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Complications and Adjacencies: An Organizing Logic for Information Graphics

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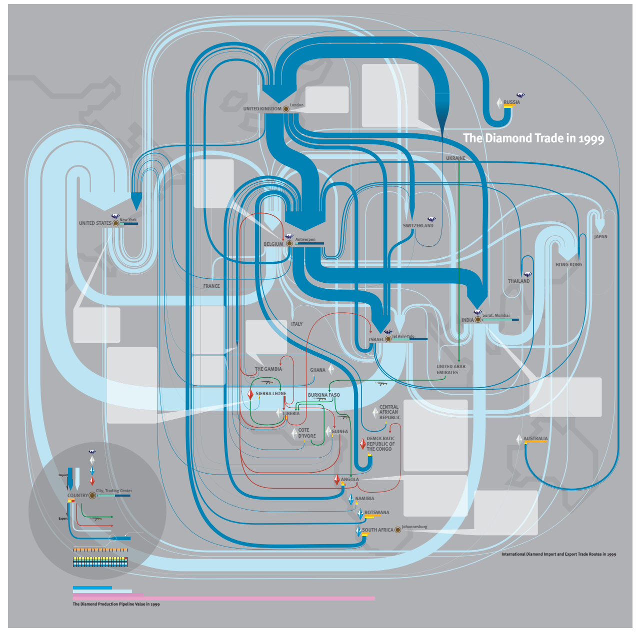
KEYWORDS *Adjacencies, basemap, Coelacanth, Coelacanthiforme, complication, grid-pattern, information design, information graphics, superfice, visualization, VT-CAD*

ABSTRACT The composing of intelligible patterns from the noise of raw data is a hallmark of a good information designer. The most successful examples extract and present *essential* relationships in a coherent manner while limiting the obtrusiveness of *accessory* relationships. Effective results are self-evident whereby the information graphic is absorbed by the mind holistically. Such clarity often belies the intense efforts involved: like a baton race, all the work is concentrated to a point just before being passed on to the next participant in the informational relay. To this end, the designer applies a pattern or grid to position all the interrelational data fields. We call this process *stacking*: the mechanism for creating a beneficial *complication* whereby users see and understand holistically, which we consider to be cognitively superior to linear presentations.

The success of layered compositions depend on the appropriateness of the *basemap* (pictorial, relational, quantitative, or symbolic) and the quality of the designer's integration. What *can be* correlated *should be* correlated. What cannot be interrelationally correlated, such as titles, labels, metadata, etc., should not interfere with the stacking grid since they introduce noise. Any "noisy" element is better brought "outside" the main grid and handled as an *adjacency.* Stacking interrelateable information fields through effective grid patterns, and supporting such a composition through non-interrelateable adjacencies, yields effective results in information graphics.

COMPLICATION AND ADJACENCY SCHEMATICS

The images within this paper are accompanied by a series of explanatory schematics. These illustrate: how informational fields interrelate within the information graphic (the complication) and how non-integrated information (the adjacencies) functions discretely. The patterns used within the schematics are based on the VT-CAD system.[1] A sample of how this functions is shown in FIGURE 1.



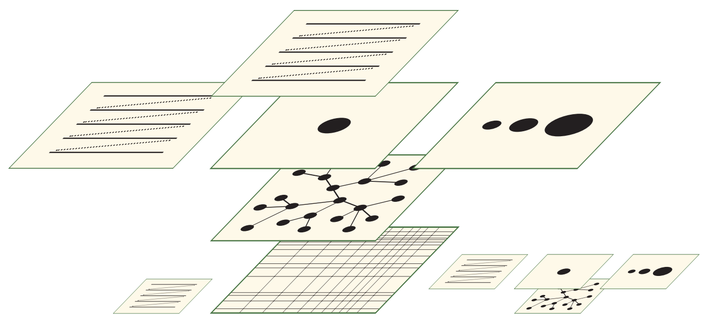


FIGURE 1: *This information graphic, greatly reduced from a 48″ × 48″ panel, is entitled "The Diamond Trade in 1999." It is the product of numerous interrelated layers that form a complication. This yields a comprehensive and holistic understanding of the complexities respecting uncut diamonds (light blue network), cut diamonds (dark blue network), and their trade and commerce flow throughout the globe.*

Based on VT-CAD patterns,[2] the accompanying schematic is a short-hand reference to the stacking (larger-sized panels) and the adjacencies (smaller-sized panels) present in the information graphic. They may be read from the bottom up. Here a very distorted map (A) positions a node-and-link network (B), which further positions a composition of text, pictographs, and quantigraphs (C1, C2, C3). This finally positions supporting-text elements (D). The title of the piece (E) and the referencing key (F) are considered adjacencies even though they appear within the framework of the main piece. They are extra and not interrelated elements.

PARTIAL AND TOTAL REVEAL

A first consideration in the design of informative visualization is whether users will see information as a "total" or ascertain through a sequence of portions. In the latter case, information is selectively and sequentially revealed, as through the process of reading a book — the user functions as the physical toolset by holding the book and moving the pages. This is not dissimilar to information that is gathered through an electronic interface; in this case the user engages key or mouse commands, gestures, or voice activation to navigate the information. Both the book and the electronic interface provide examples of a *partial reveal*.

Alternatively, there is the *total reveal* of information; this may be the case with museum graphics, full wall presentations, or large-scale immersive displays. With total reveal, the user acts as a navigational tool — moving about *en toto*, and placing themselves at the most useful vantage point. *The notion of complications and adjacencies is particularly critical for those instances requiring a total reveal of information.* The logistical challenges in working with total reveal information should not be underestimated. The organizing principles involved in doing so can be highly constructive to interactive designers who may too quickly opt to avoid dealing with supporting data through the mere usage of hyperlinks.

ESSENTIAL AND ACCESSORY RELATIONSHIPS

How do we parse the information that may be termed *essential* from the information that may be termed *accessory*? (Assume both types to be of equal importance.) Essential and accessory relate to the concept of *data* and *metadata:* the "information" and the "information about the information." However, collections of the same "type" of metadata about parallel key content tend to gravitate upward and become key information. This shift from accessory to essential is because a collection of matched metadata may itself become *patternable*.

Consider a photograph and a collection of photographs. The singular photograph is the data (the essential); everything about the photo (its photographer, its title, its method of capture, the coordinate points of its capture, its file size, etc.) may be considered metadata (the accessory). But, if there is a collection of a hundred photographs, each accompanied by their respective method of capture, then this meta data may become equally patternable. The other unique points (the photographer, file size, etc.) would remain accessory, but the coupled collection of the images and their method of capture (assuming some importance there) becomes part of the essential information.

The division between essential and accessory deals with the ability to bring information into a pattern and then to bring patterns into greater relationships. Another dividing principle might be the difference between that which *must be seen* and what *may be seen*. The title could simply be read to you, the photographers name mentioned. But seeing the photograph, and seeing a large collection of photographs with their corresponding method of capture in the lower corner of each, would be far more effective than verbal descriptions.

GRIDS-PATTERNS AND BASEMAPS

The third area to be touched upon here, but by no means exhaustively, deals with grid-patterns. These *grid-patterns* provide the organizing structures that support informative visualization and provide the matrix sets that allow the data fields to be interrelated. Grid-patterns are handled in-depth within several papers dealing with a theory entitled VT-CAD (*The Visual Taxonomy for the Classification, Analysis, and Design of Informative Visualization*). This theory argues that there are only eight core spatial patterns (used singularly or collectively) supporting informative visual representation. Four main classes (each with two subclasses) are identified: *Pictorial* representations, *Quantitative* representations, *Relational* representations, and, *Symbolic* representations (*P, Q, R, S*).

These grid-patterns, used for displaying informative visualizations through the techniques of information graphics, are identified as "constrained," "semi-constrained," or "unconstrained." *Unconstrained patterns* support icons such as pictographs and quantigraphs (they are shown in the schematics that accompany the illustrations in this paper as either a dot, or a series of dots). These are always "placed" by the grid, but in themselves do not orientate things. But the *constrained* and *semi-constrained* examples can function as grids. These include high and low definition imagery; relational matrices, node-and-link diagrams, quantitative x-y-z axis structures, and a repeating line structure (as in a block of text). When any of the constrained and semi-constrained grid-patterns are used to organize information fields "above them," they are referred to as *basemaps*. *Essential information built up through interrelated layers (stackings) are so organized through the basemaps. Information that can be subjectively placed independent of the basemap tends to be accessory.*

The series of *Coelacanth* examples presented in this paper are first shown with a single relational basemap. This grid-pattern supports all the informational fields. As the development of the poster progresses another basemap is added. The second basemap is semi-constrained pictorial; it supports the fish outlines. This case is interesting because there are two basemaps used simultaneously (a rare occurrence except for coordinate grids placed over imagery for navigation purposes). Users can confidently read through multiple informational fields provided they are consistently constrained by the same basemap grid-pattern. Multiple basemaps become visually challenging quite rapidly and are best reserved for users with a strong pre-orientation to the data provided.

THE COMPLICATION AND THE ADJACENCY

Having discussed aspects of: partial vs. total reveal, essential information vs. accessory information, and grid-patterns and basemaps we now turn to the pith of the matter: the complication and the adjacency. *A complication is a set of interrelated data fields objectively supported by the grid-pattern basemap. Adjacencies are subjectively placed into or around this assemblage.*

This section of the paper is handled with bulleted points rather than narrative, as this will more succinctly describe the features and strengths of these two approaches and their integration through information graphics. The bulleted points alternate — first discussing an aspect concerning adjacencies (open bullet) and then follows with the comparative aspect concerning a complication (solid bullet).

FIGURES 2.1–2.9 present a specific case study utilizing a series of images, diagrams, and captions.

GENERAL NATURE

◦ Adjacencies tend toward being linear and narrative in nature; the simplest example is a string of binary code. The most common example is a line of type.

• A complication involves the use of a collection of information fields rendered through a combination of related grid-patterns and nodal devices.

EXCEPTIONS

◦ Some adjacencies are grid-patterns (such as maps), but these are used as details (perhaps as call-outs) to support information and are not otherwise able to be integrated within a complication.

• Single-layer *hybrids* of grid-patterns *do not* qualify as a complications. For example, a cartogram that renders geographic space within a constrained relational format (such as can be seen in many transit maps)[2] is not, in itself a complication. However, these cartograms are may then be stacked and interrelated with other patternable data (such as transit network lines, station stops, text about those stops, etcetera), thus making the entire composite a complication.

AREA REQUIRED

◦ Adjacencies are supporting elements. In some cases they can be details of the complication.

• The complication is the main element or stage of the information graphic. A complication may occasionally occur within an adjacent (as in a key or legend), but it is usually reserved for the main field.

FREQUENCY OF USAGE

◦ Adjacencies tend to be common graphical representations: a line of type, a column of type, a map, a simple table, an image, a simple graph. Because they are self-evident, the *ramp-up* to their understanding is very low for most users.

• Complications tend to be atypical presentations, as they involve interrelated fields of information. Users must make comparisons that require deeper cognitive processing (compared to adjacencies). Therefore, reading a complication requires more ramp-up and tends to be of greater utility to a smaller, but more specialized, field of users.

THE "VALUE-ADDED" ADVANTAGE

◦ Adjacencies benefit by being simple. The information they provide is easily ascertained and acquired, in the case of text, linearly. A good adjacency generates familiarization.

• *A complication benefits by presenting patterns with a spatial bias. This beneficial complication yields informational relationships that are holistic and often unexpected. A beneficial complication generates insight.*

Creating "simplifying complexities" is the desirable option to improve workflow for those who work with multi-disciplinary, multi-dimensional data sets.[4]

EASE OF DESIGN

- ◦ Adjacencies are easy to design, but they may be hard to present in a consistent, balanced, and logical way. Each being an independent element may collectively become visually demanding.

- • A complexity is very hard to design, but the result is balanced and logically consistent. Collectively, it is a single unit.

ARRANGEMENT

- ◦ Adjacencies create noise when they are allowed to visually interfere with the primary complication, thereby hindering the user from ascertaining relational details. This does not mean adjacencies are not useful: they provide exceptions to the pattern, serve as proof of concept to information within the complication, bridge less-familiar users to the information in the complication, deliver detail information that would prevent the appropriate scaling of the complication, etcetera. However, when the placement and scale are ill-considered, they have the potential to distract. (Even a simple title generates noise.) Because it diminishes the informational value, placing adjacencies within areas of low density on the main stage should be avoided when the "white space" itself is an informative part of an otherwise undisturbed pattern (e.g., in information graphics dealing with demographics or geospace). If white space is informative, supplemental information should be isolated outside of the main stage.

- • Complications that contain adjacencies within their borders allow for the entire information graphic to be more compact. Adjacencies within the complication may exhibit fewer difficulties for the user to navigate to details or explanatory information. Clarity aside, the information graphic may appear aesthetically integrated when adjacencies are combined with the complication. The inclusion of adjacencies decreases the number of apparent elements (even though each adjacency is an element, the graphical treatment will generally diminish the appearance of this).

KEYS AND LEGENDS

- ◦ Complications often require a key to their interpretation. A key is an adjacency. It sometimes is rendered as a detail of the complication although it may take many forms. The key, though a detail, may be equally layered as any specific part of the complication.

- • Complications may be so designed that an adjacency in the form of a key is unnecessary. This is desirable if possible. A key may also be generated by simply selecting or highlighting a section of the complication (without using any spatial re-arrangement) and denominating the values or meanings of the components so highlighted. This is an exploded adjacency (see next entry).

INTEGRATED OR EXPLODED ADJACENCIES

- ◦ An adjacency is usually within its own field. If information is scattered across a complication (such as with a series of text call-outs and arrows to identified areas) it is an *exploded adjacency*. This treatment adds considerable noise to a complication and is undesirable, though it may be easy to navigate for users.

- • Complications that have many-layers of specific, extra notation may not be able to support adjacencies without considerable difficulties in navigating the users to such extra-information. These exploded adjacencies, if possible, should be integrated as related patterns into the complication, thus becoming part of the complication itself (thereby absorbing the adjacency into the pattern).

SHUFFLING CONTENT

- ◦ Ideally, adjacencies should only be created if they cannot be integrated into the pattern(s) of the complexity.

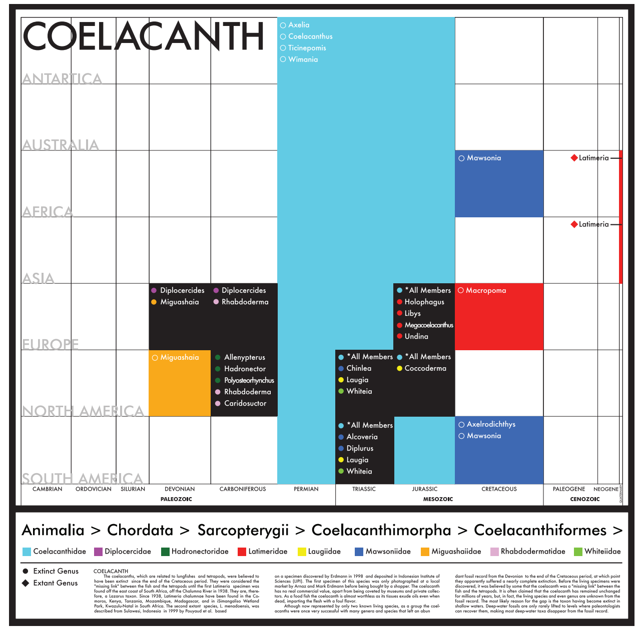
- • An informational field (though it may integrate into a complication) sometimes supplies minimal intelligence value. It may create more noise than it is worth, effectively diminishing the clarity of the overall complication. Such information may best be built through a different grid-pattern, or degraded into an adjacency.

PICTOGRAPHS, QUANTIGRAPHS, AND BRIEF SYMBOL STRINGS

- Icons such as *pictographs* (compact informational qualities) and *quantigraphs* (compact informational qualities) function as unconstrained nodes. They are effectively distributed across patterns and become part of the pattern. Although these nodes are *not* themselves adjacencies, their descriptions and references may need to be handled within an adjacency.

  Lines of text (symbol strings), unlike pictographs and quantigraphs, tend to be noisy because they create random shapes dependent upon the content they carry. Additionally, lines of text do not need adjacencies as a key to their explanation. Designers must balance this dichotomy.

- Complications have several "last mile" methods to become extra-informative. This is usually accomplished through the use of nodal elements that may be placed within the pattern. Icons and lines of text (symbol strings) are examples. These devices are usually conceived as sets (a set of varying pie charts, a set of animal icons, a set of colored boxes, a set of tiny maps, etc.). These are not adjacencies but function as layers. The quantity of sets, and the distinctiveness between the sets must be carefully articulated by the designer.



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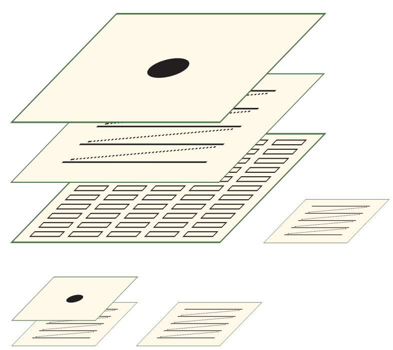
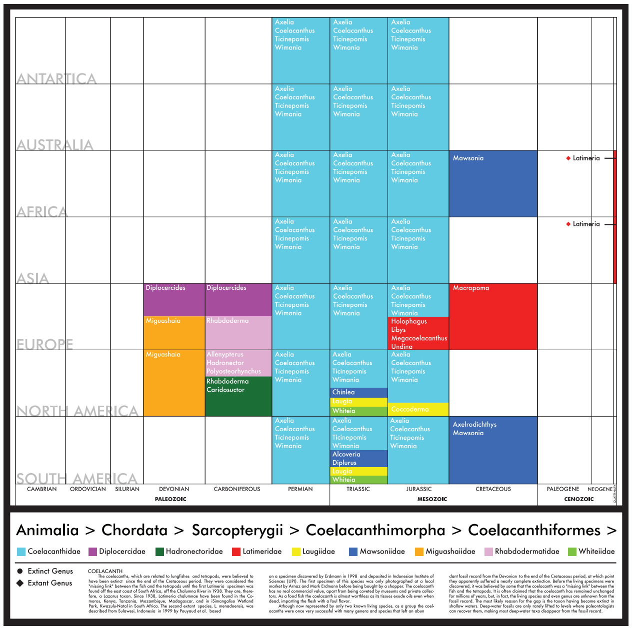
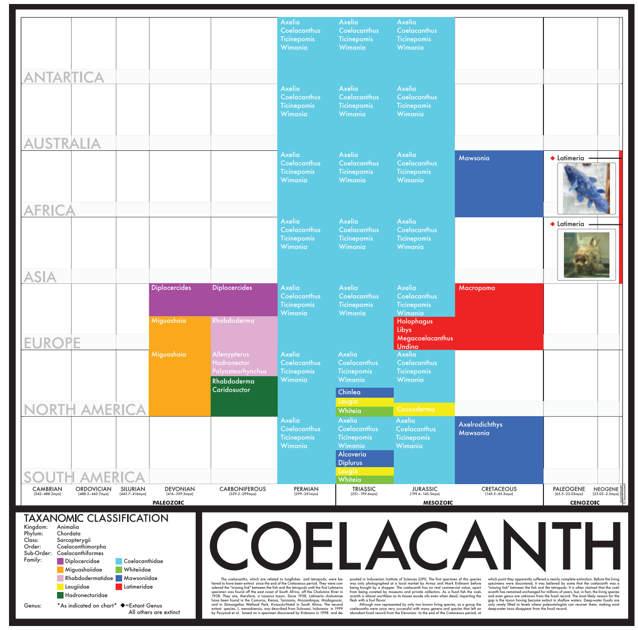
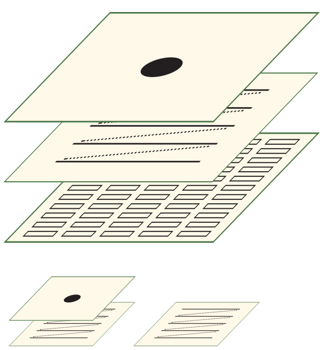


FIGURE 2.1: *Information respecting the natural sub-order, Coelacanthiformes, is presented within the organizing logic of a table (a high-constraint, relational basemap). The contemporary, continental disbursement of this fish is the central issue. The graphic is composed of two areas: a central stage (primary information) and a key for understanding that information (which is boxed off as an adjacency). Within the primary area, the y-axis indicates geography, and the x-axis displays time in regards to periods and epochs. Filled-in areas indicate a known family that occupies that division of location and epoch.*







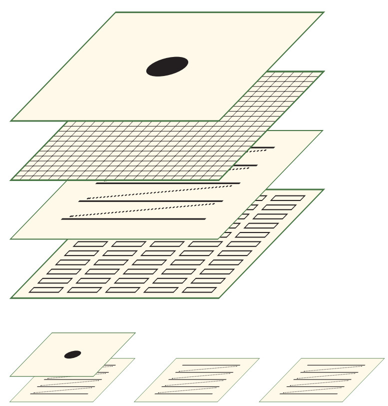


FIGURE 2.2: *Here the title, which was present on the main stage as an adjacency, was removed to decrease the noise surrounding the stacked data. The sections of the table that contained overlapping families were divided into parts for each genus represented in that location/epoch. Inside of the divided sections of the grid, genera were color-coded individually, and the genera present in each cell were listed out in full. In doing this the decision was then made to reveal the grid on top of the relational matrix to indicate the genera that were present within each unit of time/geography.*

FIGURE 2.3: *The title was reintroduced as an adjacency because it is an element that provides context to the main stage. In addition, high-constraint, pictorial images were incorporated onto the main stage. The key was also given its own distinct area from the explanatory text and was formatted appropriately.*

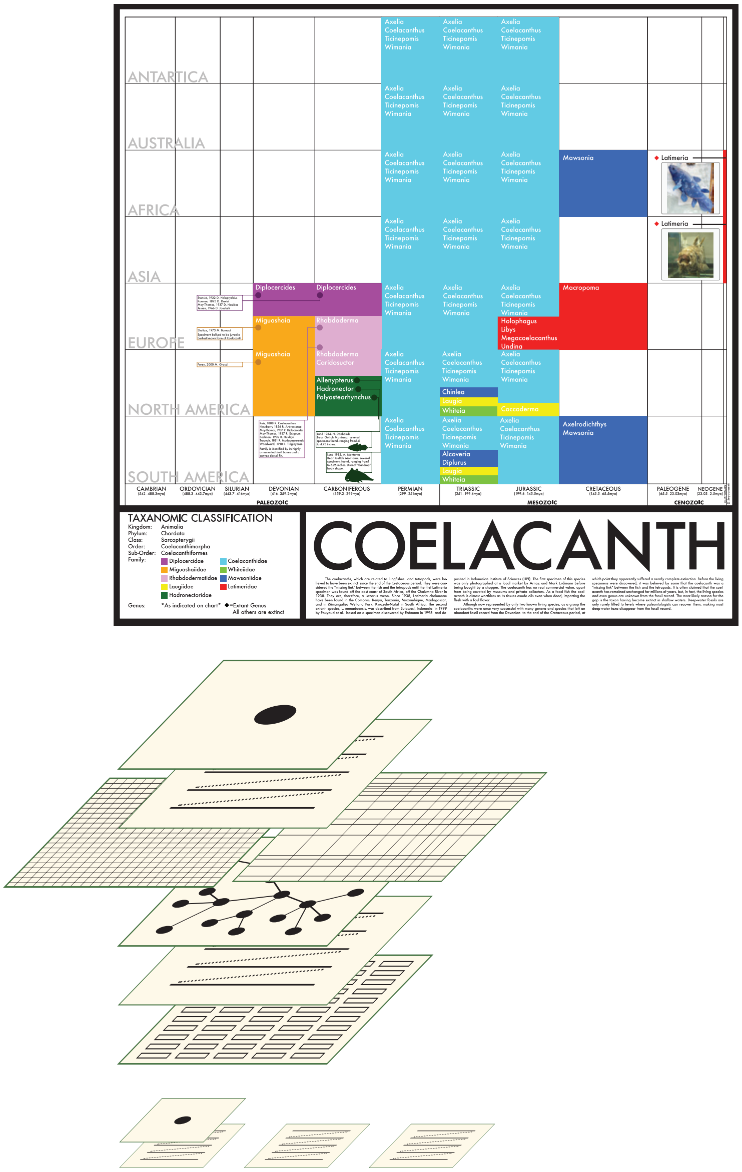


FIGURE 2.4: *With this incarnation of the piece, the three adjacencies were unchanged from the former example. Informational nodes (low-constraint devices) were added to provide further details respecting each species as well as the discovery of each species within each of the identified genera.*

Low-constraint images depicting outlines of the basic morphology of distinct species were overlaid upon these nodes. The shape at the other end of the link-and-node diagram continued to serve as an identifier indicating whether the species is extant.

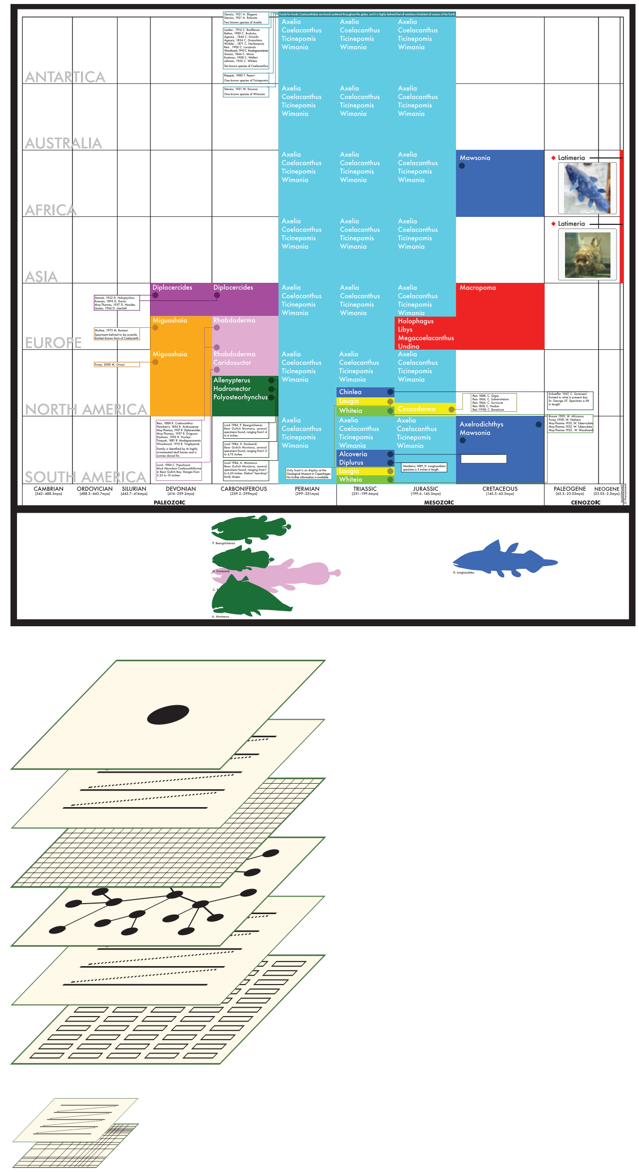


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FIGURE 2.5: *As the low-constraint images increased, they started to become noisy. So, to resimplify the main stage, the low-constraint pictorial images were converted to an adjacency. (The other adjacencies, though not shown here, are still intended to be re-incorporated.) Note that it is apparent that the basic morphology is color-coded, thereby relating to the essential information on the main stage.*

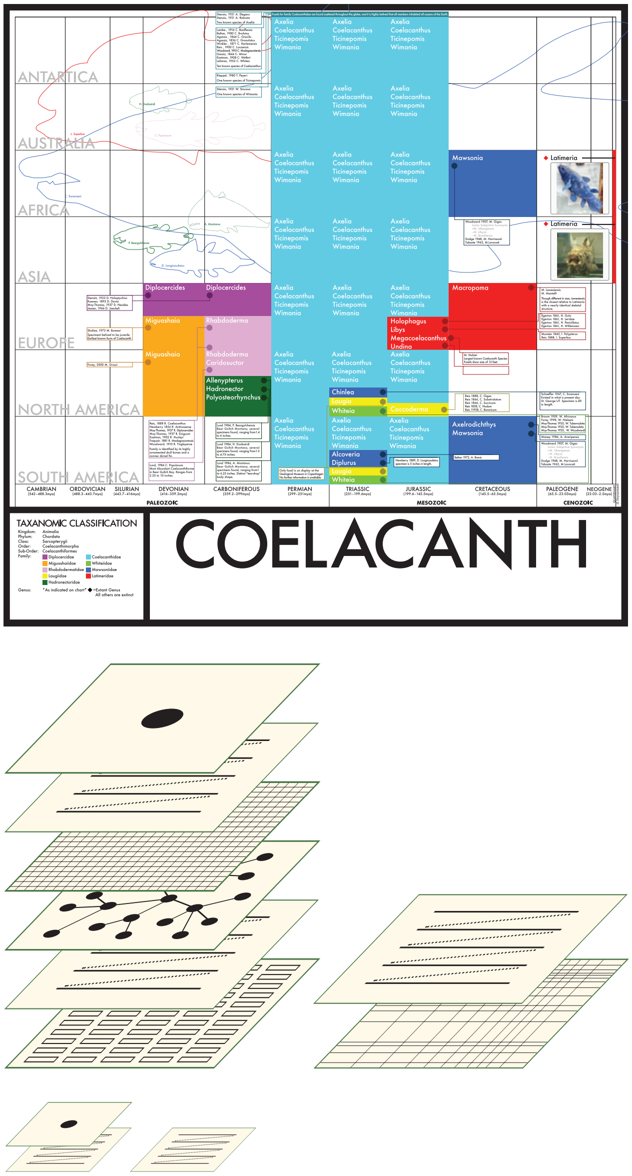


FIGURE 2.6: *Previously displayed as an adjacency, the illustrations of the particular species were shifted back onto the main stage as a supplemental basemap. The poster now has a complication with two basemaps. This creates a new parallel system of layers within the main stage. The new stack, parallel to the initial one is integrated via a system of color coding that relates the particular species with the information on the family within the main structure.*

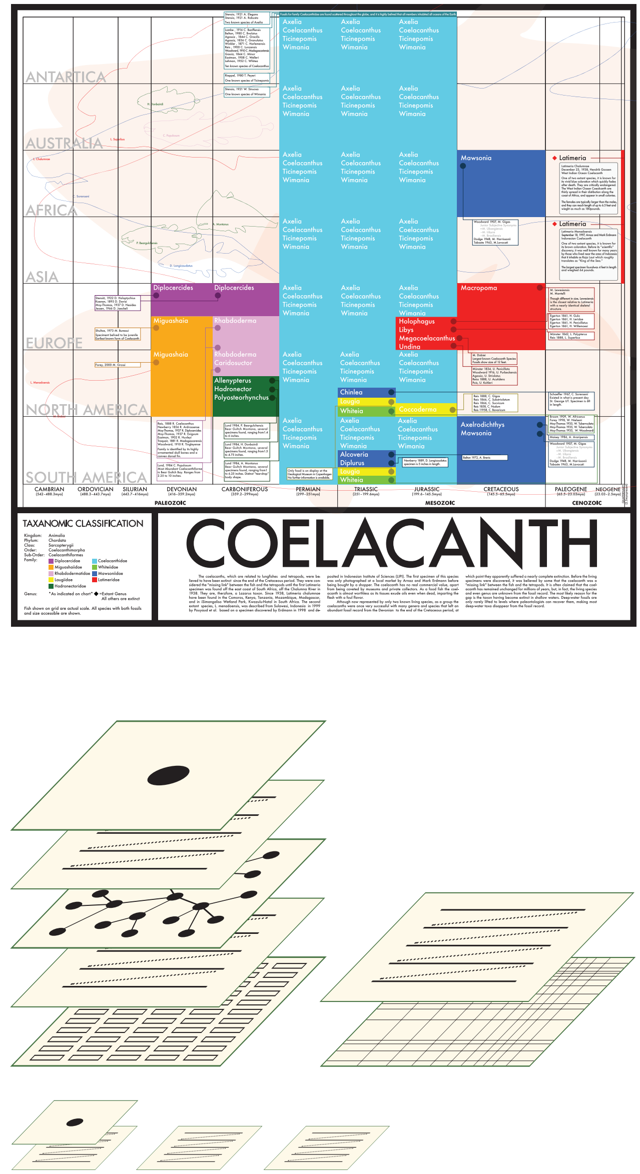
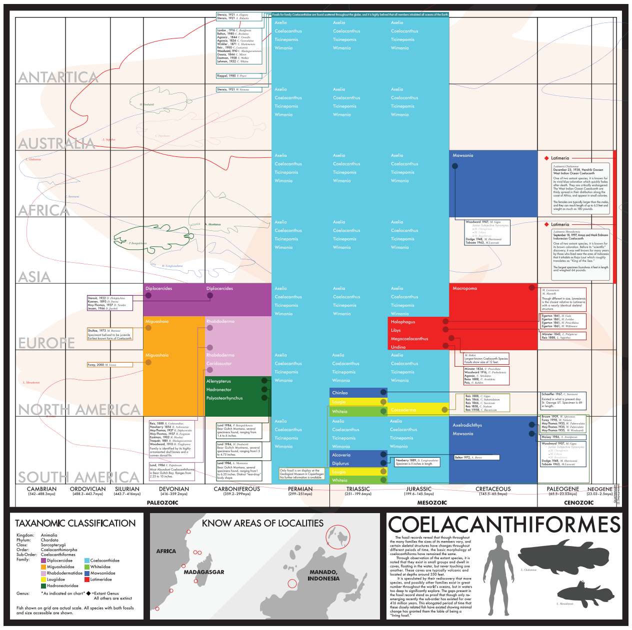
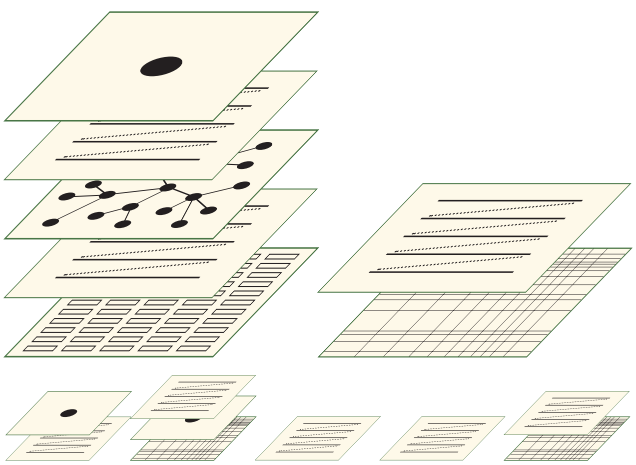
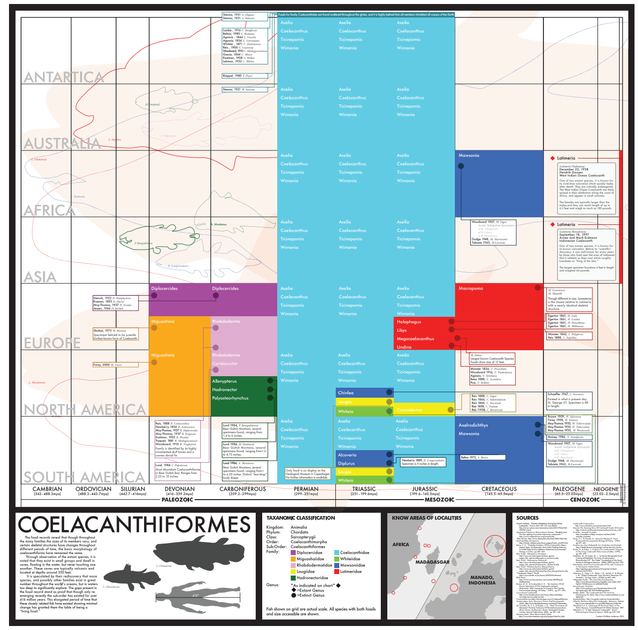


FIGURE 2.7: *At this stage of development the high-constraint pictorial superfices (photographs) were removed in order to accomodate additional text (high-constraint symbolic). The extant species were also layered in solid-color form within the basemap of the parallel stack as seen in* FIGURE 2.6. *However, note that in this these iterations the title serves is a very "aggressive" adjacency and overpowers the subtlety of the complication.*







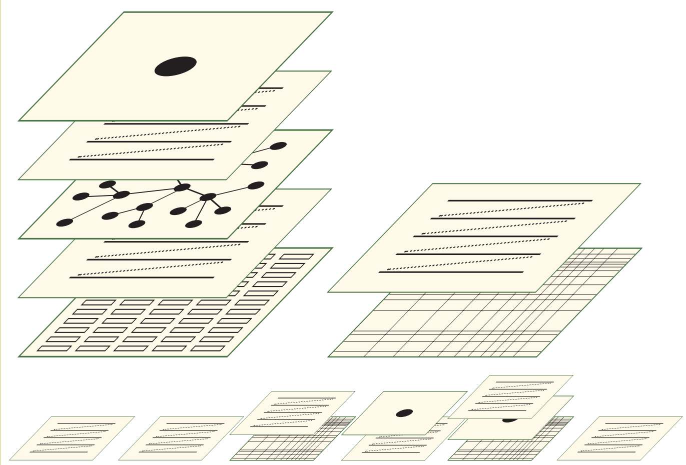


FIGURE 2.8: *In this iteration, considerable craftsmanship is being applied to the adjacencies. There are now five adjacencies.The title block contains three of them: title, text, and a comparison of scale between a 6ft person and the contemporary memebers of the sub-order. A map was also introduced as an adjacency using a low-constraint symbolic system to indicate the areas of the known localities for the two extant species. This map, not adhering to either basemap, was treated as an adjacency so as to reduce noise.*

FIGURE 2.9: *The final rendition of the work condensed the map and re-ordered the structure of the adjacencies: providing first an explanatory text, then a key to disseminate the information of the main stage, followed by a cartographic system to pin-point localities, and finishing with a bibliography to provide a back-bone to the content of the work. All of these adjacencies supplement the complication without adding noise to the complication. This permits users to extract insight from the essential theme of the information graphic.*

THE DESIGNER'S LEARNING CURVE

In designing the informational panel the intent was to approach the subject from the broadest sense of what made a *Coelacanthiforme* a *Coelacanthiforme*. Starting at the sub-order, the taxonomy was broken down piece by piece until arriving at specific species, the names of those who discovered them, and any other details revealed. These details, found in the search for data, provided keys to layering and methods for finding patterns. A majority of the information available was not in some easy-to-translate, list format, but rather required the careful extraction of data from scientific journals and catalogues that indexed species discoveries. Revealingly, laying out this data visually provided a ready method to discern gaps and discrepancies in the time line, such as *Mawsoniidae* presence in the Triassic and Cretaceous periods, but absent during the Jurassic period. Gaps such as this example are key proofs to the value of designing a complication — exposing the existence of a yet undiscovered link. (There is also a notable gap of approximately 65 million years between today's *coelacanths* and the other most recent members in the fossil record.)

The project spanned over thirty unique sources of information, each often several pages in length. Combining a majority of the information scattered throughout them in one visual piece was not easy. One of the objectives was to embrace complexity and not to have a knee-jerk reaction to overt simplification during the initial design process. The logic of breaking everything down to simple, linear units was suspended in order to generate layers and patterns that might be more informative than oversimplification.[5] The process itself served as a means of organizing research into a single comprehensive visual. The generation of this work was a guide and process to understanding an element outside of the field of design. Working with an information-heavy project focuses both design strategies and the research ability to support it. Making visual connections between pieces of information often reveals similar connections between the information itself, showing trends or inconsistencies that would otherwise be incomprehensible. Making the visually interrelated inferences guides the process of research. This, in turn, improves the next generation of visualization. It is a very productive cycle.

NOTES ON TYPOGRAPHIC REFINEMENT

In the poster's final form, the typographical hierarchies serve as a system of identifying both levels of information and, in instances such as the labels of the silhouettes, relates to other systems of information. Throughout the development of the work, the use of typeface was kept fairly consistent, relying primarily on Futura with the later addition of ITC New Baskerville Italic. This was introduced to provide deeper visual distinction between a species name and additional information within the floating (unconstrained) nodes. In these same nodes, while the species' discoverer and date of discovery are noted in black, additional facts are present in a lighter tint of black. The lightest tints cover yet lower hierarchies.

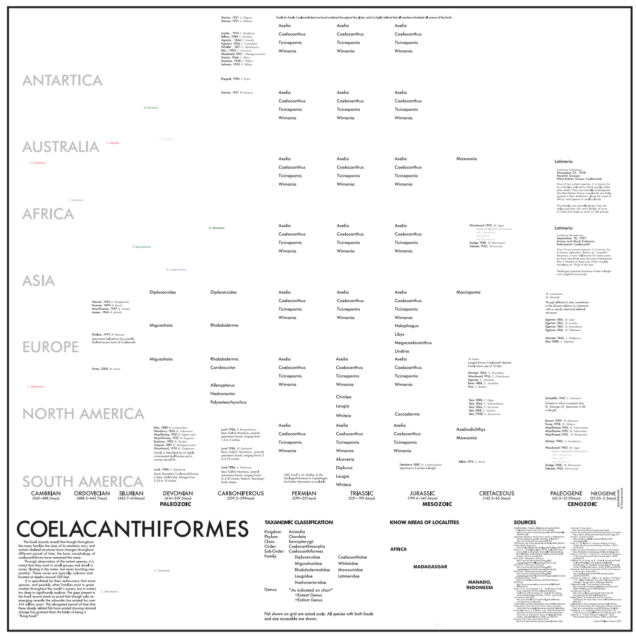


FIGURE 3: *The adjacencies possess a distinct grid system from the main stage. However, the typographic treatment is essentially unified. Futura is used throughout the information graphic. Because the complication requires additional levels of distinction,* ITC *New Baskerville Italic is introduced to denote species identification.*

BIOGRAPHY

William M. Bevington currently serves as Associate Professor of Information Mapping in the School of Art, Media, and Technology at Parsons The New School for Design, The New School, New York. He formerly served as the Executive Director for Parsons Institute of Information Mapping, Chairman of the Communication Design department at Parsons School of Design, and various professorial and instructional roles at his *Alma Mater*, The Cooper Union for the Advancement of Science and Art. He is an information designer and information theorist specializing in creating tools for the rapid assessment of complex data. His first significant project was the *Blackout Procedures Manual* for Con Edison in 1983, and the last was a major *Geospatial Media Mash-up Tool* under U.S. government contract entitled the Geospace and Media-Tool (GMT). Mr. Bevington has developed toolsets for transit systems applications, stock trading applications, and health management tools as a principle designer at Spire Integrated Design, New York. He has lectured worldwide, illustrated *Graphic Designers Production Handbook*, co-authored *Working with Graphic Designers* and *Designing with Type* with Jim Craig. He is also the author of *Typography: The Principles, A Basic Guide to Using Type* published by The Cooper Union.

ACKNOWLEDGEMENTS

William A. Anderson is an undergraduate student at Parsons The New School for Design pursuing his BFA in Communication Design. His focus is on information and interactive design, and he possesses a deep interest in design methodology. The *Coelacanthiforme* project featured in this paper was developed as part of an assignment in an information design class taught by Mr. Bevington. In addition to the project images, he contributed the associated captions and schematic plans, as well as the sections entitled "The Designer's Learning Curve" and "Notes on Typographic Refinement." In his spare time he teaches Children's World Kanreikai Karate at the Society for Martial Arts Instruction.

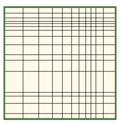
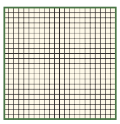
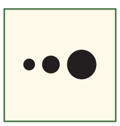
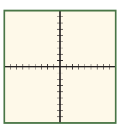
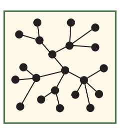
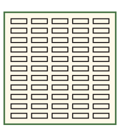
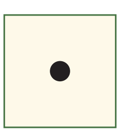
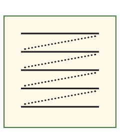
David Fusilier provided valuable design input, as well as assistance in the clarifying logic between complications and adjacencies.

Gregory McNulty, always insightful, provided welcomed advice.

NOTES

1, 2 The table below is based on the eight structural classes that support informative visualization as presented in: William M. Bevington, "PIIMPaper 01, Part One: A Visualization-based Taxonomy for Information Representation: Introduction and Overview" (New York: Parsons Institute for Information Mapping, 2007).William M. Bevington, "PIIMPaper 01, Part One: A Visualization-based Taxonomy for Information Representation: Introduction and Overview" (New York: Parsons Institute for Information Mapping, 2007) http://piim.newschool.edu/_media/pdfs/PIIM-PAPER_01-Pt3_Bevington-William.pdf.

GRID PATTERNS AND THEIR UTILITY FOR INTERRELATABILITY

CLASS AND VARIANT		EXAMPLES	UTILITY FOR COMPLICATIONS:
	**PICTORIAL** *Semi-constrained*	*distorted maps, illustrations*	*very high*
	**PICTORIAL** *Constrained*	*satellite imagery, photographs,*	*high*
	**QUANTITATIVE** *Unconstrained*	*symbols scaled one to another to reflect quantities*	*used as nodes*
	**QUANTITATIVE** *Constrained*	*bar charts, line graphs stack graphs*	*high*
	**RELATIONAL** *Unconstrained*	*node-and-link diagrams, networks*	*very high*
	**RELATIONAL** *Constrained*	*spreadsheets, tree maps, tables*	*high*
	**SYMBOLIC** *Unconstrained*	*ideographs, pictographs*	*used as nodes*
	**SYMBOLIC** *Constrained*	*letters, glyphs, Morse code, braille, binary code*	*low*

3 For further examples and discussion of cartograms, See Peter Bain's "Aspects of Transit Map Design," *Parsons Journal for Information Mapping* 2, no. 3 (New York: Parsons Institute for Information Mapping, Summer 2010), http://webserver/education/parsons-journal-for-information-mapping.

4 An example of the need for such simplifying complexity occurs in healthcare toolsets: "Current EMRS are built upon simple, yet ineffectual, underlying taxonomies. Consequently, they cannot effectively support healthcare professionals' complex workflow needs without requiring a multitude of taxonomical exceptions. These workarounds result in data redundancies caused by excessive structural compartmentalization and navigational inefficiences. Such a foundation may be reffered to as a complicating simplification. Health Care Service Iconography is a discipline-centric set of intelligent icons. They represent a simplifying complication. When integrated into an electronic medical records graphical users interface they permit such toolsets to become more benficially simple in usage due to their complex underlying taxonomy." William Bevington and David Fusilier, "Health Care Service Iconography: Advancing Medical Record Lucidity Through Intelligent Iconography," *Parsons Journal for Information Mapping* 2, no. 2 (New York: Parsons Institute for Information Mapping, Spring 2010), http://piim.newschool.edu/journal/issues/2010/02/pdfs/ParsonsJournalForInformationMapping_Bevington-William+Fusilier-David.pdf.

5 "When managers and policy makers hear about complexity research, they often ask, 'How can I control complexity?' What they usually mean is, 'How can I eleminate it?' But complexity, as we shall see, stems from fundamental causes that cannot always be eliminated. Although complexity is perceived as a liability, it can actually be an asset." Robert Axelrod and Michael D. Cohen, *Harnessing Complexity: Organizational Implications of a Scientific Frontier* (Free Press, May 12, 2000), XI.

6 Detail from William Anderson's "Coelacanthiformes" poster. This is an example of a single adjacency — in this case, a bibliography supporting his findings. In the schematics, the adjacency is represented by the constrained-symbol grid-pattern. Deeper analysis would also argue that the constrained symbol logic (represented by a continuous line) is, in this case, sub-supported by a relational matrix (as the text formed in two columns).

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