ( ce:index-flag-see-also | ce:index-flag )* )>
<!ATTLIST ce:index-flag
    %common-reqref.att;
    %common-role.att; >
<!ELEMENT ce:index-flag-term ( %text.data; )* >
<!ELEMENT ce:index-flag-see ( %text.data; )* >
<!ELEMENT ce:index-flag-see-also ( %text.data; )* >

<!-- biography -->

<!ELEMENT ce:biography ( ce:link?, ce:simple-para+ )>
<!ATTLIST ce:biography
    %common-optref.att;
    %common-view.att; >

<!-- footnote -->

<!ELEMENT ce:footnote ( ce:label, ce:note-para+ )>
<!ATTLIST ce:footnote
    %common-reqref.att; >

<!-- anchor in text, the target of e.g. a cross-ref -->

<!ELEMENT ce:anchor ( %richstring.data; )* >
<!ATTLIST ce:anchor
    %common-reqref-link.att;
    %common-role.att; >

<!-- displayed quotation -->

<!ELEMENT ce:displayed-quote ( ce:simple-para+ )>
<!ATTLIST ce:displayed-quote
    %common-link.att;
    %common-role.att; >

<!-- enunciation -->

<!ELEMENT ce:enunciation ( ce:label, ce:section-title?, ce:para+ )>
<!ATTLIST ce:enunciation
    %common-optref-link.att;
    %common-role.att; >

<!-- reference to an external entity -->

<!ELEMENT ce:link EMPTY>
<!ATTLIST ce:link
    %common-link.att;
    locator ENTITY #REQUIRED
    %size-info.att; >

<!-- reference to an external lower-level doctype -->

<!ELEMENT ce:include-item ( ce:prii, ce:doi?, %titles;, ce:pages* )>
<!ATTLIST ce:include-item
    %common-role.att;
    %common-view.att; >

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<!ELEMENT ce:pages ( ce:first-page, ce:last-page? )>
<!ELEMENT ce:first-page ( %richstring.data; )* >
<!ELEMENT ce:last-page ( %richstring.data; )* >

<!-- reference to objects in this document -->

<!ELEMENT ce:cross-ref ( %text.data; )* >
<!ATTLIST ce:cross-ref
  refid IDREF #REQUIRED>

<!ELEMENT ce:cross-refs ( %text.data; )* >
<!ATTLIST ce:cross-refs
  refid IDREFS #REQUIRED>

<!-- reference to objects in related documents -->

<!ELEMENT ce:intra-ref ( %text.data; )* >
<!ATTLIST ce:intra-ref
  %common-link.att;
  xlink:type (simple) #FIXED "simple"
  xlink:role CDATA #IMPLIED
  xlink:href CDATA #REQUIRED>

<!ELEMENT ce:intra-refs ( ce:intra-refs-text, ce:intra-ref-end+, ce:intra-refs-link )>
<!ATTLIST ce:intra-refs
  xlink:type (extended) #FIXED "extended">
<!ELEMENT ce:intra-refs-text ( %text.data; )* >
<!ATTLIST ce:intra-refs-text
  %common-link.att;
  xlink:type (resource) #FIXED "resource"
  xlink:label (intra-refs-start) #FIXED "intra-refs-start">
<!ELEMENT ce:intra-ref-end ( ce:intra-ref-title? )>
<!ATTLIST ce:intra-ref-end
  xlink:type (locator) #FIXED "locator"
  xlink:label (intra-ref-end) #FIXED "intra-ref-end"
  xlink:role CDATA #IMPLIED
  xlink:href CDATA #REQUIRED>
<!ELEMENT ce:intra-ref-title ( %text.data; )* >
<!ATTLIST ce:intra-ref-title
  xlink:type (title) #FIXED "title">
<!ELEMENT ce:intra-refs-link EMPTY>
<!ATTLIST ce:intra-refs-link
  xlink:type (arc) #FIXED "arc"
  xlink:from (intra-refs-start) #FIXED "intra-refs-start"
  xlink:to (intra-ref-end) #FIXED "intra-ref-end">

<!-- reference to global external entity -->

<!ELEMENT ce:inter-ref ( %text.data; )* >
<!ATTLIST ce:inter-ref
  %common-link.att;
  xlink:type (simple) #FIXED "simple"
  xlink:role CDATA #IMPLIED
  xlink:href CDATA #REQUIRED>

<!ELEMENT ce:inter-refs ( ce:inter-refs-text?, ce:inter-ref-end+, ce:inter-refs-link )>
<!ATTLIST ce:inter-refs
  xlink:type (extended) #FIXED "extended">
<!ELEMENT ce:inter-refs-text ( %text.data; )* >
<!ATTLIST ce:inter-refs-text
  %common-link.att;
  xlink:type (resource) #FIXED "resource"
  xlink:label (inter-refs-start) #FIXED "inter-refs-start">
<!ELEMENT ce:inter-ref-end ( ce:inter-ref-title? ) >
<!ATTLIST ce:inter-ref-end
  xlink:type (locator) #FIXED "locator"
  xlink:label (inter-ref-end) #FIXED "inter-ref-end"

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                xlink:role      CDATA          #IMPLIED
                xlink:href      CDATA          #REQUIRED>
<!ELEMENT   ce:inter-ref-title ( %text.data; )* >
<!ATTLIST  ce:inter-ref-title
            xlink:type          (title)          #FIXED  "title">
<!ELEMENT   ce:inter-refs-link EMPTY>
<!ATTLIST  ce:inter-refs-link
            xlink:type          (arc)          #FIXED  "arc"
            xlink:from          (inter-refs-start) #FIXED  "inter-refs-start"
            xlink:to            (inter-ref-end)   #FIXED  "inter-ref-end">

<!-- list -->

<!ELEMENT   ce:list           ( ce:label?, ce:section-title?, ce:list-item+ )>
<!ATTLIST  ce:list
            %common-optref.att;>
<!ELEMENT   ce:list-item     ( ce:label?, ce:para+ )>
<!ATTLIST  ce:list-item
            %common-optref.att;>

<!-- definition list -->

<!ELEMENT   ce:def-list      ( ce:label?, ce:section-title?,
                               ( ce:def-term, ce:def-description? )+ )>
<!ATTLIST  ce:def-list
            %common-optref.att;>
<!ELEMENT   ce:def-term     ( %text.data; )* >
<!ATTLIST  ce:def-term
            %common-optref-link.att;>
<!ELEMENT   ce:def-description ( ce:para+ )>

<!-- inline figure -->

<!ELEMENT   ce:inline-figure ( ce:link )>
<!ATTLIST  ce:inline-figure
            baseline            NMTOKEN          "0.0">

<!-- chemistry -->

<!ELEMENT   ce:chem          ( %textfn.data; )* >

<!-- float and display containers -->

<!ELEMENT   ce:floats        ( ce:figure*, ce:table*, ce:textbox*, ce:e-component* )>
<!ELEMENT   ce:float-anchor  EMPTY>
<!ATTLIST  ce:float-anchor
            refid              IDREF            #REQUIRED>

<!ELEMENT   ce:display       ( ce:figure | ce:table | ce:textbox | ce:e-component | ce:formula )>
<!ELEMENT   ce:caption       ( ce:simple-para+ )>

<!-- formulas -->

<!ELEMENT   ce:formula       ( ce:label?, ( mml:math | ce:chem | ce:link | ce:formula+ ) ) >
<!ATTLIST  ce:formula
            %common-optref-link.att; >

<!-- figure -->

<!ELEMENT   ce:figure        ( ce:label?, ce:caption?, ce:copyright?, ( ce:link | ce:figure )+ )>
<!ATTLIST  ce:figure
            %common-optref-link.att;>

<!-- textboxes -->

<!ELEMENT   ce:textbox       ( ce:label?, ce:caption?, ce:copyright?,

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                                ce:textbox-head?, ce:textbox-body, ce:textbox-tail? ) >
<!ATTLIST ce:textbox
          %common-optref-link.att;
          %common-role.att; >

<!ELEMENT ce:textbox-head ( ce:title?, ce:subtitle?, (ce:alt-title, ce:alt-subtitle?)*,
ce:author-group*, ce:intro? )>
<!ELEMENT ce:textbox-body ( ce:sections, ce:acknowledgment?, ce:appendices? )>
<!ELEMENT ce:textbox-tail ( ce:bibliography?, ce:further-reading?,
ce:glossary?, ce:biography* )>

<!-- multi-media component -->

<!ELEMENT ce:e-component ( ce:label?, ce:caption?, ce:copyright?,
( ( ce:link, ce:alt-e-component? ) | ce:e-component ) ) >
<!ATTLIST ce:e-component
          %common-optref-link.att;>
<!ELEMENT ce:alt-e-component ( ce:link | ( ce:caption, ce:link? ) )>

<!-- text effects -->

<!ELEMENT ce:bold ( %richstring.data; )* >
<!ELEMENT ce:italic ( %richstring.data; )* >
<!ELEMENT ce:sans-serif ( %richstring.data; )* >
<!ELEMENT ce:monospace ( %richstring.data; )* >
<!ELEMENT ce:small-caps ( %richstring.data; )* >

<!ELEMENT ce:underline ( %richstring.data; )* >
<!ELEMENT ce:cross-out ( %richstring.data; )* >

<!ELEMENT ce:sup ( %richstring.data; )* >
<!ATTLIST ce:sup
          loc %loc; "post">
<!ELEMENT ce:inf ( %richstring.data; )* >
<!ATTLIST ce:inf
          loc %loc; "post">
<!ELEMENT ce:hsp EMPTY>
<!ATTLIST ce:hsp
          sp NMTOKEN "1.0">
<!ELEMENT ce:vsp EMPTY>
<!ATTLIST ce:vsp
          sp NMTOKEN "1.0">

<!-- non-Unicode glyphs -->

<!ELEMENT ce:glyph EMPTY >
<!ATTLIST ce:glyph
          name %glyph-names; #REQUIRED>

<!-- examination -->

<!ELEMENT ce:exam-reference ( ce:inter-ref )>
<!ATTLIST ce:exam-reference
          %common-view.att; >
<!ELEMENT ce:exam-questions ( ce:section-title?, %parsec; )>
<!ATTLIST ce:exam-questions
          %common-optref-link.att;
          %common-role.att;
          %common-view.att; >
<!ELEMENT ce:exam-answers ( ce:section-title?, %parsec; )>
<!ATTLIST ce:exam-answers
          %common-optref-link.att;
          %common-role.att;
          %common-view.att; >

<!-- MathML2, with namespace prefix mml -->

```

```

<!ENTITY % MATHML.prefixed      "INCLUDE" >
<!ENTITY % MATHML.prefix       "mml" >

<!ENTITY % mtext.mdl
  " %nondisplay.data; | %MATHML.prefix;:mglyph | %MATHML.prefix;:malignmark " >

<!ENTITY % mathml-dtd
  PUBLIC "-//W3C//DTD MathML 2.0 Mod ES//EN"
  "mathml2-mod-ES.dtd">
%mathml-dtd;

<!-- Extended CALS table model -->

<!ELEMENT   ce:legend           ( ce:simple-para+ )>
<!ELEMENT   ce:table-footnote  ( ce:label, ce:note-para+ )>
<!ATTLIST   ce:table-footnote
  %common-reqref.att; >

<!ENTITY % yesorno              "(0|1)" >
<!ELEMENT   tb:top-border      EMPTY>
<!ATTLIST   tb:top-border
  type       %hline;           'bar'
  style      %style;           's'>
<!ELEMENT   tb:left-border     EMPTY>
<!ATTLIST   tb:left-border
  type       %vline;           'vb'
  style      %style;           's'>
<!ELEMENT   tb:bottom-border   EMPTY>
<!ATTLIST   tb:bottom-border
  type       %hline;           'bar'
  style      %style;           's'>
<!ELEMENT   tb:right-border    EMPTY>
<!ATTLIST   tb:right-border
  type       %vline;           'vb'
  style      %style;           's'>
<!ELEMENT   tb:alignmark       EMPTY >
<!ELEMENT   tb:colspec         EMPTY >
<!ATTLIST   tb:colspec
  colnum     NMTOKEN           #IMPLIED
  colname    NMTOKEN           #IMPLIED
  colwidth   CDATA            #IMPLIED
  colsep     %yesorno;         #IMPLIED
  rowsep     %yesorno;         #IMPLIED
  align      (mark)           #FIXED 'mark' >

<!ENTITY % tbl.titles          "ce:label?, ce:caption?" >
<!ENTITY % tbl.back           "ce:legend?, ce:table-footnote*" >

<!ENTITY % tbl.table.name      "ce:table" >
<!ENTITY % tbl.table-titles.mdl "%tbl.titles;," >
<!ENTITY % tbl.table-back.mdl  ",%tbl.back;" >
<!ENTITY % tbl.table-main.mdl  "(tgroup | ce:link)+" >
<!ENTITY % tbl.table.mdl       "%tbl.table-titles.mdl; %tbl.table-main.mdl; %tbl.table-back.mdl;" >
<!ENTITY % tbl.table.att
  %common-optref-link.att;
  xmlns      CDATA            #FIXED %CAL.S.xmlns;
  xmlns:tb   CDATA            #FIXED %ESTB.xmlns; '>
<!ENTITY % tbl.tgroup.mdl      "(colspec | tb:colspec)*, thead?, tbody">
<!ENTITY % tbl.tgroup.att
  %common-alting.att; '>

<!ENTITY % tbl.entry.mdl       "(%cell.data;)*" >
<!ENTITY % tbl.entry.att
  xmlns      CDATA            #FIXED %ESCE.xmlns; '>

<!ENTITY % CALS-dtd
  PUBLIC "-//OASIS//DTD XML Exchange Table Model 19990315//EN"

```

```
"soextblx.dtd">
%CALSDtd;

<!-- extra entity names -->

<!ENTITY % esextra
PUBLIC "-//ES//ENTITIES extra entities 1.0.0//EN"
"ESextra.ent" >
%esextra;
```