

STRATIGRAPHY

workshop / demonstration led by

Andrew Paterson

:: introduction ::

The term stratigraphy refers to the recording of layers or 'strata' primarily in the discipline of geology and archaeology. Over the previous year Paterson has adapted the metaphor of stratigraphy to form a conceptual platform for the design, data-structure and communication of content - in this case sound samples or spatialised sources - in a changing spatial-temporal context. The following text will elaborate this approach, describe the particular objectives of the example presented, and further detail it's content design.

:: approach ::

The basis of this approach is formed on the premise that the interactor of a LISTEN environment occupies a dynamically changing soundscape, responsive to changes in the spatial movement of the user, and also to the passage of time or duration of sound. Hence, a stratigraphical approach to this space aimed to assist the author of the environment to organise sound content into units of narrative potential, according to the spatial and temporal relationships between them.

Borrowing terminology and conceptual structure from archaeological data recording methods: Units or loci have been defined with relative relationships to other loci in a given area, for example directly before, after or contemporary*. According to these basic relationships, each locus may be construed to exist in different layers or strata that represent the 'present-tense' of the soundscape at a given moment in its occupation.

The system presumed that the strata were replaced consecutively mirroring the passage of time according to defined durations, or that they may be changed consequentially due to the interactor triggering change of the 'present-tense' with their agency. As a larger component of content presentation, the strata of loci could be bundled into a phase or period, allowing greater authorship of the linear and non-linear (i.e. user agency activated) change.

* Of course less-discrete temporal relations exist, concurrent with sound design, such as overlap, within, etc. but these were not implemented in the stratigraphic example presented.

Within the changing relation-structure described previous, the binding of content presentation - a soundscape created from sound samples - to the user's interaction in the LISTEN environment, may be elaborated as follows:

Each locus represents a field of agency (spatial area, with dimensions of size and position), which activates spatialised sound sources contained within, or associated to the locus entered / activated by the interactor. Using the notion that a locus may be permeable* - allowing sound to pass into it - variable indexes are configured, either during the authoring process, or in response to occupation, so that upon activation the locus 'gathers' spatialised or ambient sound sources to play from surrounding loci, both spatially and temporally. For example, upon activation, a locus which is permeable with its contemporaries and relations previous, gathers sound sources from it's contemporaries and it's before-relations, that due to a scalar permeability-value of, say, 2, exist within a spatial field twice its own. Therefore, those gathered - the sound sources & samples associated to that locus - that 'field of agency' - are what can be heard when activated by the interactor.

:: objectives of workshop example ::

The main purpose of the demonstration example for the Second LISTEN Expert Workshop was to explore the potential of the stratigraphical metaphor for authoring poetic, spoken-word sound content. Hence, the activity expressed the personal creative interest of Paterson, and aims to anticipate authorship issues for the creative involvement of poet Oswald Egger in the final LISTEN exhibit, to be presented at the Kunstmuseum Bonn in June 2003.

Such ambition involved consideration of the necessity to structurally manage, and author for, both linear and so-called non-linear change, affected by the user's movement during their occupation of the LISTEN space. How may the author of the textual content accommodate multiple possible locations in the narrative presentation, over certain durations of time? To what effect does authorship 'control' assist or hinder the experience? And to what extent does the influence of 'granularity-in-change' effect interpretation?

Further, the example aimed to further dialogue regarding the remote, interactive and 'non-bodied' performance of the spoken word, and the semantic/active potential of words 'performed' in response to the agency of the listener. Lastly, through presenting the metaphor of stratigraphy as a

* This quality of the locus continues the metaphorical association of the spatio-temporal unit of agency to that of the excavated archaeological stratigraphical deposit, usually some form of natural material such as soil, mud, stones etc.: A variable of context is its porous nature, and so may assist to determine how much the of contained objects or artefacts may have actually originated from surrounding stratigraphical deposits, for example, temporally after.

conceptual platform for authoring immersive audio-augmented environments, Paterson aimed to question the usefulness, and seek the point of 'breakage', of (such) a metaphor to communicate the complex relationship between agency, space and time.

As will be elaborated in the following section, Paterson used a high 'granularity' of structure to construct a spatio-temporal spoken-word environment to test the objectives above, and in general, the stratigraphical conception, using many loci, and thus many strata of change.

Although, it was originally the intention to use spatialised sound sources in the 'stratigraph' example, which may exist outside the discrete agency boundaries of the locus, demonstrating the concept of permeability described previous, this was not possible. Due to technical/ quality constraints of using ORTF spatialised sound sources with the LISTEN sound server version-in-use during the workshop, and the lack of a dynamic sound-module allocation in Paterson's example test code, there was a limitation to the presentation of the stratigraphical concept, as described above.

Instead, as a compromise to the large number of loci in the stratigraph, less-computationally-demanding mono-file samples were used which were associated only to one locus (i.e. no loci had any dynamic permeability values). Admittedly, with experience, this focused the interpretation to a less subtle experience and enhanced the arguably limiting, discrete, aspects of the authoring structure.

:: content design ::

The demonstrated example was composed, using spoken-word samples, based upon a text written by Paterson, entitled 'upper-interior'. The text, constructed from an evolving series of 'cut&pastes' of the original sentence, takes the complete form of 12 similar sentences, broken into segments according to emphasis upon word and 'sound-bite' (appendix A). Worthy of remark, are the more or less ambiguous references to the activity and process that the interactor is involved, through immersion in an audio-augmented environment, and the 'voice' of the tracking system - the continuous stream of data generated with occupation within the system. Also, the intentional marking of the end of each sentence with 'Stop', 'stop', or a rhyming equivalent; evocative of a 'telegrammed' message, repeated and consistently warped.

The stratigraph is structured to reflect, with intent, authorship control of narrative sequence, placing the interactor in the uncontrollable passage of linear time, and thus the uncontrollable passage of sentence, leaving the user's spatial agency as the arbiter of change in the content experienced. The sentences are arranged into parallel streams, where similar references or segments are coordinated to co-exist in the same 'present-tense', the same strata, and leaving gaps where there was not a co-existence (appendix B).

It may be useful to conceptualise and visualise the sentences as a full stratigraph: a grouped block of segmented columns which collapses downwards at changes in the 'present-tense'; a matrix of strata consisting of loci - contemporary, before and after - with gaps that represent an absence in content at a particular spatio-temporal moment (see figure 1).

The listener's spatial movement and, in relation, the time spent without movement, influences what they hear as time passes during immersion. Once triggered into activation, the stratigraphic strata changed according to linear time-scheduler at consistent intervals and following a short pause, looped through the strata sequence again (figure 2). Indeed the spoken-word structure was intended to reward patience, as to stand still would present the sentence in its, albeit paced, entirety. Further, the sound 'installation' aimed to explore an increasing sense or experience of structure while immersed in the loop.

figure 1. Stratigraph matrix of spatio-temporal 'fields of agency'.

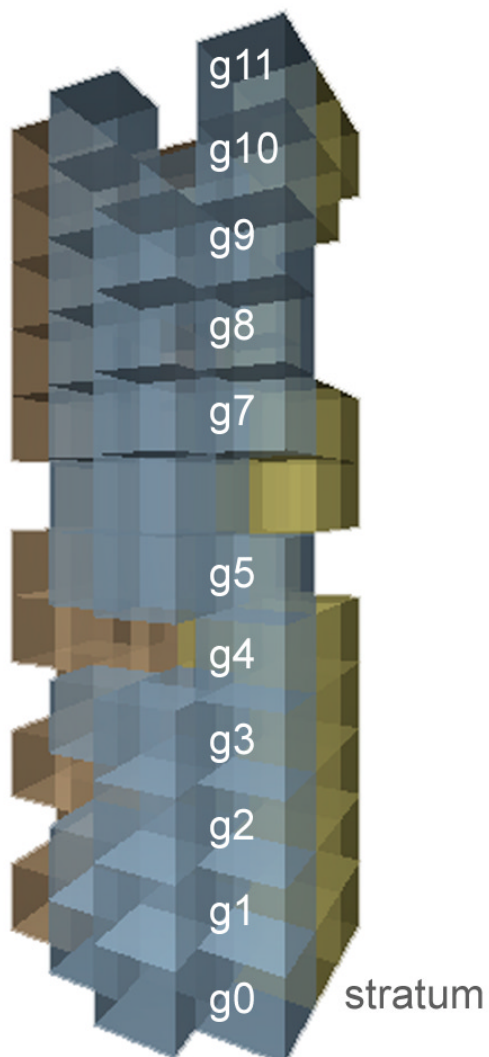
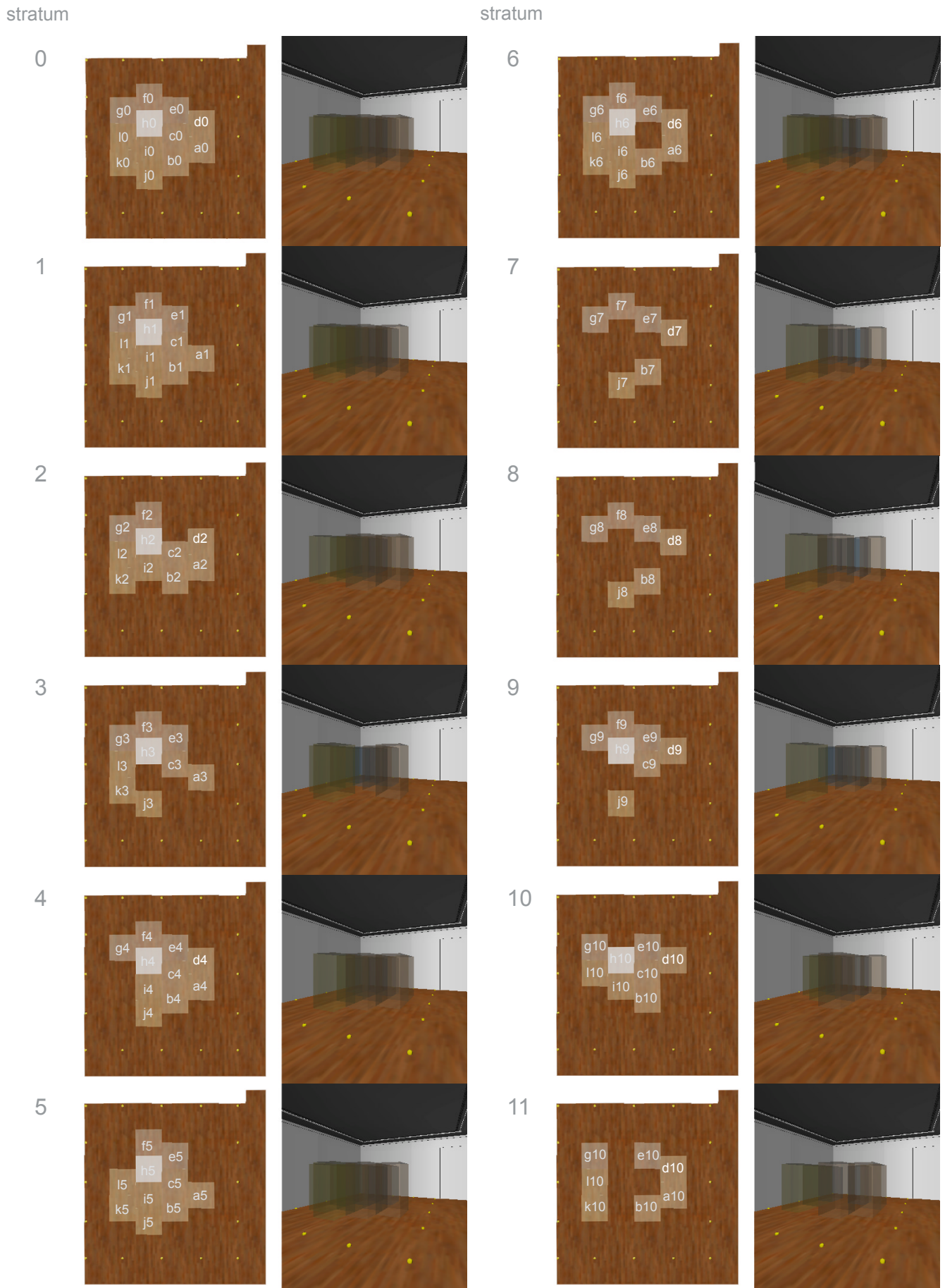


figure 2. Plan & perspective Avango screenshots of changing strata during runtime. Loci reference tags, e.g. a0, relate to the textual segments in appendix B.



The LISTEN system demonstrated at the Expert Workshop in Paris was based upon three computer-networked components:

- * Real-time virtual 'world-model' graphical environment (see figure 2 for illustration) using the AVANGO VE distributable environment system (<http://www.avango.org>), running on high spec. LINUX workstation.
- * Advanced Real-Time optical tracking system (<http://www.ar-tracking.de/info/ARTtrack1-en.pdf>), which tracked a group of reflectors positioned on the user's headphones, in a 6 x 6 metre area.
- * LISTEN Sound Server (MAX MSP environment), on a G4 Mac workstation. This component acted as a hub, receiving the location position data, and rendering and delivering mono-file & ORTF spatialised sound files to user wearing the wireless, tracked headphones.

All stratigraphical environment components were interfaced with the AVANGO system and scripted as Scheme (LISP-based) object-oriented classes.

:: acknowledgments ::

The stratigraphy workshop and demonstration was developed and produced by Andrew Paterson during a 7-month period as visiting artist-researcher at the Fraunhofer Institute of Media Communication in Sankt Augustin, Germany, sub-contracted into the LISTEN project by the Kunstmuseum Bonn. For further information: <http://listen.imk.fraunhofer.de>

The LISTEN system architecture utilised in this production was developed by Dr Gerhard Eckel, Joachim Goßmann, Matthias Haringer, Martin Voelkel (all IMK), Ramon Arroyo-Gonzales (sub-contract IMK), Olivier Warusfel & Olivier Delerue (IRCAM), Bernd Rupprechter (AKG GmbH.).

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'upper-interior' (original text)

The complete essence | of what | may be seen | Within the black-red landscape | eyelids
the upper interior | fully conceived | while you wait | Begins when this voice stops

The complete essence | of what | can be felt | seen not without eyelids | The upper interior
can you comprehend | while you pause - you hide nothing | And begins | covering of the full | Stop

The complete | sense | of what is now heard | hidden not to the ears | stream of numbers
do you understand | while i count - you know nothing | And ends with dot

The complete shift in what | now heard is hidden | you compound the data | an alter ego
while you | no | i know nothing | And so on the continuation of | the voice stops

The partial shift | what is now seen is hidden | the black as interior exterior | it is listening
Do you know that | And all that ends well | while you are | not | yes here | Now not

The full but partial | what's now known | can be found here | The exterior is interested
while you do you cannot | you are listening | And all flows | stop

The essence that | remember | remembers | found on the edge | the interior boundary-less
without border | while you do not know | listening | And all that ends well | data | Stop

The complete essence | Remember when i told you | you found | numbers | The geography
is boundary-less | you do not know | as you are listening | And that is the beauty's end | Stop

The common essence | you hear when you see | You find laterally | no boundary to, to be
The geography | You know you can listen | and you can choose not | And that is the end

The complete sense you will need | the flow | For geography and history | holds memory
real space I know nothing | And that is | the end | data | Stop

The absolute sense | you cannot hear it | to comprehend | for geography and history
folds memory | I know nothing | but the upper interior | Stop

The absolute essence | of flows | Within the black-red landscape | geography behind eyelids
the history interior | fully conceived | partial exterior | data streams end | when this voice stops

'upper-interior' (structured text into strata 0 - 11, where 0 is first)

a0	The complete essence	b0	The complete essence
a1	of what	b1	of what
a2	may be seen	b2	can be felt
a3	Within the black-red landscape	b3	
a4	eyelids	b4	seen not without eyelids
a5	the upper interior	b5	The upper interior
a6	fully conceived	b6	can you comprehend
a7	while you wait	b7	while you pause - you hide nothing
a8		b8	And begins
a9		b9	
a10		b10	covering of the full
a11	Begins when this voice stops	b11	Stop
c0	The complete	d0	The complete shift in what
c1	sense	d1	
c2	of what is now heard	d2	now heard is hidden
c3	hidden not to the ears	d3	
c4		d4	you compound the data
c5	stream of numbers	d5	an alter ego
c6	do you understand	d6	
c7		d7	while you
c8		d8	no
c9	while I count - you know nothing	d9	I know nothing
c10	And ends with dot	d10	And so on the continuation of
c11		d11	the voice stops
e0	The partial shift	f0	The full but partial
e1	what is now seen is hidden	f1	what's now known
e2		f2	can be found here
e3	the black as interior exterior	f3	The exterior is interested
e4		f4	
e5	it is listening	f5	while you do
e6	Do you know that	f6	you cannot
e7	And all that ends well	f7	you are listening
e8	while you are	f8	And all flows
e9	not	f9	stop
e10	yes here	f10	
e11	Now not	f11	

'upper-interior' (continued)

g0 The essence that
 g1 Remember
 g2 remembers
 g3 found on the edge
 g4 the interior
 g5 boundary-less without border
 g6
 g7 while you do not know
 g8 listening
 g9 And all that ends well
 g10 data
 g11 Stop

i0 The common essence
 i1 you hear when you see
 i2 You find laterally
 i3
 i4 no boundary to, to be
 i5 The geography
 i6 You know you can listen
 i7 and you can choose not
 i8
 i9
 i10 And that is the end
 i11

k0 The absolute sense
 k1 you cannot hear it
 k2 to comprehend
 k3 for geography and history
 k4 folds memory
 k5
 k6 I know nothing
 k7 but the upper interior
 k8
 k9
 k10
 k11 Stop

h0 The complete essence
 h1 Remember when i told you
 h2 you found
 h3 numbers
 h4
 h5 The geography is boundary-less
 h6 you do not know
 h7 as you are listening
 h8
 h9 And that is the beauty's end
 h10 Stop
 h11

j0 The complete sense you will need
 j1 the flow
 j2
 j3 For geography and history
 j4 holds memory
 j5 real space I know nothing
 j6 And that is
 j7 the end
 j8 data
 j9 Stop
 j10
 j11

l0 The absolute essence
 l1 of flows
 l2 Within the black-red landscape
 l3 geography behind eyelids
 l4 the history interior
 l5
 l6 fully conceived
 l7 partial exterior
 l8
 l9
 l10 data streams end
 l11 when this voice stops