

— BEING —

*A Compleat Manual
upon the Noble Art of*

HYPER-TEXT



*Wherein the Curious & Industrious Reader is led, by Stages
most gentle, through the Whole Mystery of the Inscription, the
Adornment, & the Display of Documents upon the Modern
Engine.*

PRO PATRIA & APPARATU

A COMPLEAT & UNABRIDGED
MANUAL



Upon

THE NOBLE ART OF HYPER-TEXT

*Being a Lucid & Sympathetick Account
of the Modern Method by which Documents
are Inscribed, Adorned, & set forth
upon the Universal Engine of Communication;*

together with

*Particular Instruction for the absolute Novice,
An Account of Common Pitfalls & their Remedies,
and a complete Bestiary of TAGS, ATTRIBUTES, & ENTITIES.*



By PROFESSOR Q. ELDRITCH HORNCastle

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Author of "On the Carriage of Notation by Sub-Atlantic Cable".*

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Third Impression, considerably Enlarged.
This being a Verbatim Reprint of the Third.

*“The illuminated Page is the supreme bastion of Civilization.
Surrender it not.”*

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— DEDICATED —

To that anonymous & long-suffering
SCRIVENER OF THE FUTURE

*who, having opened this volume in earnest pursuit of mastery,
proceeds at once to skip the Preface—
may these pages reward his impatience
better than the Author has dared to hope.*

*“The instructed man knoweth a thousand things,
and is in possession of none of them;
the practised man knoweth but one,
and rules the World by it.”*

— Thos. Carlyle (apocryphal)

— PREFATORY —

A WORD FROM THE AUTHOR



When the publishers were so kind as to approach me with the proposition of composing a manual upon the present subject, I confess my immediate inclination was to decline the honour, and to plead — as I have so often pleaded — the press of other obligations, the deteriorating state of my eyesight, and an unaccountable but persistent dread of writing in the second person.

The publishers, however, were nothing if not *persistent*. They wrote letters of considerable length and uncommon flattery; they sent emissaries; they intercepted me in the smoking-room of the Athenæum; and at last, by a stratagem too embarrassing to recount, they obtained my reluctant signature upon a contract whose terms I had read but indifferently. Such, dear reader, are the means by which Books are made.

The volume you hold has been the work of some eighteen months. I have endeavoured throughout to assume *nothing* of the reader save a willingness to attend, and a residual capacity for amusement. The matter is novel; the apparatus, intricate; the language of those who

hold themselves authorities upon the subject is, as a general rule, abominable. I have done what I can.

One word more. The reader who is impatient to begin *practising* rather than merely *reading* may, with my blessing, skip directly to **CHAPTER IV**, where matters become productive. The reader who is impatient with anything beyond the Practical may close this book at once and use it as a doorstep, in which capacity (the volume being thick) it shall serve admirably.

I shall not, in any case, be offended.

Q. E. Horncastle

— Cambridge, in the Trinity Term, Anno Domini MCMX.

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— INTRODUCTION —

AN ADDRESS TO THE CURIOUS READER



*“The thing seemeth difficult only because we have
not yet condescended to consider it.”*

— A wise person, name forgotten.

It is the firm conviction of the present author, after many years of patient instruction in matters both mechanical and litterary, that the great mass of subjects deemed *“too difficult for the layman”* are, in nine cases out of ten, perfectly within the comprehension of any reasonable man, woman, or child of ordinary parts. What is wanting, in the great majority of instances, is not capacity, but the patient and considerate explanation of one who has himself once been ignorant.

To the matter, then, of **HYPER-TEXT**. Allow me first to dispel, with all the briskness at my command, several persistent and pernicious notions that hover about it like flies above a summer cheese.

First, that the subject is the exclusive province of bespectacled young men in unsuitable trousers. It is not. Hyper-Text is, at root, a

system of marks; and the writing of marks upon paper is so ancient an art that the cave-dwelling ancestors of all of us were proficient in it, on rather better terms than we presently are with our typewriters.

Second, that the subject demands a particular cast of mind, called by its devotees "*logical*" or "*computational*", and possessed only by some narrow few. This is the merest cant. The mind required is the mind of any housekeeper who can write a list of provisions to be ordered from the grocer, with the items grouped sensibly by category. If you can do *that*, you can do *this*; and if you cannot do that, I would respectfully enquire how your household functions at all.

Third, that one must be initiated into the mysteries by a properly accredited Sage in some High Temple of Technology. To which I reply: I have known many such Sages, and the majority of them could not give clear directions to a railway station. Pay them no mind. The book in your hand contains everything required.



What, then, is **HYPER-TEXT**? In the simplest possible terms — and we shall expand upon this at length in the chapters which follow — it is a method of *writing a document in such a fashion that a Machine can read it*, and, having read it, present it to a human reader in a comely and useful arrangement.

Imagine, if you will, that you wished to send a letter to your aunt in **DUMFRIES**, and you wished further that the letter, upon its arrival, should be read aloud to her by the postman in a particular tone of voice — solemnly, perhaps, where you spoke of grave matters, and in tones of merriment where you reported upon the antics of the family dog. You would have, would you not, to provide some *indication* upon the letter itself as to which passages required which treatment? You might, for instance, draw a small sketch of a tear-drop beside the solemn passages, and a sketch of a small dog beside the merry ones; and the postman, being literate, would interpret these accordingly.

Hyper-Text is precisely this, in principle. The writer affixes to his document certain marks & indications — called **TAGS** — and the reading-engine, called the **BROWSER**, performs accordingly. *"This is a heading,"* says one tag; the engine prints it large. *"This is a paragraph,"* says another; the engine sets it forth in plain prose. And so on, through every variety of textual furnishing that the heart of an author could desire.

A NOTE UPON TERMINOLOGY

The word Hyper-Text is composed of the Greek prefix hyper-, meaning over or beyond, and the Latin textus, meaning that which is woven. It denotes, therefore, a kind of writing which goes beyond the ordinary woven text — by which is meant, principally, that any word in such a document may be made to lead the reader elsewhere at his pleasure, much as a footnote in a learned volume might lead him to a citation, save that here the citation lies not at the foot of the page but, properly speaking, everywhere at once.

The remainder of this volume shall instruct the reader, by gentle and well-considered degrees, in the practice of this art. We shall begin with the history (briefly), proceed to the principles (without unnecessary haste), and conclude with the practice (in considerable detail, with examples of every necessary kind).

Should the reader, at any point, find himself bewildered, he is encouraged to *set the book down*, take a turn about the garden, & resume at his leisure. The matter is not perishable; it shall await him. So, indeed, shall the author — though by then, in all likelihood, in a less material form.

Let us begin.

Q. E. H.

PART THE FIRST

OF THE NATURE
OF HYPER-TEXT



*Wherein the Reader is acquainted, in three short
chapters, with the History, the principal Apparatus,
and the elementary Vocabulary of the Subject; before
any practical Instruction is attempted.*

— CHAPTER THE FIRST —
THE GENESIS OF HYPER-
TEXT,
BRIEFLY RECOUNTED



"All new things are old; only the labels are different."

— attributed to Pliny, who in fact never said anything of the kind.

The history of Hyper-Text is, like the history of most useful inventions, a tale of several earnest persons working in distinct corners of the Earth upon the same problem at the same time, each of them entirely unaware of the others, until at last they collide upon some occasion of international academical festivity and discover, to their joint astonishment, that they have been duplicating one another's labours for the better part of a decade.

For the impatient reader, the history may be told in a sentence: *a young Englishman by the name of Sir Tim. Berners-Lee, then employed at a great Continental laboratory near to Geneva, did, in the latter years of the present*

century, devise the system which we now know as the World-Wide Web.

There. The matter is dispensed with, and the impatient reader may proceed to the next chapter.

For the curious reader, however, the matter requires a touch more amplification.

I. — THE NEED THAT GAVE RISE TO THE THING

Imagine a Library. Imagine, more particularly, a library whose holdings are dispersed across some *thousand* separate buildings, in *fifty* distinct cities, on *seven* different continents, the whole catalogued (where it is catalogued at all) according to *fourteen* mutually incompatible systems, and accessible to any given reader by a process of correspondence so lengthy that he is more often than not deceased before his volume arrives.¹

Such was, prior to the arrangements herein described, the situation of the learned Sciences. A man at **CAMBRIDGE** wishing to consult a paper composed by a colleague at **PRINCETON** might write a letter; might receive, six weeks later, a reply requesting clarification of his enquiry; might respond; might, after a further interval, be informed that the paper in question had been mislaid; and so the matter would continue until the heat-death of the universe, or his retirement, whichever came first.

It was, in short, a state of affairs that no reasonable person could permit to continue. And so a number of reasonable persons did not permit it to continue.

II. — OF CERTAIN ANTECEDENTS

Let us pause briefly and acknowledge — for it would be churlish not to — that the *idea* of hyper-text long predates its mechanical realisation. The Talmud, that vast and revered compendium of Jewish learning, is essentially a hyper-text avant la lettre: each page presents the central scripture in the middle, surrounded on every side by commentaries, commentaries upon the commentaries, and (one suspects) commentaries upon those. The reader's eye is invited to wander from one to the next according to his interest, and the page itself is an object of considerable beauty.

Closer to our own day, an American gentleman by the name of Vannevar Bush conceived, in the year 1945, of a hypothetical engine he called the *memex*, which was to be a sort of mechanical desk capable of recalling any document its operator had ever consulted, together with any associations he had cared to form between them. The memex was never built — Bush was a busy man, and there was a war on — but the idea germinated.

Then came one Theodor Holm Nelson, a man of singular vision & still more singular hairstyles, who in the 1960s coined the very word *Hypertext*, and proposed a grand scheme called *Project Xanadu* for the unification of all written knowledge into a single boundless inter-

connected document. Project Xanadu has been forthcoming, in some form or another, for approximately fifty years; this author has, alas, not yet had the privilege of inspecting it.

III. — THE DECISIVE HOUR

It fell to Sir Tim. Berners-Lee, then a researcher at **CERN**, to assemble the various fragments — the marking-up convention, the addressing scheme, the transport protocol — and to do so with such modesty and lack of fanfare that several years passed before the world realised what had occurred.

In the year of grace 1989, Berners-Lee composed a memorandum proposing what he called *“a hypertext-based information management system”*. His superiors, by an oversight which must have caused them many sleepless nights afterwards, returned the memorandum with the comment, written in the margin in some perplexity: *“Vague, but exciting.”*

Within two years, Berners-Lee had constructed a working specimen, complete with the **BROWSER**, the **SERVER**, and the marking-up language we now call **HTML**. Within a decade, the system had spread to every quarter of the globe; within two decades, the global commerce of every literate nation had become wholly dependent upon it; and within a third decade — which is to say, our own — the entire world had grown so accustomed to its workings that it began to forget how recent the whole apparatus actually was.²

IV. — A PRACTICAL NOTE

The reader may at this juncture enquire: "*And what, sir, has any of this to do with the matter of writing a Document of my own?*" To which the answer is: *everything*, and *nothing*.

It is *everything*, in that the entire edifice of conventions, expectations, & tools by which one composes a document of Hyper-Text is the legacy of these gentlemen and their predecessors, and to write such a document in ignorance of how one came to have the means is much like driving a motor-carriage in ignorance of the fact that it contains an engine: serviceable, but inelegant.

It is *nothing*, in that one may pass through life writing perfectly serviceable documents without ever consulting a history of the field, just as one may eat dinner without first acquainting oneself with the chemistry of digestion. The matter is offered for the reader's interest, not for his obligation.

We shall now turn from history to mechanism — from the past to the engine which sits, even now, upon the reader's desk.

¹ *The author has personally written some thirty-eight letters to a particular Continental colleague over the course of his career, and has received, at the present count, four replies. Of these, two consisted entirely of the salutation. He cannot say that he was greatly disappointed.*

² *A fact which, the author submits, ought occasionally to be remembered, when one is tempted to despair of the present age.*

— CHAPTER THE SECOND —

THE BROWSER, THAT FAITHFUL SERVANT



*"A good butler is one who anticipates needs you
have not articulated; a bad butler is one who
anticipates needs you do not have. A browser is some of
both."*

— Anonymous

Before we may speak of how to *compose* a document of Hyper-

Text, we must first examine the engine which is to *read* it. For just as the dramatist must consider the stage before composing the play, and the architect must consider the site before designing the residence, so must the writer of Hyper-Text consider the apparatus by which his work shall be displayed.

The apparatus in question is called, with disarming simplicity, the **BROWSER**. It is a kind of programme — that is to say, a sequence of instructions issued to a Computing Engine — which, presented with a document of Hyper-Text, performs the necessary acts of reading,

interpreting, and laying-forth, with the result that a comely page appears upon the screen of the apparatus before the reader.

I. — A USEFUL ANALOGY

Consider a butler in a great country house. The master of the house, going up to dress for dinner, calls down: *"James, bring up the brown shoes — and the silver button-hook is in the lower drawer of the bureau in the dressing-room — and pray see that the fire is mended in the smoking-room before the gentlemen retire."*

James, being a competent butler, performs all of these things in the proper order, in the proper way, without further enquiry; and indeed if his master had merely said *"the usual,"* James would have done the same. The master gives instructions; the butler interprets; the work is done.

This is, *mutatis mutandis*, the relation between the writer of Hyper-Text and the browser. The writer issues instructions, more or less precise; the browser interprets these in light of universal convention and its own particular dispositions; and a finished page appears, generally as the writer intended, but with occasional discrepancies which we shall in due course call *"bugs"* & learn to forgive.

II. — OF THE SEVERAL BROWSERS IN EXISTENCE

Lest the reader form the idea that there is but one such butler in existence, we must mention at once that there are several. Among the most prominent of the present day are:

- **Chrome**, manufactured by the Google Corporation, a creature of considerable speed but somewhat indelicate manners;
- **Firefox**, a public-spirited and reliable engine, distinguished for its respect of the user's privacy;
- **Safari**, the offering of the Apple Corporation, of which the principal virtue is that it consumes very little electrical fluid;
- **Edge**, the latest in a long & somewhat lugubrious line of browsers from the Microsoft house, much improved of late;
- and certain others of less prominence, which we shall not delay over.

The reader will be relieved to learn that, for the great majority of purposes, these browsers behave so similarly that the writer may treat them as interchangeable. Where they do *not* behave similarly, the differences are documented in tedious volumes which we shall not multiply by adding our own. The Practical motto, here as elsewhere, is: *write according to the standards, and trust the rest to providence.*

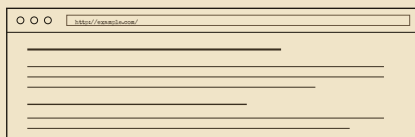


FIG. I. A SPECIMEN OF THE BROWSER, IN REPOSE.

The white expanse, into which Hyper-Text is laid; observe the slot above wherein the document's address is inscribed, & the small embossed apertures by which the operator may close, minimise, or otherwise reduce the apparatus.

III. — WHAT THE BROWSER DOES, IN SUCCESSION

When the operator types an address into the appropriate slot upon the browser & presses the great key marked **RETURN**, the following events occur, in this approximate order:

1. The browser dispatches a *request* across the inter-network to the indicated **SERVER** — a remote engine which holds the document in its memory.
2. The server, supposing it is awake & in good humour, responds by transmitting the document, character by character, back to the browser.
3. The browser receives this transmission; reads it through; identifies the various **TAGS** & their associated content; constructs in its internal memory a kind of skeletal representation of the document; and then, by a process called *rendering*, paints the result upon the screen.

4. The browser further requests, as needed, any auxiliary documents — pictures, decorative style-sheets, scripts of motion — which the principal document calls for.
5. The result is presented, all in a moment (or, occasionally, all in several moments), to the operator.

It is a remarkable performance, when one considers it. The reader is encouraged to *do* consider it, the next time he visits a favoured page; for familiarity hath bred, as it usually doth, contempt — and the internet is among the modern wonders most undeservingly taken for granted.

IV. — OF THE THREE LANGUAGES SPOKEN BY THE BROWSER

The browser, like a well-bred Continental gentleman, speaks fluently in three distinct tongues. They are:

- **HTML** — the language of *structure*, in which the document's bones are described;
- **CSS** — the language of *adornment*, in which the document's clothing & cosmetic is described;
- **JAVASCRIPT** — the language of *animation*, in which the document is told to do things, jump about, & respond to the operator's promptings.

The present volume is concerned principally with the first of these, & secondarily with the second. The third is a vast subject of its own,

sufficient to occupy a competent author for the better part of his natural life, and is beyond our present scope. The reader who, having mastered the matters herein, finds himself hungry for further instruction in animation may consult any of several worthy treatises advertised at the back of this volume.

And now, having become acquainted with the engine that is to read our documents, let us proceed to the rudiments of how those documents shall be composed.

— CHAPTER THE THIRD —
OF TAGS, ELEMENTS,
& THEIR CONCOURSE



"Bracket. n. A small architectural support; a typographic punctuation; the most essential mark in the whole of Hyper-Text."

— from a forthcoming Dictionary.

We have spoken in the foregoing chapters of **TAGS** as if the reader knew what they were, which the reader, in all probability, does not. We must now repair the omission. The matter is exceedingly simple, and we shall be brief.

I. — THE TAG, ANATOMICALLY CONSIDERED

A **TAG** is a small piece of text, bounded upon each side by a particular kind of bracket which we call (with a fine disregard for geometry) the *angle bracket*. It looks like this:

<p>

The bracket on the left is <, called the *less-than sign* by mathematicians and the *opening angle bracket* by us. The bracket on the right is >, the *greater-than sign* & *closing angle bracket*, respectively. Between them, in this case, is the simple letter p, which is the abbreviation for *paragraph*; and so this tag is called the *opening paragraph tag*, and it serves to indicate to the browser the commencement of a passage of prose.

For nearly every opening tag, there is a *closing* tag, distinguished from its opener by the addition of a forward solidus immediately within the opening bracket:

</p>

And so the writer who wishes to compose a single paragraph does so as follows:

SPECIMEN NO. 1 — A SOLITARY PARAGRAPH

<p>It was a dark & stormy night.</p>

In this construction, the opening tag <p> declares: *"What follows is a paragraph."* The closing tag </p> declares: *"The paragraph is now ended."* The text between them is the substance of the paragraph itself, and is called — with a refreshing want of obscurity — the **CONTENT**.

The whole construction — opening tag, content, closing tag — is called an **ELEMENT**. The tag is therefore the *part*, and the element is the *whole*. This distinction will become important in due course; the reader is encouraged to commit it to memory.



FIG. II. THE ANATOMY OF AN ELEMENT.

II. — A BESTIARY OF COMMON TAGS

There are some hundred or so distinct tags in regular use, of which perhaps thirty are essential, ten are indispensable, & three or four are sufficient to compose a respectable document. We shall encounter

them all in the chapters which follow; for the moment, we offer a small assortment to whet the appetite.

`<h1> ... </h1>` — **HEADING OF THE FIRST MAGNITUDE.** A title; that which the reader's eye finds first. Renders large & emboldened.

`<p> ... </p>` — **PARAGRAPH.** A single passage of prose. Renders in plain type with a small space at the end.

`<em> ... </em>` — **EMPHASIS.** Indicates that the contained text is to be stressed. Renders, by tradition, in *italics*.

`<strong> ... </strong>` — **STRONG EMPHASIS.** Indicates considerable urgency. Renders in **bold-face**.

`<a> ... </a>` — **ANCHOR.** The hyperlink itself. Causes its content to become a clickable portal to elsewhere.

`<img />` — **IMAGE.** An exception to the rule of opening & closing tags; this one stands alone, & calls forth a picture.

III. — OF SELF-CLOSING TAGS

The reader may have noticed in the foregoing list a certain peculiarity in the tag for the image. Whereas the others come in matched pairs, this one bears, within its single bracketing, a small forward solidus before the closing angle. It is what is called a **SELF-CLOSING** tag, or *void* element, & it is one which has no content of its own.

The image-tag is so because the image is summoned, not contained — that is to say, the picture itself lies in a separate file elsewhere, and

the tag merely indicates *where* in the document it is to appear, & *which* picture is to be summoned. Without content of its own, the tag has no need for a closing partner.

Other self-closing tags include `<br />`, which forces a line-break; `<hr />`, which produces a horizontal rule (as one sometimes sees between sections of a chapter); and `<input />`, which calls forth a form-field for the operator's filling. We shall meet them all in their proper places.

△ A COMMON PITFALL, ATTENDED BY CONFUSION

The novice will, with depressing regularity, omit a closing tag. The browser, being a tolerant beast, will frequently *guess* at where the tag ought to have closed, & will sometimes guess *correctly*. But it will sometimes guess *wrongly*, with results which range from the merely unsightly to the catastrophic. *Always close the tags you open.* The exceptions — the void elements — are few, & we shall make no further mention of forgetfulness as a defence.

IV. — OF ATTRIBUTES

An **ATTRIBUTE** is a quality, or particular, attached to a tag, which modifies its behaviour. It is written within the opening tag, after the

tag-name, in the form: *name equals value*, with the value enclosed in inverted commas.

The image-tag, for instance, requires at minimum two attributes: one called **src** (an abbreviation for *source*), which indicates which picture is to be summoned; and another called **alt** (for *alternative text*), which provides a description of the picture in words, for those circumstances in which the picture itself cannot be displayed.

SPECIMEN NO. 2 — AN IMAGE WITH ATTRIBUTES

```

```

Here, **src** & **alt** are the attribute-names; "portrait.jpg" & "A portrait of the author" are their values. Note carefully the inverted commas; they are not optional.

Most tags accept a great many possible attributes; some require certain ones & ignore others; a few tolerate any attribute the writer cares to invent. We shall meet attributes in profusion as we proceed; do not, on first encountering them, be alarmed.

V. — OF NESTING

Tags may be enclosed within other tags, as a Russian doll is enclosed within another Russian doll, or as a citation is enclosed within a

footnote which is itself enclosed within a paragraph which is enclosed within a chapter, & so on. This practice is called **NESTING**, & it is the principal mechanism by which complex documents are constructed.

SPECIMEN NO. 3 – A MODEST NESTING OF
ELEMENTS

```
<p>The dog was, by all accounts, <em>remarkably</em>  
stupid.</p>
```

The `<em>` element is here nested within the `<p>` element. Note carefully that the inner element is closed *before* the outer one. To do otherwise — to interleave the closures — is, in the parlance of our trade, to write *malformed* hyper-text, & the consequences are unpredictable.

If you would write

```
<p>The dog was, <em>remarkably stupid.</p></em>
```

— that is, with the closures in the wrong order — you are committing the cardinal sin of malformed nesting, and the browser

will judge you for it. Often it will display the result tolerably; occasionally it will not; in *all* cases it is, at the very least, in poor taste.

| *A useful mnemonic, taught me in my youth: "First in, last out, and all your tags shall be devout." I have not forgotten it.*

With these elementary principles in hand — tags, elements, attributes, nesting — the reader is now possessed of the entire grammatical apparatus of Hyper-Text. The remainder of the volume is devoted to *vocabulary*: the specific tags & their uses; the conventions of layout; the ornaments of style. The grammar, you have. Be of good cheer.

PART THE SECOND

FIRST
ACQUAINTANCE
WITH THE
APPARATUS



*Wherein the Reader, having been sufficiently lectured
upon Theory, is at last permitted to take up the pen &*

*compose a Document of his own; the Author standing
close at hand throughout, in case of fainting.*

— CHAPTER THE FOURTH —
THE SKELETAL FRAME
OF EVERY DOCUMENT



*“Begin at the beginning, the King said gravely, and
go on till you come to the end: then stop.”*

— L. Carroll, who would have made an
indifferent web-developer.

Every Document of Hyper-Text, regardless of its purpose or contents, possesses a common skeletal frame; an underlying anatomy which is, with very minor variation, identical from the simplest greeting-card to the grandest commercial enterprise. Once acquainted with this frame, the reader will find that ninety percent of the labour of producing a new document consists merely of *filling in the spaces*. The frame in question is composed of four elements, which we present here in their entire inelegant simplicity:

SPECIMEN NO. 4 — THE MINIMAL DOCUMENT

```
<!DOCTYPE html>
<html>
  <head>
    <title>A Document</title>
  </head>
  <body>
    <p>Salutations to the World!</p>
  </body>
</html>
```

This is, the reader may take my word for it, a perfectly valid & complete document of Hyper-Text. It is not a particularly *interesting* document — it greets the world & nothing more — but it is structurally faultless, & will be displayed by any browser, anywhere on Earth, with reliable consistency. Let us examine the parts.

I. — THE DOCTYPE DECLARATION

The very first line —

```
<!DOCTYPE html>
```

— is called the **DOCTYPE DECLARATION**, & it serves the modest function of informing the browser that *“What follows is a document of Hyper-Text, of the modern variety.”* It is, in essence, a polite cough at the start of a sentence; a clearing of the throat; an announcement that the speaker is about to speak.

In times past, this declaration was an affair of considerable complexity, requiring the writer to specify the precise dialect of Hyper-Text in use, complete with references to obscure ratifying bodies & their published standards. Mercifully, the modern world has dispensed with all of that. The seventeen characters above suffice for any document the reader is likely ever to compose. *Use them, & ask no further questions.*

A TRIFLING CURIOSITY

The Doctype declaration is the only place in a Hyper-Text document where one will find a tag beginning with an exclamation mark. It is also the only tag that does not require closing. It is, in short, an exception to almost every rule we shall lay down. Do not let this trouble you; it has been this way since the beginning, & we have all made our peace with it.

II. — THE `<HTML>` ELEMENT

Following the doctype, every document opens with the tag `<html>` & closes with `</html>`. This element is the *great envelope* within which the entire document resides. Whatsoever lies outside it shall be ignored by the browser, with the exception of the doctype just mentioned.

One may liken the `<html>` element to the leather covers of a book: nothing of the actual reading-matter goes upon the covers themselves, but they bind the whole together & declare it to be a Book.

III. — THE `<HEAD>` ELEMENT

Within the great envelope, we find first the **HEAD**, which is, despite its name, a region the reader is *not meant to see*. The head contains *information about* the document: its title, its character set, its associated style-sheets, its author's name (if he be vain enough to inscribe it), & sundry other pieces of metadata.

The most essential occupant of the head is the `<title>` element, which gives the document its name. This name appears not in the body of the page itself, but rather in the title-bar of the browser, in the lists of bookmarks & histories, & in the results of search-engines. It is, therefore, of considerable importance, & the wise writer chooses it carefully.

IV. — THE `<BODY>` ELEMENT

And here at last we arrive at the **BODY**, which is the region the reader *is* meant to see. Everything intended for the reader's eye — every paragraph, image, table, link, button, form, & ornament — is to be placed within the `<body>` element. To put such things outside it is much like leaving the chairs & sofas in the front garden, & expecting one's guests to dine upon them: technically possible, but in poor taste.

The relation of the four elements is illustrated below.

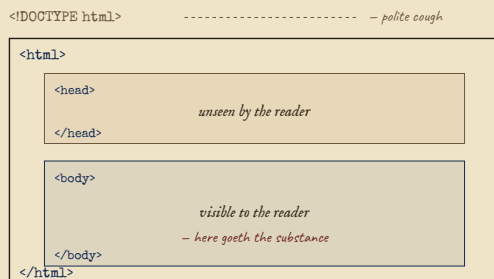


FIG. III. THE SKELETAL FRAME, IN CROSS-SECTION.

V. — A FIRST PRACTICAL EXERCISE

The reader is now in possession of all the materials required to create a document of his own. We shall not, however, abandon him to his own devices; the kindly author will conduct him through the procedure step by step. Should he have access to a computing engine equipped with any text-editor whatsoever (the simpler, the better), he is invited to follow along.

1. Open the text-editor & create a new, empty document.
2. Type the seven lines from *Specimen No. 4* above, exactly as shown.
3. Save the document under any name agreeable to the reader, with the appended suffix **.html** — for example, **first-attempt.html**.
4. Find the document upon the disk, & double-click it.

5. The browser shall open, & display the words *“Salutations to the World!”*

If this occurs, the reader has created his first document of Hyper-Text, & is entitled to a small celebration. If it does not occur, consult **CHAPTER XVII**, on diagnostic procedures; the most likely cause is a misspelling.

The author confesses to having shed an actual tear, in 1996, when his own first document displayed correctly. The reader need not be embarrassed by a similar reaction.

— CHAPTER THE FIFTH —

THE TITLE-BAR
& THE PREAMBLE



*“He that nameth his document well shall prosper;
he that nameth it ill shall be confounded in the search-
engines.”*

— Proverbial.

We turn now to a closer examination of the `<head>` element, that unseen but indispensable parlour into which the document admits the browser before showing it to the body proper. Several useful tags reside here, & the writer who furnishes his head with care shall be richly rewarded.

I. — THE TITLE

We have already encountered the `<title>` tag, but it deserves a fuller treatment. The title is the *name* of the document; the legend by which

the world shall recall it; the inscription upon the spine of one's volume. It appears in three principal places:

- In the title-bar of the browser-window itself (where it serves to identify the page among many);
- In the labels of the browser's bookmarks & history (where it functions as the document's address-card);
- In the results returned by search-engines (where it is, frequently, the *only* thing a prospective reader sees of the document at all).

For these reasons, the title ought to be:

- **Descriptive**, that the reader may know at a glance what he beholds;
- **Concise**, for long titles are truncated by the browsers without ceremony, & the truncated portion is invariably the most informative;
- **Particular**, for a title which would suit a thousand documents shall identify none of them.

SPECIMEN NO. 5 – TITLES, INDIFFERENT &
SOUND

// Indifferent: too vague, identifies nothing —

```
<title>My Page</title>
```

// Indifferent: too long, will be truncated —

```
<title>A Compleat Guide to the Manufacture of...</title>
```

// Sound: descriptive, particular, brief —

```
<title>Horncastle's Guide to Hyper-Text</title>
```

II. — THE CHARACTER SET

One of the more curious fixtures of the head is the `<meta>` element which declares the document's **CHARACTER SET**, or *charset*. It looks like this:

```
<meta charset="UTF-8" />
```

To explain this declaration in full would require us to embark upon the vexed history of how the worlds many writing-systems came to be encoded in the limited memory of a Computing Engine, a topic upon which entire books have been written, none of them entertaining. We

shall therefore content ourselves with the practical advice: *declare your charset to be UTF-8, & do not give the matter another thought.*

This single declaration ensures that any character the writer might type — be it a French é, a German ö, a Russian Ъ, a Japanese 桃, an Egyptian 𐪓, an emoji 🐶, or a humble English ampersand — shall be transmitted & rendered faithfully. Without it, the writer is at the mercy of fortune, & fortune, in matters of textual encoding, is a fickle mistress.

III. — THE VIEWPORT

Another tag that ought always to appear in the head is the *viewport* declaration, which informs the browser how the document is to behave upon engines of differing physical size — be they the great desk-bound monitors of the office or the diminutive pocket-engines we now carry in such numbers.

```
<meta name="viewport" content="width=device-width,  
initial-scale=1" />
```

The phrase **width=device-width** directs the browser to assume that the document's width is equal to the screen's width — which is to say, *not* to attempt to render the document as if it were upon a large screen & thereby reduce it to a postage-stamp upon a small one. The **initial-scale=1** directs the browser not to magnify the document at outset.

The reader who omits this declaration shall find his document, when viewed upon a pocket-engine, displayed in such miniature that the text is legible only by the keen-eyed & the youthful — & the reader will, soon enough, be neither of these.

IV. — A FULLER SPECIMEN OF THE HEAD

Combining what we have discussed, a properly furnished head looks like this:

SPECIMEN NO. 6 — A RESPECTABLE PREAMBLE

```
<head>
  <meta charset="UTF-8" />
  <meta name="viewport"
    content="width=device-width, initial-scale=1" />
  <title>Horncastle's Guide to Hyper-Text</title>
  <meta name="description"
    content="A complete & sympathetick manual." />
</head>
```

The third of these meta-tags, declaring the **description**, is what the search-engines display beneath the title in their results. Like the title itself, it ought to be a fair & honest summary; for a document whose description promises one thing & whose contents deliver

another shall earn no friends among readers, search-engines, or its author's conscience.

A USEFUL HABIT

Make a copy of the head shown in Specimen No. 6 & keep it pasted somewhere accessible — within a notebook, perhaps, or upon the wall above one's desk. You shall use it, with only the title & description varying, in every document you ever compose. There is no shame in this; the author has been doing it for a quarter-century.

— CHAPTER THE SIXTH —
HEADINGS & THEIR
PROPER HIERARCHY



"Hierarchy is to text what gravity is to architecture: invisible, omnipresent, & calamitous to defy."

— H. R. Sykes, *On Composition*.

We turn now to the matter of **HEADINGS**, that family of tags by which a document is divided into its principal & subordinate sections. They are perhaps the most useful tools in the entire vocabulary of Hyper-Text, & the most universally *misused*.

I. — THE SIX MAGNITUDES

Hyper-Text provides, with characteristic profligacy, no fewer than *six* distinct heading tags, denoted `<h1>` through `<h6>`. They differ in two respects: their *size* upon the page (greater for lower numbers, smaller for higher) & their *semantic rank* in the document's outline.

SPECIMEN NO. 7 — THE SIX MAGNITUDES

<h1>A Heading of the First Magnitude</h1>

<h2>A Heading of the Second Magnitude</h2>

<h3>A Heading of the Third Magnitude</h3>

<h4>A Heading of the Fourth Magnitude</h4>

<h5>A Heading of the Fifth Magnitude</h5>

<h6>A Heading of the Sixth Magnitude</h6>

II. — THE INVIOABLE RULES

These tags are governed by certain Rules, the violation of which the diligent author shall studiously avoid:

1. Every document begins with a single <h1>, & one only. The <h1> is the title of the document, the very banner above its gates. To have two of them is, by analogy, to attempt to ascend a hill which has two summits — a topographical impossibility, & a logical absurdity.
2. Headings descend in order, & do not skip. An <h1> may be followed by an <h2>; an <h2>, by an <h3>; & so on. To leap from <h1> directly to <h4> is to skip three rungs of the ladder, & to leave the reader (or, more importantly, the *screen-reading* apparatus used by those of impaired vision) confused as to where he stands.

3. Headings are chosen for their semantic rank, not their visual size. A heading is not a means of making text larger; it is a means of declaring a section to *be* a section. If the writer wishes to make text large for purely decorative reasons, he should use the apparatus of **CSS** (which we shall discuss in due course), & not the heading tags.

III. — THE OUTLINE OF A DOCUMENT

The headings of a document, taken together, constitute its *outline* — that is to say, its skeleton expressed in textual form. A well-headed document is one whose outline, if extracted & printed alone, would convey the gist of the whole. Consider the following:

SPECIMEN NO. 8 — A DOCUMENT'S OUTLINE

```
<h1>On the Care of Garden Bees</h1>
<h2>The Hive & its Furniture</h2>
  <h3>Of Frames</h3>
  <h3>Of Foundation</h3>
<h2>The Bees Themselves</h2>
  <h3>The Queen</h3>
  <h3>The Workers</h3>
  <h3>The Drones</h3>
<h2>Of Honey, & its Extraction</h2>
```

The reader, presented with this outline, has a tolerable notion of what the document concerns, even without seeing a single word of the body. This is precisely the function of headings, & the test by which the writer should judge his own work: *Could a reader of the outline alone form a fair impression of the whole?*

IV. — A COMMON MISTAKE

△ THE COSMETIC HEADING — A DEPLORABLE PRACTICE

The most frequent error in this region is the use of heading tags as a means of *decoration* rather than *structure*. The writer, observing that `<h2>` renders text in a pleasing bold typeface, employs it for any line he wishes to make prominent — whether it is, in truth, a section heading or merely an emphatic remark.

This is to be deprecated upon every ground. The screen-reader stumbles over it; the search-engines mis-index the document; the outline is corrupted; & the writer's soul, as a particular consequence, suffers a small but cumulative diminution. *Use headings for headings only.*

The author once knew a young man who, in a moment of desperation, used `<h1>` tags upon every paragraph of his prose. He did this for emphasis. The result was a document of such unrelieved bombast that it could scarcely be read. The young man is now in a sanatorium.

— CHAPTER THE SEVENTH —
PARAGRAPHS, PERIODS,
& PROSE AT LARGE



"The paragraph: a unit of thought, sometimes complete, sometimes interrupted by an unscheduled conjecture about the weather."

— from a writers' handbook.

Having seen to the headings, we turn to that humbler & vastly more numerous component, the **PARAGRAPH**. It is the workhorse of all prose composition — the cart that bears the bulk of meaning from the writer to the reader's mind — & it deserves a chapter to itself.

I. — THE PARAGRAPH TAG, SIMPLY CONSIDERED

The reader has by now seen `<p>` & `</p>` often enough that no further introduction is required. They open & close a paragraph; the content between is the paragraph's substance; the browser renders it in plain prose with a small space at the end. The matter is simplicity itself.

What perhaps requires emphasis is that *each paragraph is its own element* — a discrete entity, with its own beginning & end, & not (as some novices imagine) merely a length of text terminated by a doubled space or a line-break.

SPECIMEN NO. 9 — TWO PARAGRAPHS, PROPERLY
COMPOSED

`<p>It was the best of times.</p>`
`<p>It was the worst of times.</p>`

And not, on any account, this:

SPECIMEN NO. 9 (B) — A COMMON SOLECISM

// Wrong! No closing tag, & relies on line breaks —
`<p>It was the best of times.`
`It was the worst of times.`

The browser, presented with the second specimen, will most likely render both sentences as a single run-on paragraph, since it has no instructions to divide them. The doubled space & line-break in the source-text are, to the browser's eye, simple white-space, & signify nothing.

II. — OF WHITE-SPACE

This is perhaps a useful moment to address that vexing matter. The browser's treatment of white-space — that is, the spaces, line-breaks, & tabulations the writer inserts in the source-text — is, to the uninitiated, *thoroughly perverse*.

To wit: any number of consecutive spaces, tabulations, or line-breaks in the source-text are collapsed by the browser into a single space. Thus the writer who types:

```
<p>Hello      World!</p>
```

shall find that the browser displays:

```
Hello World!
```

The eighteen spaces have been reduced to a single one. This is *by design*, & not a fault: it permits the writer to indent his source-text for legibility, with no consequence upon the rendered page.

To insert a forced line-break *without* commencing a new paragraph, the writer employs the self-closing tag `<br />`:

SPECIMEN NO. 10 — OF FORCED LINE-BREAKS
(VERSE)

<p>Tyger! Tyger! burning bright,

In the forests of the night;

What immortal hand or eye,

Could frame thy fearful symmetry?</p>

The `<br />` is the proper instrument for verse, addresses, & the like — wheresoever a forced line-break is desired without the spacing implied by a new paragraph.

III. — OF PHRASING WITHIN THE PARAGRAPH

Within any paragraph, the writer may further mark certain words for special treatment by the browser. The most common of these are:

TAG	MEANING & CUSTOMARY DISPLAY
	Emphasis. Renders in italic. <i>Use sparingly.</i>
	Strong emphasis or importance. Renders in bold-face.
<mark>	Highlighted text, as if by yellow marker.
<small>	Reduced text, useful for legalistic notes.
<sub>	Subscript, for chemical formulae &c.
<sup>	Superscript, for footnote-references & ordinals.
<code>	Computer code, rendered in monospaced type.
<cite>	The title of a cited work.

These tags, called *phrasing* or *inline* elements, are nested within paragraphs & do not interrupt the flow of text. They differ from the *block* elements (paragraphs, headings, lists) in that they create no break before or after themselves.

IV. — A FULLER SPECIMEN

Let us see these together in a single passage:

SPECIMEN NO. 11 – A PASSAGE OF PROSE, FULLY
MARKED UP

<p>The Apparatus Factory,
according to its inventors, was first
described in the work <cite>On the Mechanical
Production of Letters</cite> <small>(1907)</small>.
The reader is strongly
encouraged to consult that volume.</p>

Which renders, approximately, as:

The *Apparatus Factory*, according to its inventors, was first
described in the work *On the Mechanical Production of Letters*
(1907). The reader is strongly encouraged to consult that
volume.

The reader is encouraged to study Specimen No. 11 with care, & to
note especially how the inline elements interpose themselves within
the paragraph without disturbing its overall continuity. This is the
essence of phrasing markup: to add *meaning* without adding *visual*
breaks.

V. — ON THE RESTRAINT OF EMPHASIS

A final & serious word. The novice, having discovered & , is liable to apply them with the lavishness of a small child decorating a birthday cake. He emphasises every fourth word; he *strongly* emphasises every tenth; *and frequently he combines them, like so.*

The result is a passage in which nothing is emphasised, because *everything* is emphasised — & the reader's eye, finding no place of repose, learns to ignore the whole apparatus together. Emphasis works only by contrast; & contrast requires a great deal of un-emphasised text to set it off.

"To italicise everything is to italicise nothing." — first principle of typography. Engrave it upon the inside of your spectacles.

Use & , then, as a French chef uses garlic: with affection, but with discipline. The flavour is in the proportion.

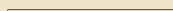
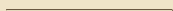
¹ *The reader who has never seen a French chef use garlic is encouraged to remedy the deficiency at his earliest convenience. Both the gastronomy & the typography shall benefit.*

PART THE THIRD

CONTAINMENT & ARRANGEMENT



*Wherein the Reader, having mastered the simple
Paragraph, is introduced to those Tags by which
collections of Items are enumerated, Quotations
distinguished, & – most marvellous of all – the Reader*



*transported instantaneously to other Documents at the
click of a finger.*

— CHAPTER THE EIGHTH —

LISTS OF SUNDRY
DESCRIPTION



*"Of all the Forms in which Information may be
presented, the List is the only one which the Modern
Mind tolerates without Complaint."*

— a despondent essayist.

The List is, perhaps, the form of presentation most congenial to the modern reader, who is so often pressed for time that he requires his information served up in discrete morsels rather than continuous courses. Hyper-Text obliges him with three distinct varieties: the *Unordered*, the *Ordered*, & the *Definitional*.

I. — THE UNORDERED LIST

An **UNORDERED LIST** is a collection of items whose mutual order is of no consequence — a shopping list, perhaps, where the reader cares only that the milk & the eggs & the loaf of bread should

all be remembered, but not in which order they shall be placed in the basket.

It is composed with the `<ul>` tag, which is the abbreviation for *unordered list*; within it, each item is wrapped in a `<li>` tag, abbreviating *list item*:

SPECIMEN NO. 12 — AN UNORDERED LIST

```
<ul>
  <li>A pound of butter</li>
  <li>Three eggs, large</li>
  <li>A bunch of asparagus</li>
</ul>
```

The browser shall render this with a small bullet-point before each item — a typographical mark inherited, by some lineage I have not bothered to trace, from the medieval scriptoria.

II. — THE ORDERED LIST

The **ORDERED LIST**, by contrast, is for items whose sequence *matters* — the steps of a recipe, the rounds of an argument, the monarchs of a dynasty. It uses `<ol>` in place of `<ul>`; the items are still wrapped in `<li>`:

SPECIMEN NO. 13 — AN ORDERED LIST

```

<ol>
  <li>Heat the oven to 350°.</li>
  <li>Cream the butter & sugar.</li>
  <li>Add the eggs, one at a time.</li>
</ol>

```

The browser shall number the items automatically — beginning at 1, & counting up. Should the writer wish them numbered otherwise (in lower-case Roman, for instance, or in alphabetic letters), this is achieved by the use of CSS, of which we shall speak in **CHAPTER XI**.

III. — THE DEFINITIONAL (OR DESCRIPTION) LIST

Less commonly seen but most useful is the **DESCRIPTION LIST**, formed of **<dl>** & consisting of pairs: a *term*, marked **<dt>**, & a *description* of that term, marked **<dd>**:

SPECIMEN NO. 14 — A DESCRIPTION LIST

```
<dl>
  <dt>Hyper-Text</dt>
  <dd>A method of marking up documents
    for display by browsers.</dd>
  <dt>Browser</dt>
  <dd>A reading-engine for hyper-text.</dd>
</dl>
```

This is the proper form for glossaries, dictionaries, lists of dramatic personæ, & any context in which one item is paired with its definition or description. The form is sadly under-used in the wild, & the reader is encouraged to do his small part to redress the balance.

IV. — OF NESTED LISTS

Lists may be nested within lists, with no theoretical limit (though the reader who exceeds three levels of nesting shall, in this author's opinion, be in want of a better outline):

SPECIMEN NO. 15 — A NESTED LIST

```
<ul>
  <li>Vegetables
    <ul>
      <li>Asparagus</li>
      <li>Beetroot</li>
    </ul>
  </li>
  <li>Fruits
    <ul>
      <li>Quinces</li>
      <li>Persimmons</li>
    </ul>
  </li>
</ul>
```

Note carefully that the nested `<ul>` appears *inside* the parent `<li>`, & not between two such items. To place it elsewhere is to violate the rules of well-formed nesting we discussed in **CHAPTER III**, & the browser shall punish you for it — silently, but persistently.

A WORD ON VISUAL MARKERS

The default bullets & numbering provided by the browser are, by aesthetic standards, perfectly hideous. Most authors swiftly replace them with custom markers via CSS. Do not let this dissuade you from using the proper list elements. The structural meaning of a list — that these items belong together, in such-&-such an order — is conveyed by the tags, & that meaning is what matters to search-engines & assistive devices. The marker itself is mere costume.

— CHAPTER THE NINTH —

QUOTATIONS, EMPHASIS, & ITALICKAL DISTINCTION



*"Quote sparingly, attribute always; for to attribute
is to flatter the borrowed-from, & to spare oneself the
labour of original thought."*

— Mark Twain (probably).

Hyper-Text provides specific tags for the marking of *quotations*,

& the writer who employs them faithfully shall be rewarded with documents that are well-indexed, well-rendered, & properly attributed. We treat them briefly, for their use is not difficult.

I. — THE BLOCK-QUOTATION

A quotation of any considerable length — that is to say, more than a sentence or two, set off as a passage in its own right — is wrapped in the `<blockquote>` tag. The browser shall render it with an indent & a softer voice; the writer may dress it further with CSS as desired.

SPECIMEN NO. 16 – A BLOCK-QUOTATION, WITH CITATION

```
<blockquote cite="https://example.com/source">  
  <p>Many a true word is spoken in jest;  
    but rather more, one finds, in earnest.</p>  
</blockquote>
```

The optional **cite** attribute provides the address of the source, which (though invisible to the reader) is consulted by certain instruments & is, in any case, a courtesy to the borrowed-from. Note that the content of the blockquote is itself wrapped in `<p>` tags: the blockquote contains paragraphs, not raw text.

II. – THE INLINE QUOTATION

For shorter quotations woven into the body of a sentence, the appropriate tag is `<q>`, which the browser obligingly surrounds with proper "smart" quotation marks of the language at hand:

SPECIMEN NO. 17 — AN INLINE QUOTATION

<p>As Wilde once observed, <q>A cynic is a person who knows the price of everything & the value of nothing</q>.</p>

The reader will note that the quotation marks are *not* typed into the source — the browser inserts them automatically. This is admirable when it works (which is most of the time) & vexing when it does not (which is the rest of it).

III. — CITATIONS & SOURCES

The titles of cited works — books, plays, journals, motion-pictures — are wrapped in <cite>, which renders by tradition in italic:

SPECIMEN NO. 18 — OF CITED WORKS

<p>My favourite volume is <cite>A Compleat Manual upon the noble Art of Hyper-Text</cite>, by the eminent Professor Horncastle.</p>

This is, the diligent author admits, an entirely fictitious recommendation, but the form is exemplary.

IV. — A NOTE ON THE TRINITY OF ITALIC

The novice is frequently baffled by the existence of *three* tags that all produce italic text — `<em>`, `<cite>`, & `<i>`. They differ in *meaning*, even where their visual appearance coincides:

TAG	USE
<code></code>	For emphasis — a word the reader should stress in his mental voice.
<code><cite></code>	For the title of a referenced work.
<code><i></code>	For italic for any other reason: foreign words, technical terms, ships' names.

The same trinity exists for bold-face: `<strong>` (for important matters), `<b>` (for bold for any other reason), & *technically* some others which we shall not multiply. The diligent writer chooses the tag that *means* what he intends, & lets the visual outcome follow.

— CHAPTER THE TENTH —
THE LOWLY ANCHOR
— BEING THE HYPERLINK —



“That a single word, touched, should transport the reader to the antipodes — this is the chief miracle of our age, & one which our age has, with characteristic ingratitude, ceased to notice.”

— Q. E. Horncastle, the present author.

We arrive at last at that tag which gives Hyper-Text its very name & its peculiar virtue: the **ANCHOR**, or, as it is more commonly known, the **HYPERLINK**. It is the apparatus by which one document is connected to another, the means by which the boundless library of the modern world is woven into a single continuous fabric. It deserves — & shall receive — a chapter of generous proportion.

I. — THE ANCHOR, IN ESSENCE

The anchor is composed of the tag `<a>`, & requires one essential attribute, called **href** — an abbreviation for *hypertext reference*, & one of those scraps of jargon we are now all obliged to live with. The value

of **href** is the address of the destination to which the link shall transport the reader.

SPECIMEN NO. 19 — THE SIMPLEST HYPERLINK

```
<a href="https://example.com/">visit Example</a>
```

The browser shall render the contained text — *visit Example* — in a distinctive typographic style, traditionally *blue & underlined*, to advertise its clickable nature. Upon being clicked, the browser shall navigate to the address specified, & display whatever document resides there.

II. — OF ADDRESSES, CALLED URLS

The address used in an **href** is, in our trade, called a **URL** — that is, a *Uniform Resource Locator*, three words which the inventors believed dignified what is essentially a glorified street-address. A URL has several parts:

https://	example.com	/path/to/page	?query=value
scheme	host	path	query

FIG. IV. THE ANATOMY OF A URL.

- The scheme declares the protocol of communication. **https://** is the modern standard, & the writer should employ no other

unless under unusual circumstances. (The plain **http://**, without the *s*, denotes the older & less secure form, & is rapidly going the way of the parasol.)

- The **host** is the name of the server upon which the document resides — its address in the wider inter-network.
- The **path** is the location of the particular document upon that server, much as a street & house-number locate a particular dwelling within a city.
- The **query** — optional, & introduced by a question-mark — provides additional parameters to the server, much as a postscript provides additional matter to a letter.

III. — OF INTERNAL & EXTERNAL LINKS

Hyperlinks come in two principal varieties: those that lead *within* the same document or website (called *internal*), & those that lead *elsewhere*, to documents on other servers (called *external*).

An *external* link uses a complete URL, beginning with **https://**:

```
<a href="https://other-site.com/page">elsewhere</a>
```

An *internal* link, when pointing to another document on the same site, may use a *relative* URL — one which omits the scheme & host, & specifies only the path:

```
<a href="/about.html">about us</a>
```

And a link to a *specific position within the same document* uses a fragment identifier, beginning with the # mark:

```
<a href="#chapter-three">jump to Chapter III</a>
```

Provided that some element in the document bears the matching `id="chapter-three"`, the click shall scroll the browser to that location.

IV. — THE TARGET ATTRIBUTE

By default, clicking upon a link replaces the current document with the new one. Should the writer wish the new document to open in a fresh window or tab — leaving the original undisturbed — he employs the **target** attribute:

SPECIMEN NO. 20 — OF OPENING LINKS IN A NEW WINDOW

```
<a href="https://example.com"  
  target="_blank"  
  rel="noopener noreferrer">Example</a>
```

Two attributes are at work here. `target="_blank"` commands the new window; `rel="noopener noreferrer"` is a small piece of magical incantation that prevents certain security & privacy mishaps which we shall not enumerate. *Use them together; never one without the other.*

△ OF OPENING LINKS IN NEW WINDOWS

The practice of opening every external link in a new window is a polarising one. Some authors maintain it preserves the reader's place; others, that it deprives him of the back-button & clutters his screen. The present author holds the latter view, & advises the writer to open new windows *only* when there is a compelling reason — a downloadable file, perhaps, or an apparatus the reader is meant to consult alongside the original. In all other cases, trust the reader to manage his own tabs.

V. — OF SOUND ANCHOR-TEXT

The text within an anchor — the words that become clickable — is called the *anchor-text*, & the writing of good anchor-text is a small but consequential art. Consider:

ANCHOR-TEXT, INDIFFERENT & SOUND

// Indifferent — uninformative —

For the full report, `<a href="...">click here</a>`.

// Sound — describes the destination —

See the `<a href="...">full annual report</a>`.

The phrase *"click here"* tells the reader nothing of where he shall be conveyed; the phrase *"full annual report"* tells him everything. The benefit is threefold: the reader is better-informed, the search-engines better-indexed, & the screen-reading apparatus — whose users hear only the anchor-text out of context — better-served. *Forswear "click here" forever, & let your anchor-texts describe what they link to.*

VI. — OTHER USES OF THE ANCHOR

Beyond linking to other documents, the anchor may also:

- Send mail. An `href` beginning with `mailto:` opens the reader's mail-programme with the address pre-filled: `<a href="mailto:friend@example.com">send mail</a>`.
- Place telephone-calls. Similarly, `tel:` initiates a call upon engines so equipped: `<a href="tel:+44-20-7946-0958">call us</a>`.

- **Trigger downloads.** The attribute **download** upon an anchor whose href points at a file shall, instead of opening the file, save it to the reader's disk.

Each of these is a small jewel of utility. The reader is encouraged to commit them to memory & deploy them as occasion warrants.

Berners-Lee himself has remarked that, were he able to amend a single design-choice in his original proposal, he would have eliminated the two slashes after the colon in URLs. They served, he says, no purpose. Such, dear reader, is invention: a thing one regrets afterward, in fine particular.

PART THE FOURTH

ADORNMENT BY
THE
CASCADING STYLE-
SHEET



*Wherein the Reader's documents, having now bones,
shall acquire flesh, & thereafter raiment, & thereafter*

*cosmetic; the better to please the Eye & the Sensibilities
of those who behold them.*

— CHAPTER THE ELEVENTH —

A GENTLE INTRODUCTION TO CSS



“Form follows function — that has been misunderstood. Form & function should be one, joined in a spiritual union.”

— Frank Lloyd Wright (a notable architect,
never a web-developer).

A document of pure Hyper-Text, unadorned by anything further, is a perfectly serviceable thing — but it is, by aesthetic standards, the visual equivalent of a country gentleman in his dressing-gown, taking breakfast in the kitchen. Functional, yes; presentable to company, no. To make our documents fit for company, we must clothe them; & the wardrobe in which we keep our documents' clothing is called the **CASCADING STYLE-SHEET**, mercifully shortened to **CSS**.

I. — THE PRINCIPLE OF SEPARATION

The fundamental principle of **CSS** — & one of the most important principles in the whole of our subject — is the *separation of structure*

from appearance. The Hyper-Text declares *what the document is*; the style-sheet declares *how the document looks*. The two are kept in distinct files, & the writer is free to alter one without disturbing the other.

The advantages of this arrangement are several:

- **One style-sheet may govern many documents.** A single CSS file applied to a hundred pages produces a uniform appearance across all of them, & a single edit to the style-sheet alters all hundred at once.
- **Different audiences may receive different styles.** A document may be rendered in one fashion upon a wide desktop monitor, in another upon a narrow pocket-engine, in a third upon a printer's page, & in a fourth as plain text for the screen-reading apparatus.
- **The writer's labour is divided sensibly.** When composing the structure, he thinks structurally; when adjusting the appearance, he thinks æsthetically. The separation makes both tasks easier.

II. — THE ANATOMY OF A RULE

A style-sheet is composed of *rules*, & a rule is composed of three parts: a *selector*, which identifies which elements the rule shall affect; a series of *properties*, naming the qualities to be set; & a series of *values*, specifying what those qualities shall become. The form is:

SPECIMEN NO. 21 – THE FORM OF A RULE

```
selector {  
  property: value;  
  property: value;  
}
```

An example, in the concrete:

SPECIMEN NO. 22 – A SIMPLE RULE

```
p {  
  color: navy;  
  font-size: 14pt;  
  line-height: 1.5;  
}
```

This rule, applied to a document, decrees that *every paragraph* (selected by the simple selector `p`) shall be displayed in navy-blue, at fourteen points, with a line-height of one-&-a-half. The selector points; the properties & values dictate.

III. — OF SELECTORS

Selectors are the means by which we declare *which* elements a rule applies to. They come in great variety, of which we shall here treat only the four most essential:

FORM	MEANING
<code>p</code>	Every <code><p></code> element in the document.
<code>.warning</code>	Every element bearing the class-attribute <code>warning</code> .
<code>#main</code>	The single element bearing the id-attribute <code>main</code> .
<code>a:hover</code>	An anchor, while the cursor hovers above it.

The reader will note that *classes* (preceded by a dot) & *ids* (preceded by a hash) require special attributes upon the elements themselves:

SPECIMEN NO. 23 — CLASSES & IDS IN HTML

```
<p class="warning">Beware!</p>
<div id="main">...</div>
```

The distinction between class & id is this: a *class* may be applied to as many elements as the writer pleases, while an *id* must be unique within the document — it identifies a single, particular element. Use

classes for collections of similar things; use ids for individual landmarks.

IV. — HOW A STYLE-SHEET IS ATTACHED

A CSS rule-set may be incorporated into a Hyper-Text document in three ways, ordered here from the most preferable to the least:

1. By external file. A `<link>` tag in the document's `<head>` points to a separate file, ending in `.css`, where the rules are stored. *This is the proper way.*
2. By internal style-block. A `<style>` element within the head contains the rules directly. Permissible for small documents, or for one-off styles particular to a single page.
3. By inline style. The `style` attribute upon an individual element specifies styles applying only to that one. Generally to be avoided, save in extremis.

SPECIMEN NO. 24 — THREE FORMS OF
STYLESHEET ATTACHMENT

```
// 1. External (in the document's head)
<link rel="stylesheet" href="styles.css" />

// 2. Internal (in the document's head)
<style>
  p { color: navy; }
</style>

// 3. Inline (upon a particular element)
<p style="color: navy">...</p>
```

V. — THE "CASCADE"

The reader has perhaps wondered why these style-sheets are called *cascading*. The reason is that, when several rules apply to the same element, they cascade — that is, they accumulate & override one another according to definite principles of *specificity* & *order*.

The general principles, simply stated, are these: more specific selectors override less specific ones (an id is more specific than a class, which is more specific than a tag-name); & among rules of equal specificity, the later overrides the earlier. There are exceptions & complications, but for the moment this account suffices.

"Cascade" — an unusually poetic word for what is, in essence, a system of priority. The author has often wondered whether the inventors were Romantics in disguise.

— CHAPTER THE TWELFTH —
OF COLOUR, FONT,
& MAGNITUDE



*“There are no rules of architecture for a castle in
the clouds.”*

— G. K. Chesterton

We turn now to particular CSS properties, beginning with those concerning the appearance of text. These three — *colour*, *typeface*, & *size* — are the workhorses of typographic adornment, & the writer who masters them shall produce documents of considerable distinction.

I. — OF COLOUR

Colour in Hyper-Text is specified in a variety of forms, the principal four being:

FORM	EXAMPLE	USE
Named	red, navy	One of some 140 named colours, mostly inherited from the X-Window system.
Hex	#1f1a12	Six hexadecimal digits, two each for red, green, & blue.
RGB	rgb(31,26,18)	Three numbers from 0–255, for red, green, & blue.
HSL	hsl(34,26%,9%)	Hue (0–360°), saturation, & lightness — the most intuitive form.

Two properties take colour values: **color** (the colour of the text) & **background-color** (the colour of the background). They are applied to elements thus:

SPECIMEN NO. 25 – OF COLOUR

```
body {
  color: #1f1a12;
  background-color: #f0e4c8;
}

.warning {
  color: #6b2a1f;
  background-color: rgb(255, 240, 230);
}
```

The reader will recognise these particular colours, perhaps; they are those of the present volume itself, & have been chosen to evoke the warm tones of an aged page.

II. — OF TYPEFACES

The property **font-family** declares the typeface in which an element shall be set. Its value is a list of typefaces, separated by commas, in order of preference. The browser shall use the first that is available upon the reader's system:

SPECIMEN NO. 26 — SPECIFYING A TYPEFACE

```
body {
  font-family: 'Cormorant Garamond', 'Georgia', serif;
}
```

The browser shall first attempt *Cormorant Garamond* — a fine typeface, but one not present on every system. Failing that, it shall use *Georgia*, which is more widely available. Failing both, it shall use whichever *serif* typeface the system can provide. The *fallback* chain is the writer's safety-net.

For typefaces not commonly resident upon readers' systems, the writer may furnish them himself, by means of the **@font-face** declaration:

SPECIMEN NO. 27 — OF CUSTOM TYPEFACES

```
@font-face {
  font-family: 'IM Fell English';
  src: url('IMFellEnglish.woff2') format('woff2');
}
```

This declares a font called *IM Fell English*, sourced from a particular file. Once declared, it may be invoked in any subsequent **font-family** rule. The reader will appreciate that the entire typographic distinction of the volume he holds in his hands is achieved by precisely this mechanism.

III. — OF SIZE

The property **font-size** sets the size of text, & takes a value in any of several units, of which the most useful are:

UNIT	MEANING
px	Pixel — an absolute size in screen-dots. Use sparingly.
pt	Point — the traditional typographer's unit ($\frac{1}{72}$ of an inch). Use for print.
em	Relative to the parent element's font-size.
rem	Relative to the root element's (i.e. the document's) font-size.
%	Relative to the parent's size, as a percentage.

For most modern screen-bound documents, the **rem** is the preferred unit, as it permits the reader (or the reader's system) to adjust the base size, & have all derived sizes scale accordingly. The diligent writer specifies sizes in **rem**, & only resorts to absolute units when truly required.

IV. — OF WEIGHT, STYLE, & OTHER NICETIES

Several further properties govern the appearance of text:

- **font-weight** — controls boldness. Values: **normal**, **bold**, or numerical (100, 200, ... 900).
- **font-style** — **normal** or **italic**.
- **text-align** — **left**, **right**, **center**, or **justify**.
- **text-decoration** — **none**, **underline**, **line-through**.
- **letter-spacing** — additional space between letters; small positive values lend an air of distinction.

- **line-height** — vertical distance between lines. A value of 1.4 to 1.6 is comfortable for body text.

A combined specimen, demonstrating several at once:

SPECIMEN NO. 28 — SEVERAL TYPOGRAPHIC
PROPERTIES

```
.epigraph {  
  font-family: 'IM Fell English', serif;  
  font-style: italic;  
  font-size: 0.95rem;  
  color: #3a2f20;  
  text-align: right;  
  line-height: 1.4;  
  letter-spacing: 0.02em;  
}
```

Such a rule, applied to an epigraph of the kind that opens each chapter of this volume, produces a refined & restrained effect: italic, slightly grey, gently spaced, & aligned to the right margin. *This is what taste looks like in CSS.* Or so the author flatters himself.

— CHAPTER THE THIRTEENTH —

THE BOX MODEL & ITS PECULIARITIES



*"All elements are boxes, & all boxes have four sides;
the rest is mere geometry."*

— a CSS proverb.

We turn now to one of the most fundamental — & most frequently misunderstood — concepts in the whole apparatus of CSS: the **BOX MODEL**. Master it, & the layout of pages shall hold no further mysteries; misunderstand it, & you shall spend your career baffled by margins that refuse to behave.

I. — THE UNIVERSAL BOX

The principle is this: *every element rendered by a browser is, internally, a rectangle* — a box. This is true of paragraphs, of headings, of images, of links, even of single italicised words. Some boxes are arranged in stacks (the *block* elements: paragraphs, headings, divisions), some in flowing

rows (the *inline* elements: spans, anchors, emphasis-tags), but all are boxes, all the way down.

Each box has four concentric layers, like the strata of a small geological cross-section:



FIG. V. THE STRATA OF A CSS BOX.

Reading from the inside outwards:

- **Content** — the innermost region, containing the text or image proper.
- **Padding** — a transparent cushion separating the content from the border. Set with the **padding** property.
- **Border** — a visible frame, of any thickness, style, & colour the writer pleases. Set with the **border** property.
- **Margin** — an outermost transparent zone, separating this box from its neighbours. Set with the **margin** property.

II. — THE PROPERTIES IN PRACTICE

Each of **padding**, **border**, & **margin** may be specified for all four sides at once or individually:

SPECIMEN NO. 29 — THE BOX, IN CSS

```
.frame{
  padding: 1rem;      // all four sides
  border: 1px solid #1f1a12;
  margin: 2rem 0;     // top/bottom 2rem; left/right 0
}

.aside{
  padding-left: 2rem;  // just the left
  border-left: 3px solid #6b2a1f;
  margin-bottom: 1rem;
}
```

The shorthand **margin: 2rem 0** takes two values: the first applies to top & bottom; the second to left & right. With four values (**top**, **right**, **bottom**, **left**), each side may be set individually. The same shorthand obtains for padding.

III. — OF WIDTH, HEIGHT, & THE BOX-SIZING QUESTION

By default — & this is a source of perennial confusion — when the writer specifies **width: 200px**, this *refers to the content alone*, not the entire box. The padding & border are added *outside* the specified width, so the actual visible width of the box may be considerably greater than 200 pixels.

⚠ THE DEFAULT BOX-SIZING — A SNARE

A box with **width: 200px**, **padding: 20px**, & **border: 5px solid black** shall, by default, occupy *250 pixels* of horizontal space. The writer who arranged two such boxes side-by-side in a 500-pixel container, expecting them to fit, shall find them overflowing the bounds & toppling onto the next line.

The remedy is the property **box-sizing**, which when set to **border-box** instructs the browser to *include* padding & border within the specified width:

SPECIMEN NO. 30 — THE UNIVERSAL REMEDY

```
*, *::before, *::after {  
  box-sizing: border-box;  
}
```

This rule, applied at the very top of every style-sheet the writer ever composes, makes *every* element on the page behave sensibly. The asterisk `*` is the universal selector — meaning *all elements* — & the rule confers upon every element the saner box-sizing model. The author humbly suggests the reader employ this rule unfailingly, & never look back.

IV. — DISPLAY: BLOCK, INLINE, & INLINE-BLOCK

A property closely allied to the box model is **display**, which dictates how an element behaves with respect to its neighbours:

VALUE	BEHAVIOUR
block	Stacks vertically. Takes full available width. Default for paragraphs, divs, headings.
inline	Flows horizontally with surrounding text. Width & height ignored. Default for spans, anchors, emphasis.
inline-block	Flows horizontally, but accepts width & height. The best of both worlds.
none	Removes the element from the page entirely. As if it had never been written.
flex, grid	Modern layout systems, treated in the next chapter.

The writer who understands *block versus inline* understands at least three quarters of why elements arrange themselves as they do. The remaining quarter is occupied by *flexbox* & *grid*, which we shall introduce briefly in the next chapter.

"Why is my ignoring the width I set?" – because spans are inline by default, & inline elements ignore width. The remedy is display: inline-block. You're welcome.

PART THE FIFTH

PICTORIALS
& TABULAR
ARRANGEMENTS



*Wherein we treat of those Embellishments – the
inserted Likeness, the orderly Table – by which the*

*modern Document is dignified above its merely textual
ancestors.*

— CHAPTER THE FOURTEENTH —

THE INSERTION
OF LIKENESSES



*"A picture is worth a thousand words; though
usually those thousand words would have been more
nourishing."*

— a curmudgeonly editor.

A document of words alone is a noble thing; a document of words & pictures together is a nobler still. Hyper-Text obliges the writer's pictorial ambitions through a single self-closing tag — the `<img />` — & through one or two further tags of subsidiary use. We treat them all in this chapter.

I. — THE IMAGE-TAG, IN ESSENTIAL FORM

SPECIMEN NO. 31 — AN IMAGE, PROPERLY
INSCRIBED

```

```

Four attributes appear here, each indispensable for distinct reasons:

- **src** — the source: where the picture-file resides. May be a relative path ("**flower.jpg**") or a full URL.
- **alt** — the alternative text: a description of the image in words, for those who cannot perceive it visually. *This is not optional.* A blind reader, an unreliable connection, an image-blocking system — all rely upon the alt-text.
- **width & height** — the dimensions of the image in pixels. Their declaration permits the browser to reserve space for the image while it loads, & thereby prevents the page from leaping about disconcertingly.

II. — ON THE WRITING OF ALT-TEXT

The writing of good alt-text is an art unto itself, & one shockingly under-practised. The alt-text should describe what the image *means* in context, not merely what it *shows*:

IMAGE OF	INDIFFERENT ALT-TEXT	SOUND ALT-TEXT
The author's portrait	<i>"image"</i>	<i>"A portrait of Q. E. Horncastle, c. 1908"</i>
A red warning sign	<i>"red sign"</i>	<i>"Warning: high voltage"</i>
A purely decorative flourish	<i>"swirly thing"</i>	<i>(empty: alt="")</i>

The third row above bears comment. For images which serve no informational purpose — purely decorative ornaments & the like — the proper alt-text is *empty*: `alt=""`. This signals to assistive devices that the image may be safely ignored. *Do not omit the alt-attribute entirely*; supply it & leave it empty. The distinction matters.

III. — OF IMAGE FORMATS

Images come in several formats, each with strengths & weaknesses:

FORMAT	BEST FOR
<code>.jpg</code> / <code>.jpeg</code>	Photographs & complex images. Lossy compression.
<code>.png</code>	Diagrams, icons, anything with sharp edges. Supports transparency.
<code>.svg</code>	Vector graphics — diagrams, logos. Scales to any size without blurring.
<code>.webp</code>	The modern compromise; smaller files than JPG, with transparency.
<code>.gif</code>	Simple animations. Otherwise outclassed in every respect.

IV. — THE FIGURE-ELEMENT

For an image accompanied by a caption — as the figures in the present volume — the proper structure is the `<figure>` element, with `<figcaption>` for the caption:

SPECIMEN NO. 32 — A FIGURE WITH CAPTION

```
<figure>
  
  <figcaption>FIG. VII. — The Compound Steam-Engine.</
figcaption>
</figure>
```

The `<figure>` element groups the image & its caption into a single semantic unit, useful both to the reader's comprehension & to the screen-reader's narration.

V. — A NOTE ON RESPONSIVENESS

An image of fixed pixel-dimensions, displayed upon a pocket-engine of narrow screen, may overflow its bounds disgracefully. The remedy is a CSS rule:

```
img {  
  max-width: 100%;  
  height: auto;  
}
```

This declaration ensures that no image shall ever be wider than its container, & that the image's height shall scale proportionally. *Apply this rule to every site you ever build.* Future readers, on devices not yet invented, shall thank you.

— CHAPTER THE FIFTEENTH —

TABLES, THAT MOST CIVILISED ARRANGEMENT



"Of all the works of Man, the Table is perhaps the most under-appreciated. The wheel had its admirers; the table has only had its accountants."

— anon.

For the orderly presentation of data — figures of population, prices of commodities, lineages of monarchs, comparisons of attributes — there exists no instrument more fit than the **TABLE**. Hyper-Text provides for tables a small but adequate set of tags, which we shall now examine.

I. — THE ANATOMY OF A TABLE

Every table is composed of:

- The outer container, `<table>`;
- One or more *rows*, each marked `<tr>` (for *table row*);

- Within each row, one or more *cells*, marked `<th>` for header cells & `<td>` for data cells (for *table data*).

SPECIMEN NO. 33 – A MODEST TABLE

```
<table>
  <tr>
    <th>Monarch</th>
    <th>Reigned</th>
  </tr>
  <tr>
    <td>Victoria</td>
    <td>1837-1901</td>
  </tr>
  <tr>
    <td>Edward VII</td>
    <td>1901-1910</td>
  </tr>
</table>
```

II. – OF HEADERS, BODIES, & FOOTERS

For tables of any complexity, three further tags structure the rows into logical sections: `<thead>` for the header row(s), `<tbody>` for the principal data, & `<tfoot>` for any footer (totals, &c.):

SPECIMEN NO. 34 - TABLES, WITH STRUCTURE

```
<table>
  <thead>
    <tr><th>Item</th><th>Cost</th></tr>
  </thead>
  <tbody>
    <tr><td>Pencils</td><td>2/6</td></tr>
    <tr><td>Inkwell</td><td>7/0</td></tr>
  </tbody>
  <tfoot>
    <tr><th>Total</th><td>9/6</td></tr>
  </tfoot>
</table>
```

III. — OF SPANNING CELLS

Cells may span multiple columns or rows by means of the **colspan** & **rowspan** attributes:

```
<td colspan="2">Spans two columns</td>
<td rowspan="3">Spans three rows</td>
```


IV. — A CARDINAL RULE

⚠ TABLES FOR TABULAR DATA ONLY

In the dim & benighted era of Hyper-Text's youth — roughly, the late 1990s — it was customary to use the `<table>` element for *page layout*: dividing a page into columns of navigation, content, & sidebar by means of an enormous unholy table. *This practice is utterly forbidden.* Tables are for *tabular data*; layout is the proper office of CSS, the techniques of which (flexbox, grid) we mention briefly in **CHAPTER XIV**'s closing remarks.

PART THE SIXTH

OF MISADVENTURES
& THEIR REMEDIES



*Wherein the Reader, his Document not yet behaving as
he intended, is conducted through the principal Errors
of the Novice, & instructed in the Art of Diagnosis &
Repair.*

— CHAPTER THE SIXTEENTH —

COMMON ERRORS
OF THE NOVICE



*"Experience is the name everyone gives to their
mistakes."*

— O. Wilde, who knew a thing or two.

In the course of a long career, the present author has accumulated a melancholy gallery of the errors most commonly committed by those new to Hyper-Text. He presents them here, with sorrow rather than censure, in the hope that the reader, fore-warned, may avoid making them altogether — or, at the least, recognise them swiftly when made.

I. — THE UNCLOSED TAG

The most frequent of all errors. The writer opens a tag & forgets to close it. The browser, charitably guessing where the close ought to have been, frequently produces a passable result; but in stubborn cases — particularly with nested elements — the consequences may be dramatic.

```
// Erroneous: closing tag forgotten —  
<p>A paragraph that never ends  
<p>A second paragraph trying to begin</p>  
  
// Sound: every opening matched —  
<p>A paragraph that ends</p>  
<p>A paragraph that begins after</p>
```

II. — THE MIS-NESTED TAG

Already mentioned in **CHAPTER III**, & worth repeating: tags must close in the reverse order of their opening. To do otherwise is malformed.

```
// Erroneous —  
<p>Some <em>italic words</p></em>  
  
// Sound —  
<p>Some <em>italic words</em></p>
```

III. — THE UNQUOTED ATTRIBUTE

Attribute values must be enclosed in quotation marks. The browser is, again, often forgiving about this, but the writer who depends upon that forgiveness shall sooner or later be disappointed.

```
// Erroneous —
<img src=flower.jpg alt=a flower />

// Sound —

```

IV. — THE CONFUSED PATH

Paths to images, stylesheets, or linked documents may be relative (to the current document) or absolute (from the root of the site). The novice frequently confuses these, with the result that his images mysteriously fail to appear.

- **"flower.jpg"** — relative; refers to a file in the same folder as the current document.
- **"images/flower.jpg"** — relative; refers to a file in the *images* sub-folder.
- **"../flower.jpg"** — relative; refers to a file in the parent folder.

- `"/images/flower.jpg"` — absolute; refers to *images/flower.jpg* from the root of the site.
- `"https://example.com/flower.jpg"` — fully qualified; refers to a file on a specific server.

V. — THE RESERVED CHARACTER

Certain characters — principally `<`, `>`, `&` & itself — have special meaning in Hyper-Text & cannot be typed directly into content. To display them, one must use the *character entities*:

TO DISPLAY	TYPE
<code><</code>	<code>&lt;</code>
<code>></code>	<code>&gt;</code>
<code>&</code>	<code>&amp;</code>
<code>"</code>	<code>&quot;</code>
non-breaking space	<code>&nbsp;</code>

VI. — THE FORGOTTEN DOCTYPE

A document missing its `<!DOCTYPE html>` declaration shall be rendered by the browser in *quirks mode* — an antique compatibility setting which mimics the eccentric behaviours of browsers from the late twentieth century. The results are unpredictable, & the writer who suspects his document is mis-rendering for unfathomable reasons should first check that he has supplied the doctype.

VII. — THE INFLATED STYLE

A milder error, but a costly one over time: applying styles inline, repeatedly, rather than collecting them into rules. The writer who types `style="color: red"` upon every paragraph he wishes red has produced a document that is bloated, hard to maintain, & impossible to restyle without re-editing every paragraph. *Use classes & rules. Always.*

— CHAPTER THE SEVENTEENTH —
DIAGNOSTIC PROCEDURES
& SUNDRY REPAIRS



*“When in doubt, refresh; when refreshing fails,
restart; when restarting fails, retire to the country.”*

— a senior engineer.

No matter how diligent the writer, his documents shall at some times misbehave. The art of identifying & correcting these misbehaviours is called *debugging*, & we devote this concluding chapter of the body to it.

I. — THE DEVELOPER TOOLS

Every modern browser is equipped with a remarkable suite of instruments for inspecting documents, called the **DEVELOPER TOOLS**. They are summoned, in most browsers, by pressing the key

F12, or by right-clicking upon the page & selecting *“Inspect”*. A panel shall appear, divided into several sections:

- **Elements** — displays the document's structure as a tree of nested elements; the writer may click upon any element to see (& modify) its properties.
- **Styles** — shows which CSS rules apply to the selected element, & which rules they override or are overridden by.
- **Console** — displays errors & warnings issued by the browser, particularly relating to JavaScript, but also missing files, malformed CSS, &c.
- **Network** — shows every file the browser has requested in loading the document, with timings & sizes. Indispensable for diagnosing missing images & slow loads.

The writer who has not yet learned to use the developer tools is in the position of a doctor who has not yet learned to use the stethoscope: he may make a living, but he should not.

II. — THE METHOD

When a document misbehaves, the diligent investigator proceeds thus:

1. **Open the developer tools.** Examine the Console for any errors. If errors are reported, address them first; many are of the form *“the file X was not found”*, & are easily corrected.
2. **Identify the misbehaving element.** Right-click upon it & select *“Inspect”*. The Elements panel shall highlight the relevant tag in the tree.

3. **Examine the applied styles.** Look at the Styles panel. Are the rules you expected applied? Are any overridden by others? (Overridden rules appear with a strike-through.)
4. **Modify, & observe.** The Styles panel permits temporary modifications: add, remove, or alter properties & see the effect immediately. Once the correct combination is found, transcribe it into the actual style-sheet.
5. **If all else fails, narrow the search.** Comment out half the document; observe whether the problem persists; comment out half of *that*; & so on, until the offending fragment is isolated. This is called *bisection*, & it is the surgeon's scalpel of debugging.

III. — COMMON SYMPTOMS & THEIR CAUSES

SYMPTOM	LIKELY CAUSE
An image fails to appear.	Path is wrong (check the Network tab). File missing. Filename misspelled — <i>case matters</i> .
A style is not applied.	Selector is mistyped. A more-specific rule overrides it. The style-sheet itself failed to load.
The page looks correct on your machine but not on another.	A typeface installed locally is not present on the other machine. (Use @font-face .)
Element refuses to take the width you set.	It is an <i>inline</i> element. Try display: inline-block or block .
Margins are mysteriously larger than expected.	<i>Margin collapse</i> : vertical margins between block elements merge into the larger of the two. A surprise, but a documented one.

IV. — A FINAL COUNSEL

Above all, dear reader: *do not panic*. Every error the writer has made, ten thousand writers have made before him; nearly every problem has a solution within thirty seconds' reach in any decent search-engine; nearly every despairing hour spent debugging is followed, sooner or later, by the small euphoric instant in which the cause is found & the document springs into shape. *Endure unto that instant, & you shall prevail.*

The author has, in his career, spent some 40,000 hours debugging. He has prevailed approximately 38,000 times. The remainder he attributes to acts of God.

– A P P E N D I C E S –

A REFERENCE FOR THE PRACTITIONER



*A Bestiary of Common Elements; a Glossary of
specialised Terms; & a Final Address to the diligent*

*Reader, who has now traversed the whole of our Mys-
tery.*

— APPENDIX THE FIRST —

A BESTIARY OF COMMON ELEMENTS



The following catalogue presents, in alphabetical order, the elements most likely to be encountered by the practising writer of Hyper-Text. The list is not exhaustive — that would require a volume to itself — but it includes every tag the conscientious novice should recognise on sight.

`<a>` — **ANCHOR.** The hyperlink. Requires **href**.

`<article>` — **A SELF-CONTAINED COMPOSITION.** A blog-post, a news-piece.

`<aside>` — **AN ASIDE.** Tangential content; sidebars, marginalia.

`<b>` — **BOLD-FACE FOR NON-SEMANTIC REASONS.** Use sparingly.

`<blockquote>` — **A LONG QUOTED PASSAGE.** Indented & set off.

`<body>` — **THE BODY OF THE DOCUMENT.** Contains all visible content.

`<br />` — **A LINE-BREAK.** Self-closing. Use sparingly; for verse & addresses.

<button> — A CLICKABLE BUTTON. Triggers actions.

<cite> — THE TITLE OF A CITED WORK. Renders italic.

<code> — A FRAGMENT OF COMPUTER CODE. Renders monospaced.

<div> — A GENERIC BLOCK CONTAINER. A box without semantic meaning. Use when no better tag fits.

**** — EMPHASIS. Renders italic.

<figure> / **<figcaption>** — A FIGURE WITH CAPTION. For images, diagrams, &c.

<footer> — THE FOOTER OF A DOCUMENT OR SECTION.

<form> — A FORM FOR USER INPUT. Contains inputs, buttons, &c.

<h1>–**<h6>** — HEADINGS OF SIX MAGNITUDES. Use in proper hierarchical order.

<head> — THE DOCUMENT’S PREAMBLE. Contains metadata, title, &c.

<header> — THE HEADER OF A DOCUMENT OR SECTION. Contains the heading & introductory matter.

<hr /> — A HORIZONTAL RULE. Self-closing. Marks a thematic break.

<html> — THE ROOT OF THE DOCUMENT. Contains everything except the doctype.

**** — AN IMAGE. Self-closing. Requires **src** & **alt**.

<input /> — A FORM INPUT. Self-closing. Type varies.

`<label>` — A LABEL FOR A FORM INPUT. Click-targets the associated input.

`<li>` — A LIST ITEM. Used within `<ul>` or `<ol>`.

`<link />` — A LINK TO AN EXTERNAL RESOURCE. Self-closing. For stylesheets, icons, &c.

`<main>` — THE PRINCIPAL CONTENT OF THE DOCUMENT. Only one per page.

`<meta />` — METADATA. Self-closing. For charset, viewport, description, &c.

`<nav>` — A BLOCK OF NAVIGATION LINKS.

`<ol>` — AN ORDERED LIST. Numbered.

`<p>` — A PARAGRAPH. The workhorse.

`<pre>` — PRE-FORMATTED TEXT. White-space preserved as typed.

`<section>` — A THEMATIC SECTION OF CONTENT.

`<span>` — A GENERIC INLINE CONTAINER. The inline counterpart to `<div>`.

`<strong>` — STRONG IMPORTANCE. Renders bold.

`<style>` — AN EMBEDDED STYLE-SHEET. Used in the head.

`<table>`, `<tr>`, `<td>`, `<th>` — THE TABLE FAMILY. For tabular data.

`<textarea>` — A MULTI-LINE TEXT INPUT.

`<title>` — THE DOCUMENT'S TITLE. Used in head.

`<ul>` — AN UNORDERED LIST. Bulleted.

— APPENDIX THE SECOND —

GLOSSARY OF SPECIALISED TERMS



The following definitions are offered for the convenience of the reader who, upon encountering an unfamiliar term in the body of the volume, wishes a swift refresher without hunting through several chapters.

ATTRIBUTE

A quality attached to a tag, written within the opening tag in the form name="value".

BLOCK ELEMENT

An element which stacks vertically & takes the full width of its container. Paragraphs, headings, divs.

BOX MODEL

The system whereby every rendered element is treated as a rectangle composed of content, padding, border, & margin.

BROWSER

A programme that reads & displays Hyper-Text documents. Chrome, Firefox, Safari, Edge.

CASCADE

The system by which CSS rules accumulate & override one another according to specificity & order.

CLASS

An attribute that groups elements for shared styling. Many elements may share a class.

CSS

Cascading Style-Sheets. The language of visual adornment.

DOCTYPE

The declaration `<!DOCTYPE html>` at the top of a document, announcing it as Hyper-Text.

ELEMENT

An opening tag, its content, & its closing tag, considered as a single unit.

HTML

Hyper-Text Markup Language. The language of structure.

HYPERLINK

A clickable connection from one document to another. Made with the `<a>` tag.

ID

An attribute uniquely identifying a single element. Each id may appear only once per document.

INLINE ELEMENT

An element which flows horizontally with surrounding text. Spans, anchors, ems.

MARKUP

The act, & the result, of inscribing tags upon a text.

NESTING

The placement of one element inside another. Closes must match in reverse order of opens.

PROPERTY

In CSS, a quality whose value is being set: color, font-size, margin, &c.

RENDERING

The act, performed by the browser, of converting source-text into a displayed page.

SELECTOR

In CSS, the part of a rule that identifies which elements are to be styled.

SERVER

A remote engine which holds documents & transmits them upon request to browsers.

TAG

A piece of marking-up enclosed in angle brackets, e.g. <p>.

URL

Uniform Resource Locator. The address of a document.

UTF-8

The standard character encoding. Use it always.

VOID ELEMENT

*A self-closing tag with no content of its own: ,
, <hr />.*

— APPENDIX THE THIRD —

A FINAL ADDRESS
TO THE READER



And so, dear reader, our journey draws towards its close. We began, you may recall, with a series of disclaimers about the supposed difficulty of the subject; with brave protestations that any reasonable person could master it, given but the patient explanation of one who had once been ignorant himself. The reader, having now traversed some hundred pages of explanation, is in a position to judge for himself whether those protestations were honest. The author hopes that they were.

What you have learned, in summary, is this:

- That every document of Hyper-Text is composed of *tags* & their *content*, organised into *elements*;
- That the document's structure is described by **HTML**, & its appearance by **CSS**, & that these are kept properly separate;
- That every document begins with a doctype, an html element, a head, & a body;

- That headings, paragraphs, lists, quotations, links, images, & tables — together with their CSS adornments — provide the means of producing very nearly any document the writer might require;
- That when documents misbehave, the developer tools shall reveal the cause; that errors are not occasions of shame but of education; & that no problem is so dire as to warrant despair.

The reader is now equipped to compose his own documents, to publish them upon the universal inter-network, & to take his honest place among the great fellowship of those who have, by their own labours, contributed something — however modest — to the public stock of useful information. It is a fellowship to which the author is proud to belong, & into which he welcomes the reader with all the cordiality at his command.

WHAT FOLLOWS NEXT

The reader who, having mastered the matters of this volume, finds himself thirsty for further instruction may pursue his studies in any of several directions:

- **JavaScript**, the third of the browser's tongues, by which documents are made to *respond* & *animate*. A vast subject, & a rewarding one.
- **Forms & their handling**, by which the reader's contributions are gathered & transmitted; treated only briefly herein, & deserving of their own volume.

- **Modern layout systems** — flexbox & grid — which permit elaborate page-arrangements undreamed of in earlier days.
- **Accessibility** — the practice of composing documents that are usable by readers of every kind: those with impaired vision, hearing, motor function, or cognition. A noble study, & a moral obligation.
- **The deployment of one's documents** — that is, the placing of them upon a server where the world may read them. Less complex than the novice fears.

The author has, alas, no further volumes ready for the reader's instruction in these matters; but he assures the reader that competent treatments exist, & are not difficult to find. The reader who has reached *this* page has demonstrated the persistence required to find them.

A PARTING WORD

Hyper-Text is, in its essence, a means by which one human mind may communicate with another, across distances of space & time which no previous technology has been able to bridge. It is, for all its mechanical complications, a fundamentally *literary* art — a means of *writing*, & therefore of *thinking*. The diligent practitioner shall do well to remember this.

Compose, therefore, with care; mark up with clarity; style with restraint; & above all, *have something worth saying*. The world has more than enough websites; what it wants is *readable ones*, by which is meant

ones whose authors have something to communicate & have taken the trouble to communicate it well.

Go forth, dear reader, & communicate.

Q. Eldritch Horncastle

— Cambridge, in the Trinity Term, MCMX.



FINIS

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