

7.1.3 Hyperscript Structure - Content

When around 1994 I decided that instead of a conventional printed script we would produce a "Hyperscript" that could only be accessed in the new-fangled Internet, we wanted to produce something new and unique. The team consisted of: **Wolfgang Lippik**, who, in the beginning had to convert my scribbling to an Internet format. That was a pain in you know where so he taught me how to write in HTML myself.

Jürgen Carstensen who supplied knowledge of what was possible and how it could be done by writing proper programs. I myself supplied the content

- Our basic starting mantra was:

A real Hyperscript must be different from a normal textbook or script that has been converted to HTML.
A real Hyperscript must transcend the confines of printed media and emerge as something "better" than conventional books.
A real Hyperscript for use in universities must be written by a "Professor".

- What follows is (slightly edited) text that we produced almost 30 years ago:

There was (and still is) a big problem with the request above

- It is much easier to define what is *nota* Hyperscript than to enumerate the criteria that must be met by a real Hyperscript.
- As stated above, neither an existing book converted to HTML nor a work written in HTML from the very beginning, but with a structure very similar to a real book, meets the criteria.
- A simple rule of thumb: If a print-out of the HTML pages bound together would form a self-contained entity - a *book* - you do *not* have a Hyperscript.




But what exactly is a Hyperscript and what is going to make it better than a good textbook? I don't know and neither, I sincerely believe, does anybody else (in 1994). The reasons for this are:

- Working with Hyperscripts - and working means learning - needs not only Hyperscripts, but new modes of learning and teaching, too.
- The three ingredients - teaching with Hyperscripts, learning from Hyperscripts, and the Hyperscripts themselves - depend on each other for optimal results, and since neither exists presently in a finished form, they can only come into being in an evolutionary way involving trial and error (or the survival of the fittest).

In short: When the first Hyperscript (Defekte in Kristallen) was started, we had a relatively good idea what we did not want to do; but not a very clear idea of what we wanted to do.

In other words: The **contents** of the Hyperscript were not so clear at the start- and this demanded an open but optimized **structure** meeting the following requirements:

- Distinctly *different* from the (linear) structure of books.
- *Hierarchical* - it should always be clear which parts constitute the hard core learning material - the "backbone" - and what is just help to learn what has to be learned.
- *Universal* - usable for many different types of Hyperscripts.
- Amenable to *evolution* - changes, amendments and so on should be easy.
- *Simple*, so that typical "users" (as contrasted to "hackers"), or even Professors, can work with it or amend it, respectively
- *Optimized* for HTML, *but open* to the expected evolution of the Internet.
- *Clear file system* - in order to be able to keep track of thousands of documents.
- Possibility of *"automatic" functions* by running suitable programs (e.g. for indexing) across the file tree.

-  The result, obtained after much deliberation and some trial and error, is the present structure, identical for all Hyperscripts.
-  For starters, it can be best described by looking at its graphical expression, the "**Matrix of Modules**" (accessible for all Hyperscripts from the main menu under "Project") which is the analog of the "contents" for books.
-  We use now a typical part of the Matrix of Modules from the "Defects" Hyperscript from to describe the structure of the AMAT Hyperscripts:
 The links won't work, however. If you want to use the links, just go to the [Defects in Crystals](#) Hyperscript and open the Matrix.

"Matrix of Modules" as Illustration for the Key Features of the Hyperscript Structure

Basics	Backbone I	Backbone II	Illustrations	Exercises	Advanced
2. Properties of Point Defects					
2.1 Intrinsic Point Defects					
m2 1 2 Stirling formula b2 1 3 Schottky defect b2 1 4 Frenkel defect b2 1 5 Enthalpie/ Entropie b2 1 6 Ionic crystals b2 1 7 Debye length b2 1 8 Vagaries S- Definition	r2 1 1 Simple V and i r2 1 2 Frenkel defects r2 1 3 Schottky defects	Test	m2 1 1 Math "Schottky Defects"	e2 1 1 Find the mistake s2 1 1 Solution to e2.1.1 e2 1 2 Math "S _{form} " s2 1 2 Solution to e2.1.2 e2 1 3 Calculate form s2 1 3 Solution to e2.1.3 e2 1 4 Math "conc. V" s2 1 4 Solution to e2.1.4	t2 1 1 Entropy in QM
2.2 Extrinsic Point Defects and Agglomerates					
b2 2 1 Phase diagrams b2 2 2 Arrhenius diagram b2 2 2 Java Arrhenius	r2 2 1 Impurity atoms r2 2 2 Mixed Point Defects r2 2 3 Local and global Equilib.			e2 2 1 Math "mixed PD" s2 2 1 Solution to e2.1.4	
2.3 Point Defects in Silicon					
		r2 3 1 General Remarks			Article: Point defects in Si

First, here is a two-dimensional organization (a **matrix**) and each cell in the matrix contains defined **modules** or pages dealing with a particular issue.

Horizontally, the different levels correspond to the chapters of a conventional book.

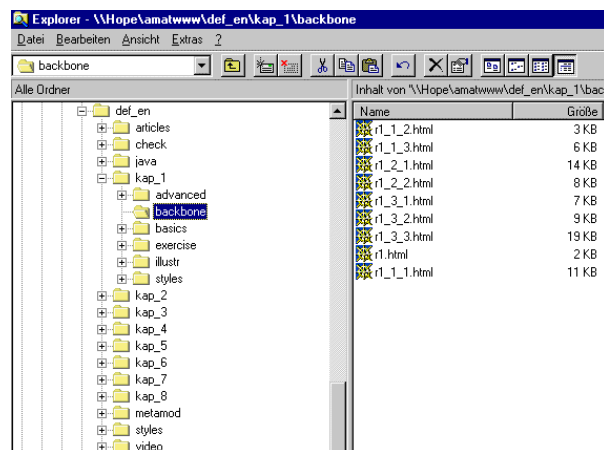
- The Hyperscript, after all, is for **learning something new**, and this still requires a sequence of topics with a succession that is dictated to a large extent from the material covered.
- There is, however, a certain deviation from a strictly linear sequence of chapters as evidenced in chapters 2.3 and 2.4 which are registered in a different column called "backbone II".

Vertically, three (color coded) columns can be distinguished:

- **"Basics"** (green column), containing stuff the student is supposed to know. The basics column contains modules which repeat important issues, give definitions, tables, mathematical rules and backgrounds - it provides whatever the student may want to look up in the context of learning the "real" stuff.
- **"Backbones"**, **"Illustrations"** and **"Exercises"** (blue columns). The modules in these columns contain the stuff that should be learned **and** everything that may be helpful for the learning process. The detailed meaning of the four columns is:
 - **Backbone I** This is the **hard core** of the Hyperscript. It contains everything the student should know or be familiar with.
 - **Backbone II** provides additional chapters which may or may not be part of the required learning - this is at the discretion of the lecturer.
 - **Illustrations** contains additional visual and other help for the understanding of the subject matter. This material was not included in the backbone in order to keep the backbone uncluttered.
 - **Exercises** provides the usual exercise questions, but also formats that could not be used in conventional text books, like multiple choice questions that can be done and evaluated on-line.
- **"Advanced"** contains everything that does not belong to the learning stuff. In contrast to the name, it is not restricted to truly advanced issues of the topics to be learned, but may also contain anything that is not required learning - e.g. amusing and entertaining side-issues, biographies, and anecdotes or whole surveys of related fields.

Second, the matrix of contents represents the **file structure** of the Hyperscript.

- Each column (except backbone II) corresponds to a file which in turn is contained in the chapter file. A representative sample of the **file structure** is shown below



- File names follow a rigid system in order to enable **automatic functions**. They are listed in the matrix of modules - this is the only way to directly finding a file with a certain content.

Third, a simple color coding provides easy information concerning the status of documents. **Blue** documents are finished, **red** ones still need work. Other colors denote somewhat subtler properties.

- This is important for the student who may want to know what he or she can find now and expect soon, and the writer, who sees at a glance where more work is needed.
- It also helps to find special modules (e.g. animations or JAVA applets) in a direct way.



Fourth, the matrix implicitly shows that the documents are linked; mostly horizontally, but also vertically.

- This is of course one of the main ingredients that make a real Hyperscript different (and hopefully better) than books.
- In the (German) [article about the use of Hyperscripts](#), a number of qualitatively different links are enumerated; suffice it to say that there are not only links between modules of the Hyperscript, but also links within one module and links to the outside world.

More about the Structure_e



If we want to dig deeper in the structure, we have to leave the matrix of modules now and look at the menu bar; which is identical in its appearance for all Hyperscripts.

Besides the direct links to the chapters of each script we find the the following buttons:

- **Project:** This will open a menu that not only contains the important matrix of modules, but a number of other "metamodules", i.e. modules about the Hyperscript, too. Some of those modules are automatically generated and help to keep the Hyperscript in working conditions.
- **Indexlist** provides an alphabetical list of index words with direct links to the modules (via the numbers) where the word has been marked in a special way.
- **Names** does the same thing for all names appearing in the Hyperscript. If a name is underlined, it is contained in a headline which means that there is probably a whole module to this name - i.e. a biography.
- **Abbreviations** lists the abbreviations with their full name and provides a link to the modules where the abbreviation has been marked.
- **Dictionary** is the newest addition to the automatically generated lists. It gives the German translation of "special" English words which may not be part of a standard students vocabulary.



It also shows some of the potential of the **"check" program** (from **J. Carstensen**) which generates all those lists: It is relatively easy to include new functions - because the structure, especially the file structure of all Hyperscripts is identical and well-defined.

- In a next step, e.g., a German to English dictionary may be implemented, or a list of all words with Greek or Latin roots and their translation, or a list of (open or hidden) quotations, Anything else useful or entertaining could be implemented.