

Information Design

SCOTT KLEMMER
FALL 2010
cs147.stanford.edu

Ottawan? → see Stanford P.D. professor
or others geometric designs

crown/claw pulling up
previous object

Alan's idea:
attach the wires to
the middle tube

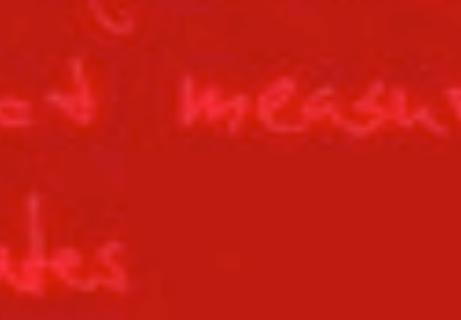
Bill: copyright
visualization of lie



passive gate
array



Scot: a gate that shows
who walked through it last



Bill: a gate that measures
ceremonial gates



January 28, 1986





MORTON THIOKOL, INC.

COMPANY PRIVATE

Wasatch Division

Interoffice Memo

31 July 1985
2870:FY86:073

TO: R. K. Lund
Vice President, Engineering

CC: B. C. Brinton, A. J. McDonald, L. H. Sayer, J. R. Kapp

FROM: R. M. Boisjoly
Applied Mechanics - Ext. 3525

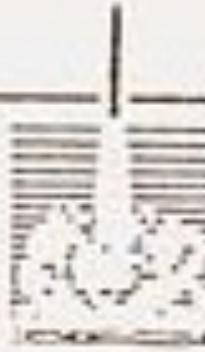
SUBJECT: SRM O-Ring Erosion/Potential Failure Criticality

This letter is written to insure that management is fully aware of the seriousness of the current O-Ring erosion problem in the SRM joints from an engineering standpoint.

The mistakenly accepted position on the joint problem was to fly without fear of failure and to run a series of design evaluations which would ultimately lead to a solution or at least a significant reduction of the erosion problem. This position is now drastically changed as a result of the SRM 16A nozzle joint erosion which eroded a secondary O-Ring with the primary O-Ring never sealing.

If the same scenario should occur in a field joint (and it could), then it is a jump ball as to the success or failure of the joint because the secondary O-Ring cannot respond to the clevis opening rate and may not be capable of pressurization. The result would be a catastrophe of the highest order - loss of human life.

An unofficial team (a memo defining the team and its purpose was never published) with leader was formed on 19 July 1985 and was tasked with solving the problem for both the short and long term. This unofficial team is essentially nonexistent at this time. In my opinion, the team must be officially given the responsibility and the authority to execute the work that needs to be done on a non-interference basis (full time assignment until completed).



R. K. Lund

It is my honest and very real fear that if we do not take immediate action to dedicate a team to solve the problem with the field joint having the number one priority, then we stand in jeopardy of losing a flight along with all the launch pad facilities.

Roger M. Boisjoly

R. M. Boisjoly

Concurred by:

Jack R. Kapp

J. R. Kapp, Manager
Applied Mechanics

COMPANY PRIVATE

31 July 1985

Challenger Disaster

HISTORY OF O-RING DAMAGE ON SRM FIELD JOINTS							
	SRM No.	Cross Sectional View			Top View		Clocking Location (deg)
		Erosion Depth (in.)	Perimeter Affected (deg)	Nominal Dia. (in.)	Length Of Max Erosion (in.)	Total Heat Affected Length (in.)	
OCT 30, 1985	22A	None	None	0.280	None	None	36° -- 66°
	22A	NONE	NONE	0.280	NONE	NONE	338° - 18°
Y	15A	0.010	154.0	0.280	4.25	5.25	163
	15B	0.038	130.0	0.280	12.50	58.75	354
	15B	None	45.0	0.280	None	29.50	354
	41D RH Forward Field	13B	0.028	110.0	0.280	3.00	None
	41C LH Aft Field*	11A	None	None	0.280	None	--
	41B LH Forward Field	10A	0.040	217.0	0.280	3.00	14.50
JULY	STS-2 RH Aft Field	2B	0.053	116.0	0.280	--	90

*Hot gas path detected in putty. Indication of heat on O-ring, but no damage.
 **Soot behind primary O-ring.
 ***Soot behind primary O-ring, heat affected secondary O-ring.

Clocking location of leak check port - 0 deg.

OTHER SRM-15 FIELD JOINTS HAD NO BLOWHOLES IN PUTTY AND NO SOOT NEAR OR BEYOND THE PRIMARY O-RING.

SRM-22 FORWARD FIELD JOINT HAD PUTTY PATH TO PRIMARY O-RING, BUT NO O-RING EROSION AND NO SOOT BLOWBY. OTHER SRM-22 FIELD JOINTS HAD NO BLOWHOLES IN PUTTY.

Blow By History

SRM-15 WORST Blow-By

- 2 CASE JOINTS (80° , 110°) Arc
- MUCH WORSE VISUALLY THAN SRM-22

SRM 22 Blow-By

- 2 CASE JOINTS ($30-40^\circ$)

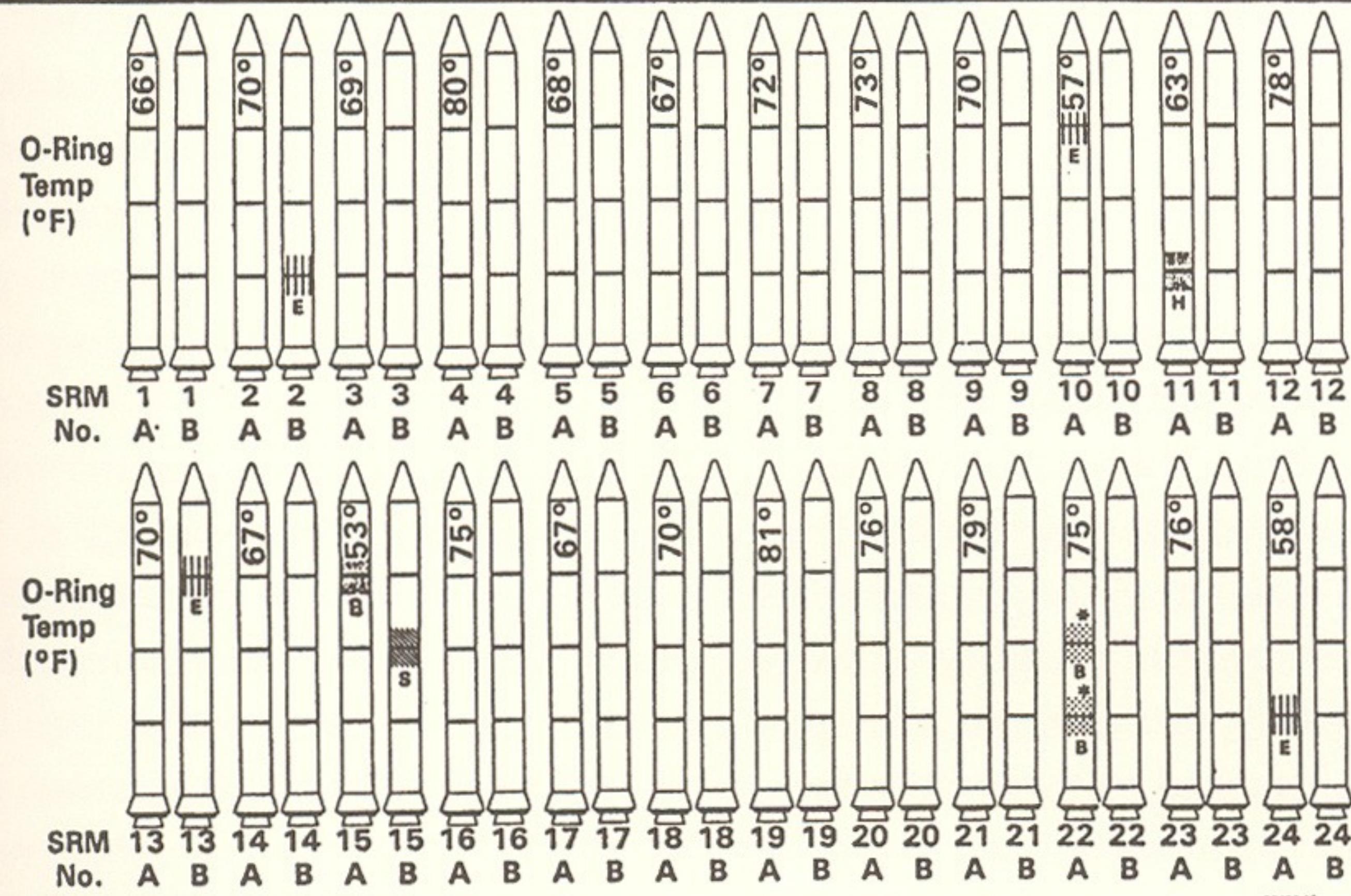
SRM-13A, 15, 16A, 18, 23A 24A

- NOZZLE Blow-By

*HISTORY OF O-RING TEMPERATURES
(DEGREES - F)*

<u>MOTOR</u>	<u>MBT</u>	<u>AMB</u>	<u>O-RING</u>	<u>WIND</u>
DM-4	68	36	47	10 MPH
DM-2	76	45	52	10 MPH
QM-3	72.5	40	48	10 MPH
QM-4	76	48	51	10 MPH
SRM-15	52	64	53	10 MPH
SRM-22	77	78	75	10 MPH
SRM-25	55	26	29 27	10 MPH 25 MPH

History of O-Ring Damage in Field Joints (Cont)



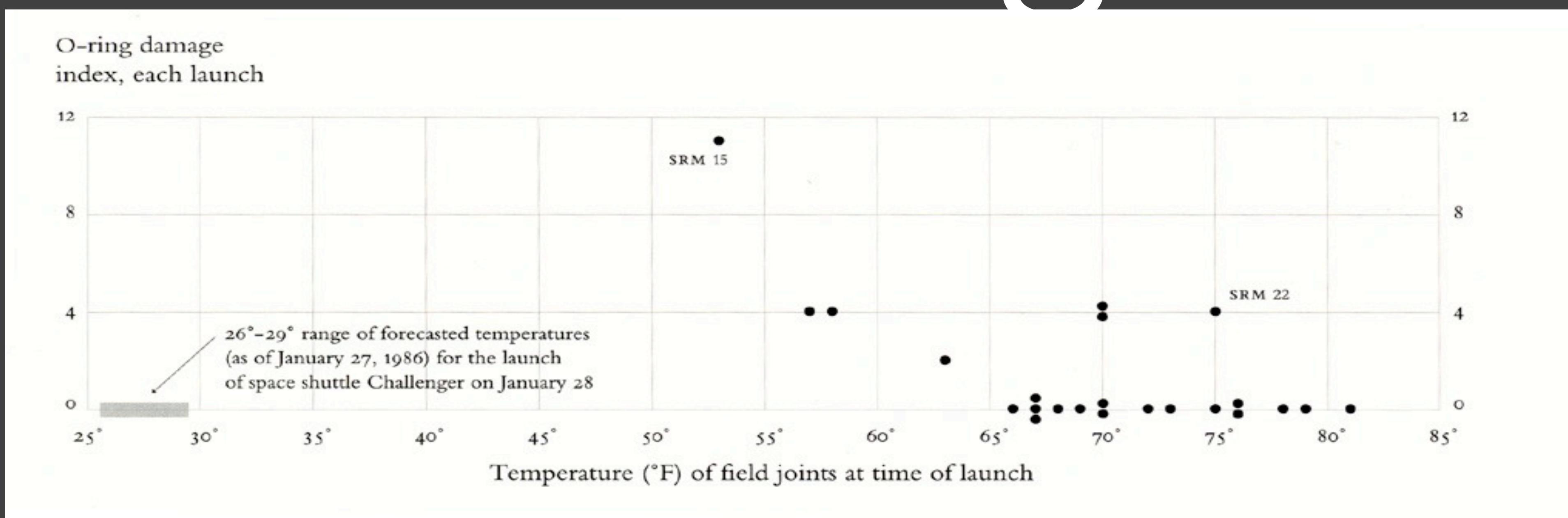
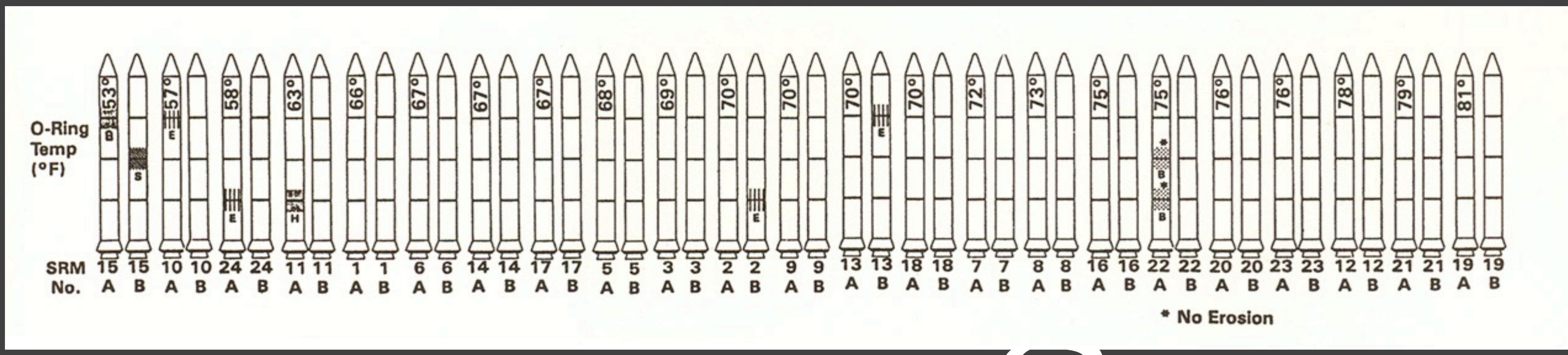
Code	
S	= Heating of Secondary O-Ring
B	= Primary O-Ring Blowby
E	= Primary O-Ring Erosion
H	= Heating of Primary O-Ring
	= No Damage

E. Tufte, pp. 46-47 , Visual Explanations

INFORMATION ON THIS PAGE WAS PREPARED TO SUPPORT AN ORAL PRESENTATION
AND CANNOT BE CONSIDERED COMPLETE WITHOUT THE ORAL DISCUSSION

Today

- Making Designs Glanceable
- Leveraging Expectations
- Using Color

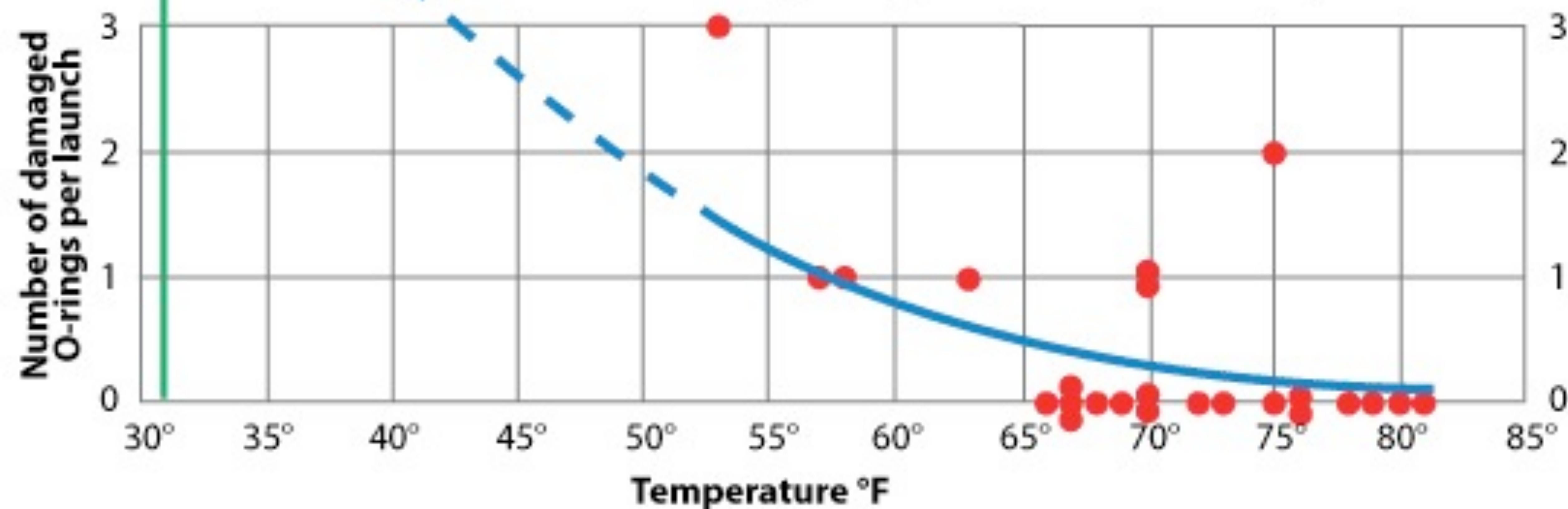


Redrawn by E. Tufte, p. 49 , Visual Explanations



Extrapolation of damage curve to the cold
Challenger launch: 31° forecasted
temperature for January 28, 1986

Dots indicate temperature and O-ring damage for 24
successful launches prior to Challenger. Curve shows
increasing damage is related to cooler temperatures.



Yesterday

Today

Tomorrow

Radar Map

Hour-by-Hour

We

**Hour-by-Hour Trend View for
San Francisco, CA (94110)**

° F | ° C

NEW! TruPoint forecast with more detail for each hour. [Learn more.](#)

Overview

Details

Thu

Nov 5

7 pm



60° F

Precip:
10%

8 pm



60° F

Precip:
10%

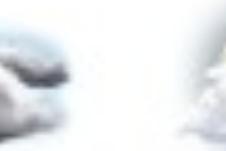
9 pm



59° F

Precip:
10%

10 pm



59° F

Precip:
10%

11 pm



59° F

Precip:
10%

Fri

Nov 6

12 am



56° F

Precip:
10%

1 am



56° F

Precip:
20%

2 am



56° F

Precip:
20%

64° F

62° F

60° F

58° F

56° F

54° F

7 pm

8 pm

9 pm

10 pm

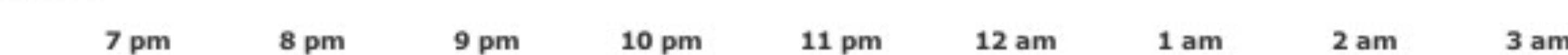
11 pm

12 am

1 am

2 am

3 am



Small Multiples

- Economy of line
- Many similarities enable us to notice differences

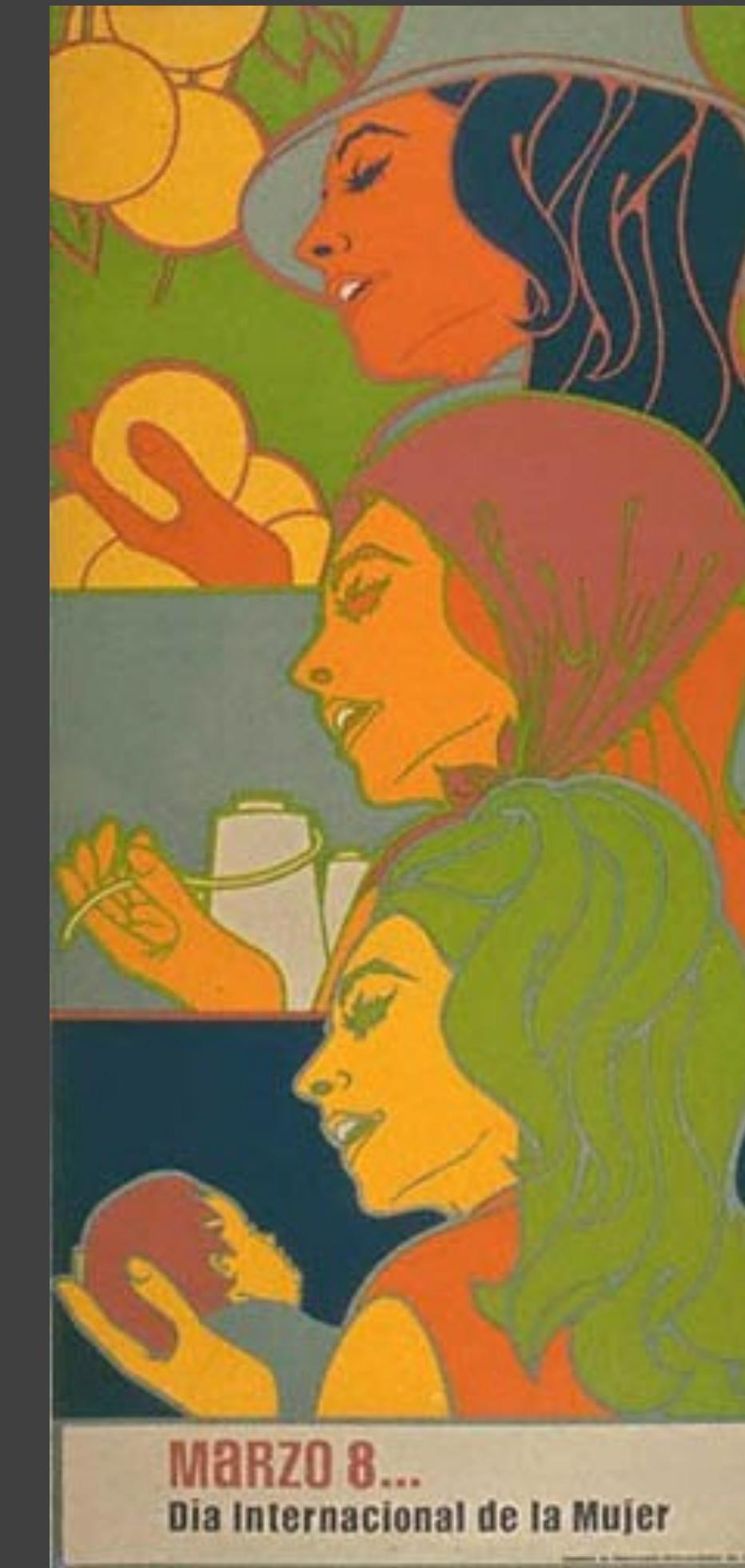


SMALL MULTIPLES

International Women's Day



Echeverria, Heriberto 1971
March 8 - International Women's Day



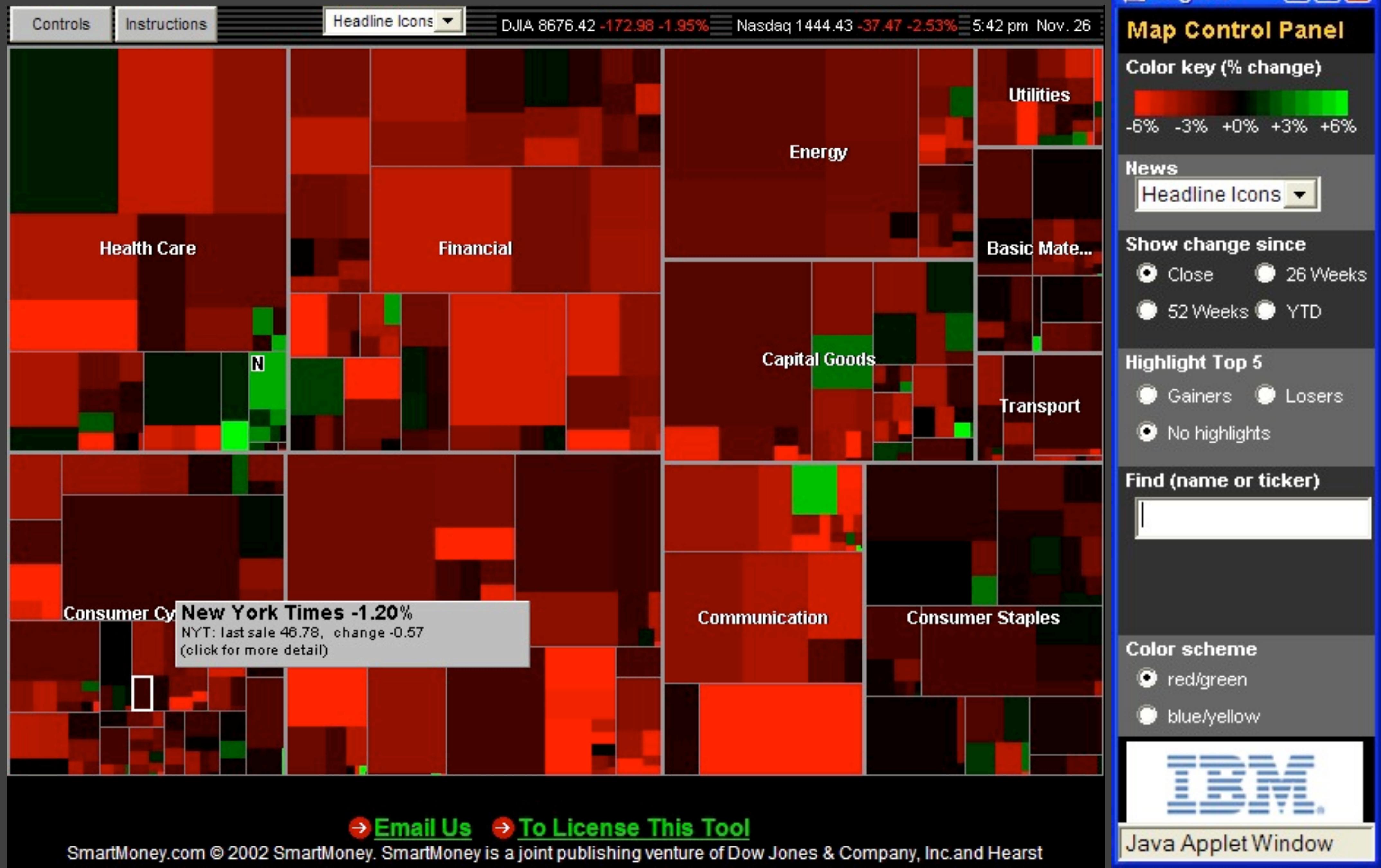
Diaz, Estela 1974
March 8 - International Women's Day

SMALL MULTIPLES

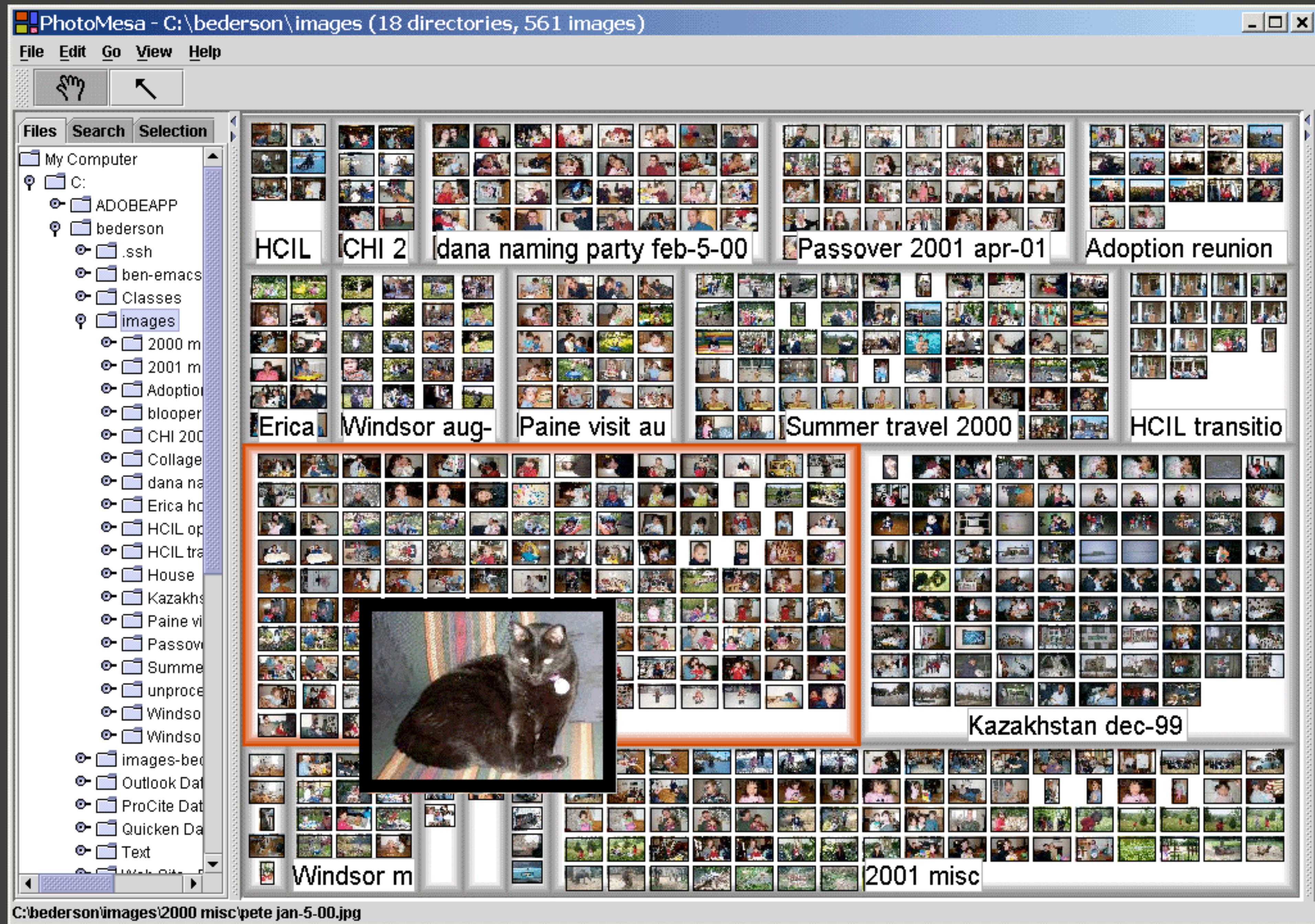
Reid Miles, Blue Note Cover



Tree Maps (SmartMoney)



Tree Maps (PhotoMesa)



Design Galleries

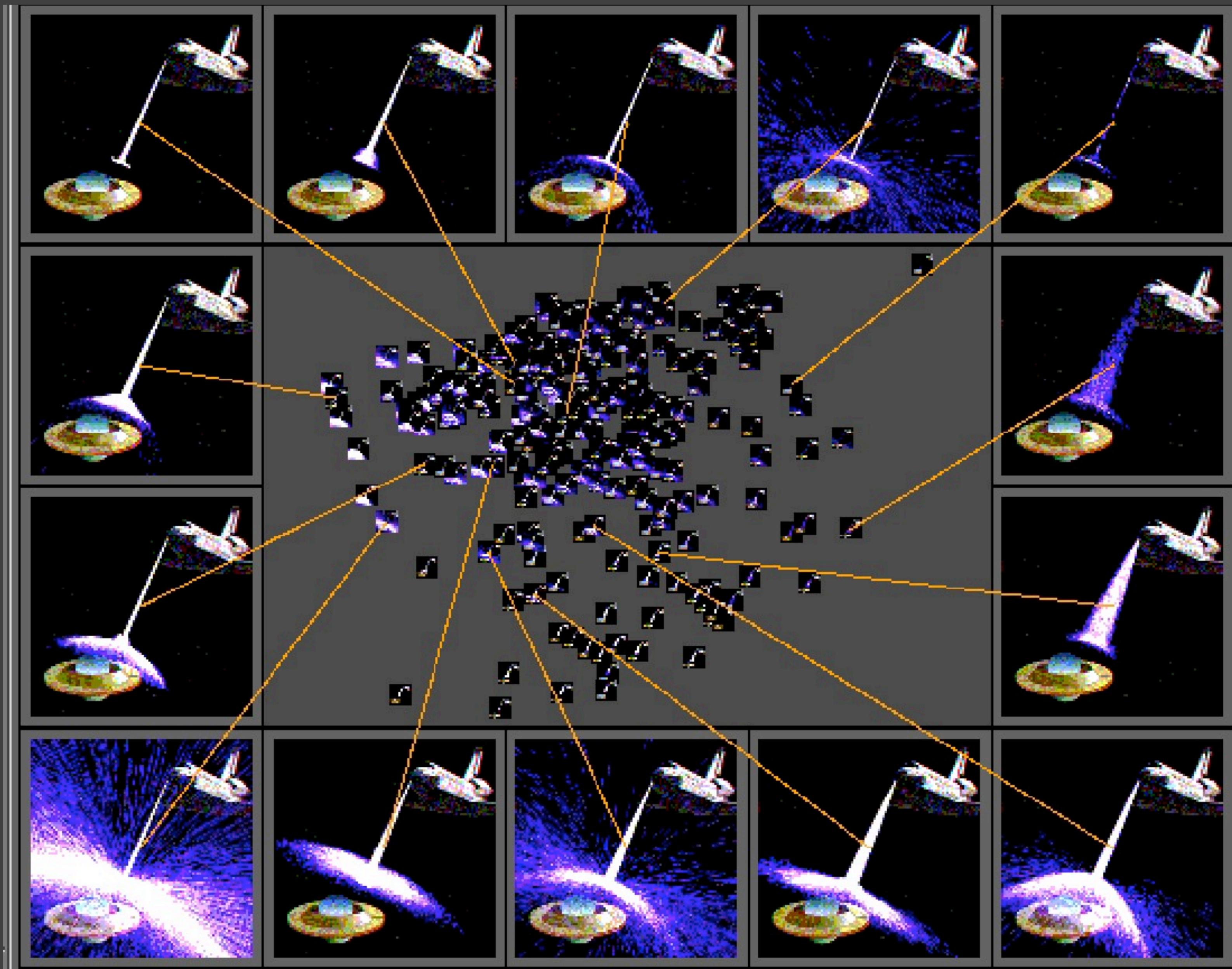


Figure 15: A DG for a particle system.

Design Galleries

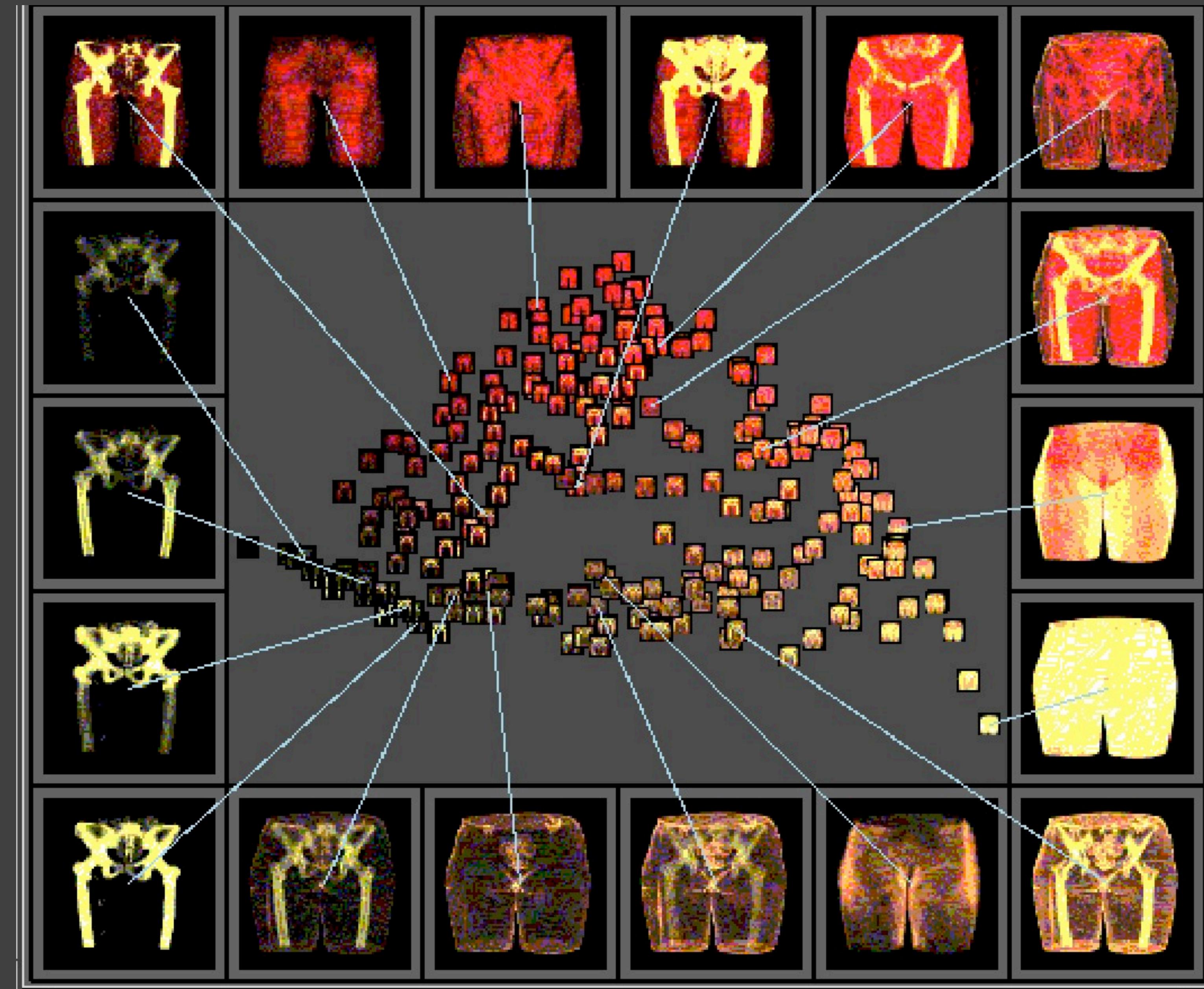


Figure 13: A DG with different opacity transfer functions.

How People Read Online

Saccades

DANS, KÖN OCH JAGPROJEKT

På jakt efter ungdomars kroppsspråk och den "synkretiska dansen", en sammansnälting av olika kulturers dans, har jag i mitt fältarbete under hösten rört mig på olika arenor inom skolans värld. Nordiska, afrikanska, syd- och östeuropeiska ungdomar gör sina röster hörda genom sång, musik, skrik, skratt och gestaltar känslor och uttryck med hjälp av kroppsspråk och dans.

Den individuella estetiken framträder i kläder, frisyrer och symboliska tecken som förstärker ungdomarnas "jagprojekt" där också den egna stilen i kroppsrörelserna spelar en betydande roll i identitetsprövningen. Upphållsrummet fungerar som offentlig arena där ungdomarna spelar upp sina performance liknande kroppsspråk.

“They Don’t”
-Jakob Nielsen

Measuring the Effect of Writing Strategy

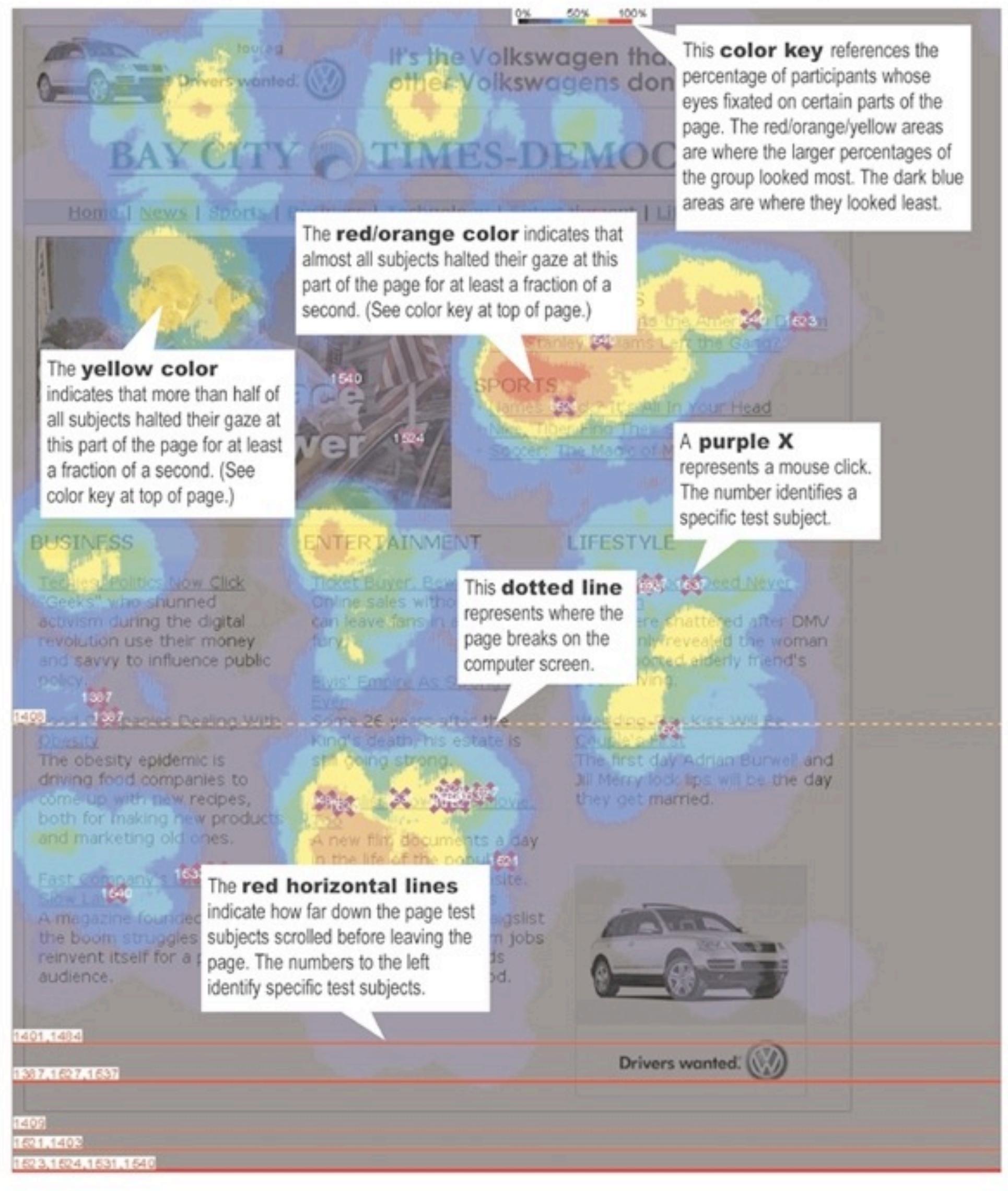
Site Version	Sample Paragraph	Usability Improvement (relative to control condition)
Promotional writing (control condition) using the "marketese" found on many commercial websites	Nebraska is filled with internationally recognized attractions that draw large crowds of people every year, without fail. In 1996, some of the most popular places were Fort Robinson State Park (355,000 visitors), Scotts Bluff National Monument (132,166), Arbor Lodge State Historical Park & Museum (100,000), Carhenge (86,598), Stuhr Museum of the Prairie Pioneer (60,002), and Buffalo Bill Ranch State Historical Park (28,446).	0% (by definition)
Concise text with about half the word count as the control condition	In 1996, six of the best-attended attractions in Nebraska were Fort Robinson State Park, Scotts Bluff National Monument, Arbor Lodge State Historical Park & Museum, Carhenge , Stuhr Museum of the Prairie Pioneer, and Buffalo Bill Ranch State Historical Park.	58%
Scannable layout using the same text as the control condition in a layout that facilitated scanning	<p>Nebraska is filled with internationally recognized attractions that draw large crowds of people every year, without fail. In 1996, some of the most popular places were:</p> <ul style="list-style-type: none"> • Fort Robinson State Park (355,000 visitors) • Scotts Bluff National Monument (132,166) • Arbor Lodge State Historical Park & Museum (100,000) • Carhenge (86,598) • Stuhr Museum of the Prairie Pioneer (60,002) • Buffalo Bill Ranch State Historical Park (28,446). 	47%
Objective language using neutral rather than subjective, boastful, or exaggerated language (otherwise the same as the control condition)	Nebraska has several attractions. In 1996, some of the most-visited places were Fort Robinson State Park (355,000 visitors), Scotts Bluff National Monument (132,166), Arbor Lodge State Historical Park & Museum (100,000), Carhenge (86,598), Stuhr Museum of the Prairie Pioneer (60,002), and Buffalo Bill Ranch State Historical Park (28,446).	27%
Combined version using all three improvements in writing style together: concise, scannable, and objective	<p>In 1996, six of the most-visited places in Nebraska were:</p> <ul style="list-style-type: none"> • Fort Robinson State Park • Scotts Bluff National Monument • Arbor Lodge State Historical Park & Museum • Carhenge • Stuhr Museum of the Prairie Pioneer • Buffalo Bill Ranch State Historical Park 	124%

Interlaced Browsing

Eyetracking

Understanding a Heatmap

Eyetrack III heatmaps provide an overall view of activity on a Web page. To create the heatmap, data from all user activity on a page are combined. The boxes below provide a key to understanding the elements.



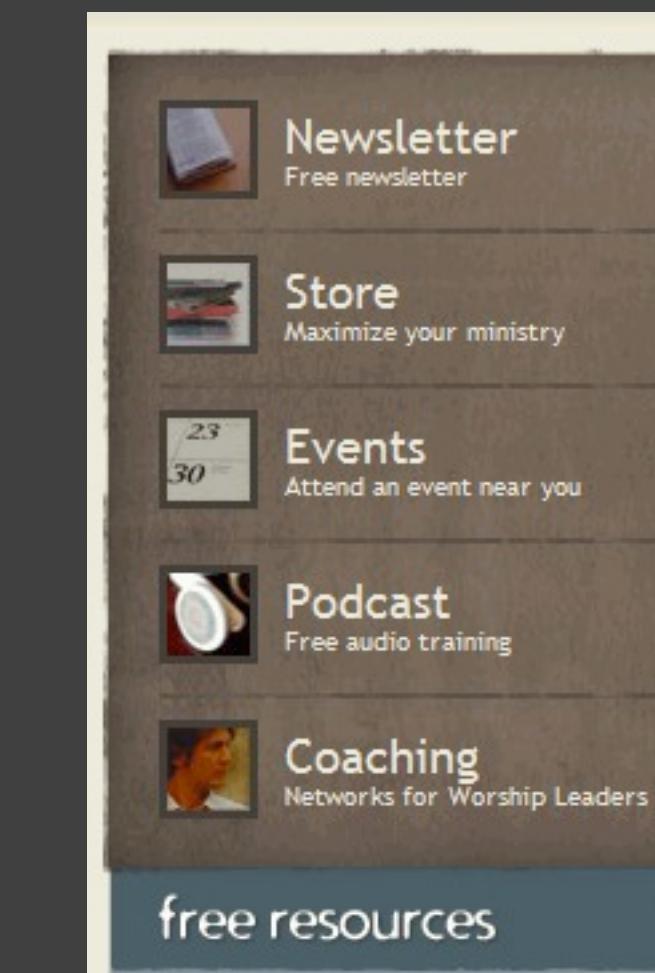
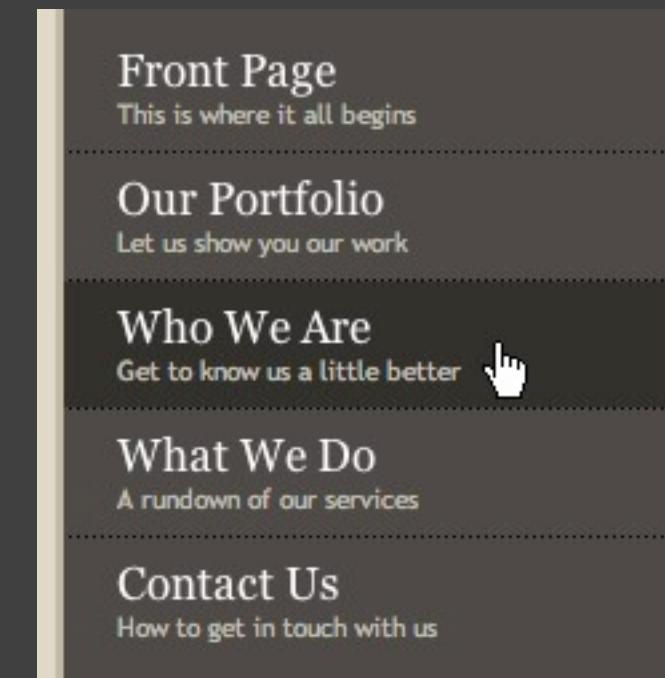
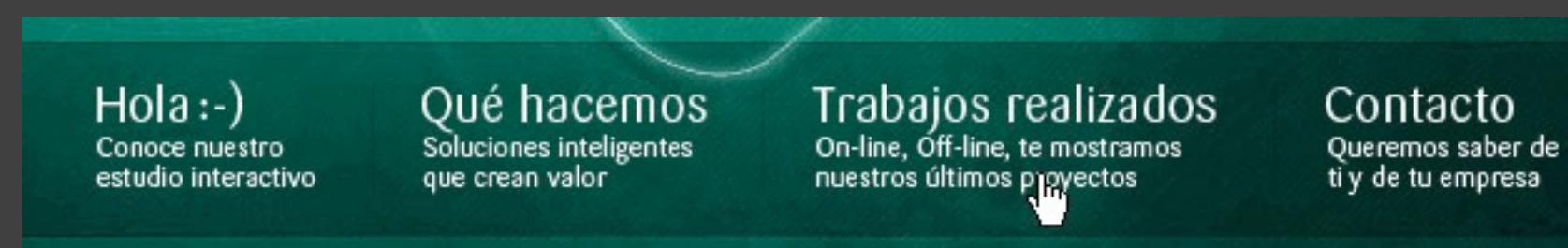
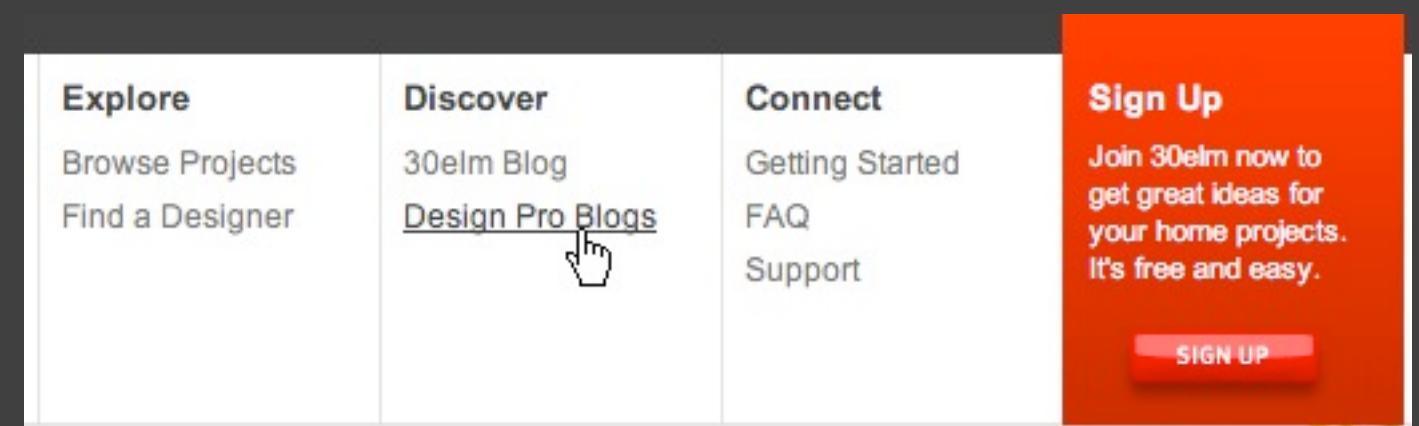
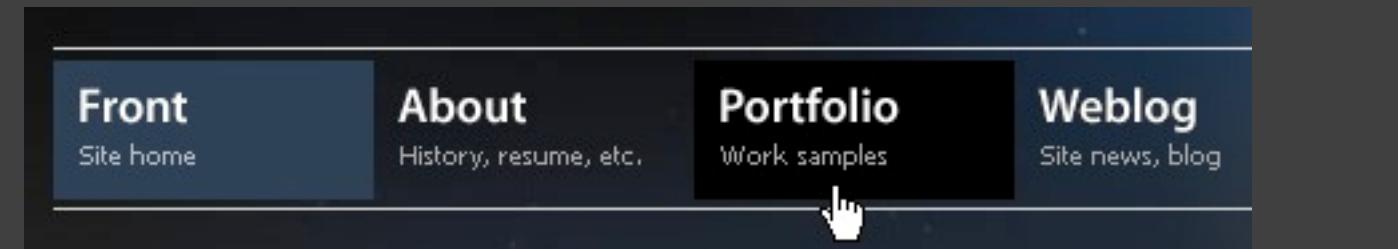
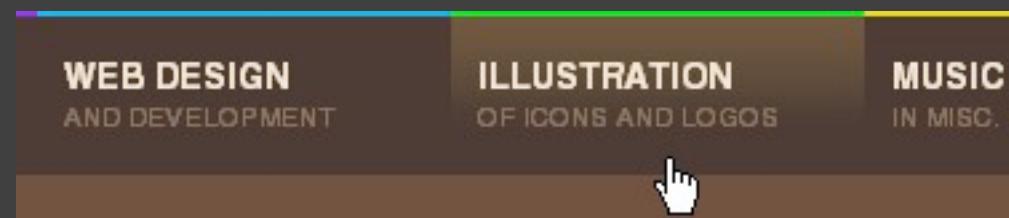
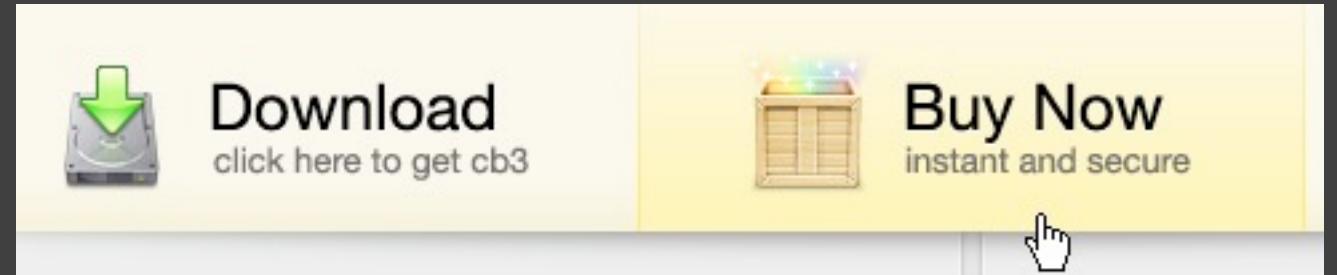
Design for Glanceability



Low-Scent Navigation



Speaking Block Navigation



Rob Haitani, Palm, from Bill Moggridge's *Designing Interactions*

I am a silly donut

JIA SPONG III MCI III I

TAE CAT

THE CAT

TAECHT

Expectation Plays an Important Role

TAE CAT

Map Description

List Description

Type Sample

HAM DUNCAN PA
MADISON TAUTON REVERE
INGBORO BIDWELL HIBBING
AS WALDRON GIBBON TRINWAY
REMONT VILLARD McGRATH
ODESSA JEFFERSON NIAGARA
TON BIRCHWOOD RUSH CITY ALBANY
KENSINGTON LAKEFIELD CALUM
KALIDA PRESTON ZI

Map One. All names in 8-point light sans-serif face (Monsen Light), all capitals.

Typewritten

Map Two. All names in 8-point light sans-serif face (Monsen Light), capitals and lower-case.

Typewritten

Map Three. All names set in 10-point serif face (Times Roman), all capitals.

Typewritten

Map Four. All names set in 10-point serif face (Times Roman), capitals and lower-case.

Typewritten

ham LOCKLAND Dehi
Duncan Revere Pa
Madison Tauton Bidwell Hibbing
ngboro Bidwell Gibbon Trinway
; Waldron Villard McGrath
remont Bainbridge Niagara
Odessa Jefferson Rush City Albany
ton Birchwood Lakefield Calume
Kensington Kalida Preston ZI

HAM LOCKLAND DELHI
DUNCAN REVERE PA
MADISON TAUTON HIBBING
NGBORO BIDWELL TRINWA
LAS WALDRON GIBBON
REMONT VILLARD MC GRATH
BAINBRIDGE NIAGARA
ODESSA JEFFERSON RUSH CITY ALBAN
TON BIRCHWOOD CALUM
KENSINGTON LAKEFIELD PRESTON ZI

am LUCKIANU Delhi
Duncan Revere Pali
Madison Tauton Bidwell Hibbing
ngboro Bidwell Gibbon Trinway
; Waldron Villard McGrath
remont Bainbridge Niagara
Odessa Jefferson Rush City Albany
ton Birchwood Lakefield Calum
Kensington Kalida Preston ZI

Type Sample

M LUCKIANU Delhi
Duncan Revere Pali
Madison Tauton Bidwell Hibbing
ngboro Bidwell Gibbon Trinway
; Waldron Villard McGrath
remont Bainbridge Niagara
Odessa Jefferson Rush City Albany
ton Birchwood Lakefield Calum
Kensington Kalida Preston ZI

ham LUCKIANU Delhi
Duncan Revere Pa
Madison Tauton Bidwell Hibbing
ngboro Bidwell Gibbon Trinway
; Waldron Villard McGrath
remont Bainbridge Niagara
Odessa Jefferson Rush City Albany
ton Birchwood Lakefield Calum
Kensington Kalida Preston ZI

Shater Lockland Delhi
Duncan Revere Palit
Madison Tauton Bidwell Hibbing
ngboro Bidwell Gibbon Trinway
; Waldron Villard McGrath
remont Bainbridge Niagara
Odessa Jefferson Rush City Albany
ton Birchwood Lakefield Calum
Kensington Kalida Preston ZI

I Lockland Barton
Duncan Presto
Madison Tauton Sunbury Hibbing
ngboro Bidwell Gibbon Trinway
; Waldron Villard McGrath
remont Bainbridge Niagara
Odessa Jefferson Rush City Albany
ton Birchwood Lakefield Bir
Danbury Kalida Piketon Calum
Kensington ZI

Map Description

List Description

Type Sample

Map Five. All names set in 12-point bold sans-serif face (Venus Bold Condensed), capitals and lower-case.

Typewritten

Test 6a:
Typewritten
Test 6b:
List set to match type in which name appears on map.
Test 6c:
List set to match type in which name appears on map.

Map Six. Contains 85 names set in 5-point Monsen Light capitals and lower-case, and 58 names set in 10-point Monsen Light, capitals and lower-case.

Test 7a:
Typewritten
Test 7b:
List set to match type in which name appears on map.
Test 7c:
List set to match type in which name appears on map.

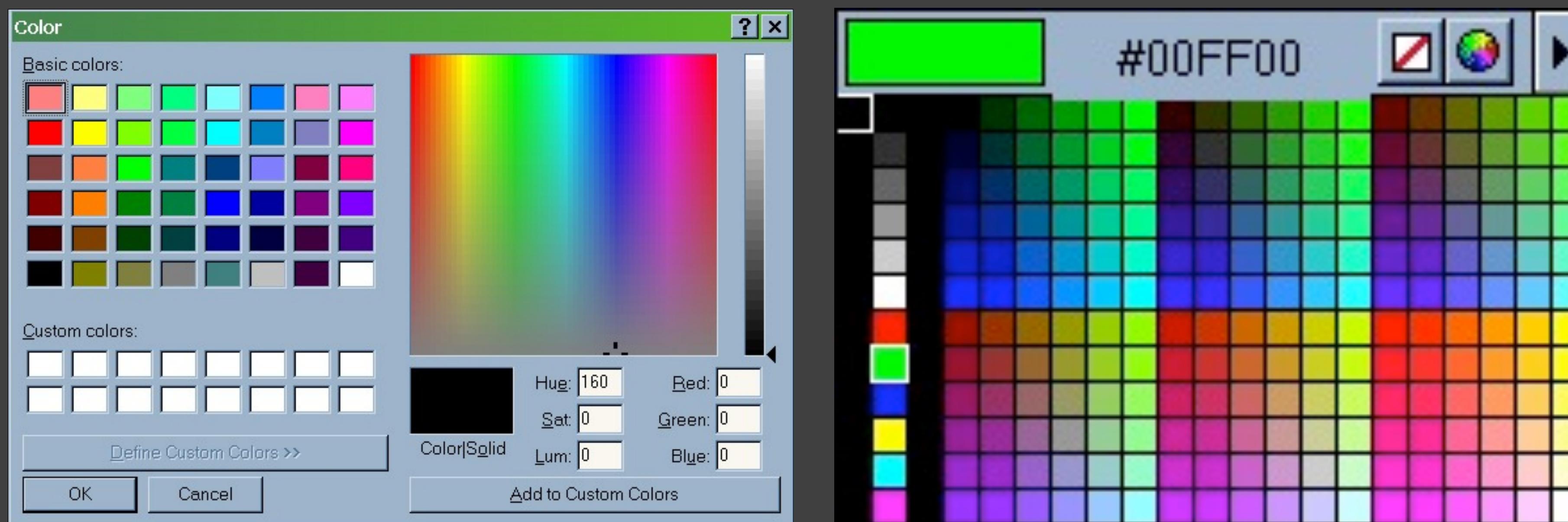
Map Seven. Contains 47 names set in 5-point Monsen Light, 57 names in same face 8-point and 36 names in same face 13-point, all capitals and lower-case.

Test 8a:
List set to match type in which name appears on map.
Test 8b:
Typewritten
Test 8c:
List set to match type in which name appears on map.

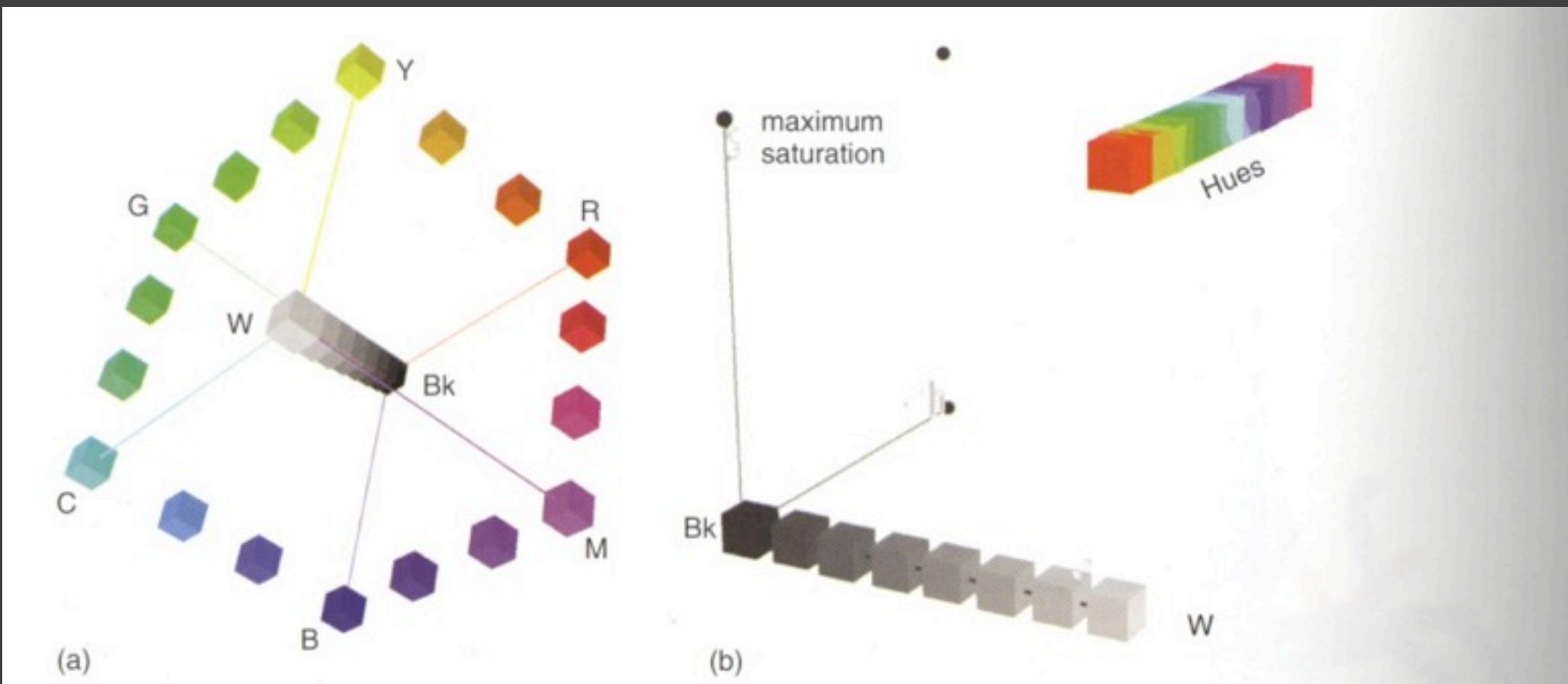
**ONE MINUTE AND
FIFTY-TWO SECONDS
WITH NEVILLE BRODY
AND RICK POYNOR**

HELVETICA
A DOCUMENTARY FILM
BY GARY HUSTWIT

Technology-Centered Colors



Color Spaces

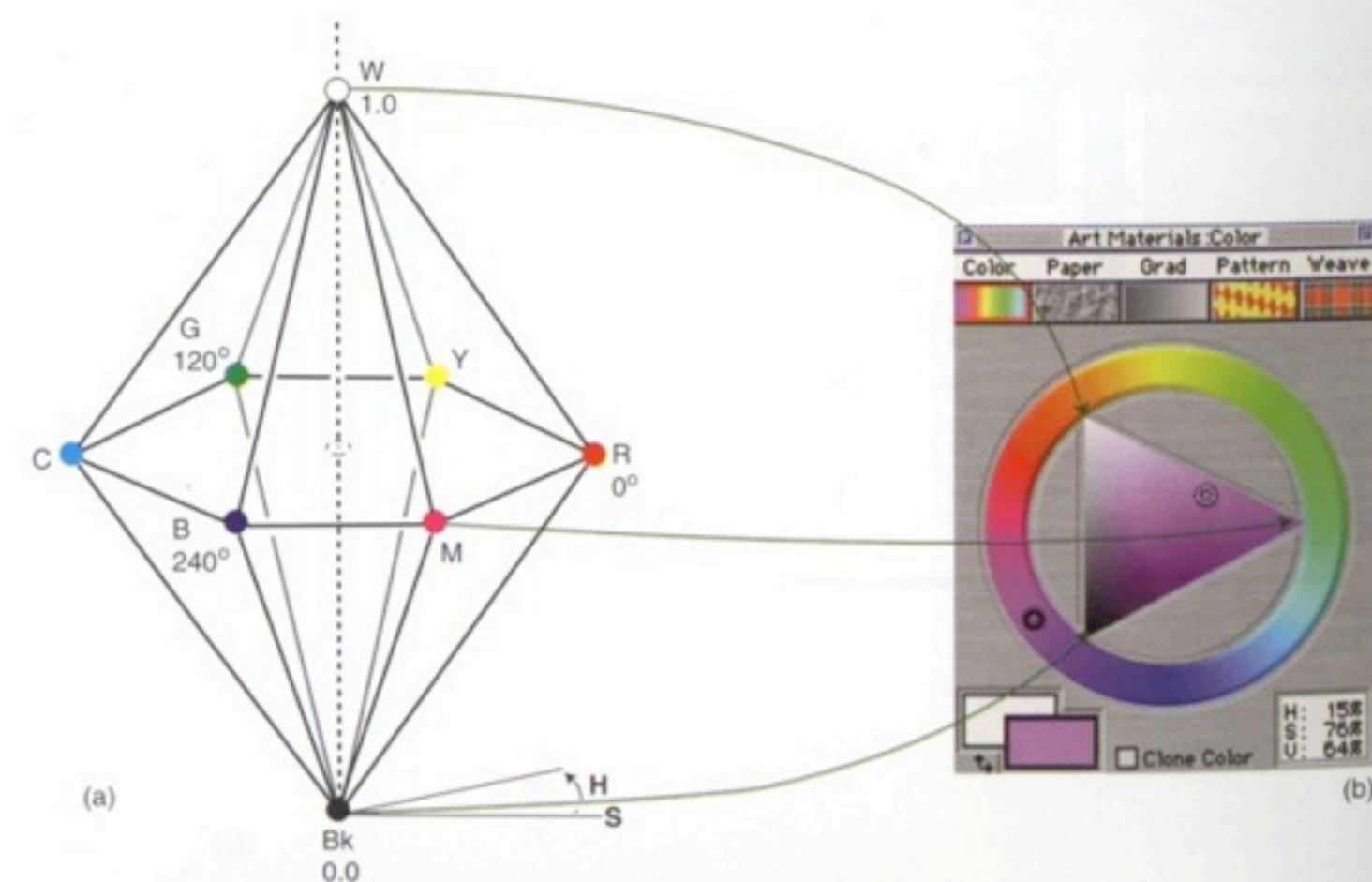


Color Plate 5 **RGB and HSV cubes.** (a) The RGB cube has fully saturated colors along the edges connecting the RGB vertices to CMY. Grays run through the center diagonally between the black and the white vertices. Note that the top of the HSV cone can be seen as a projection along the white-black diagonal of the RGB cube. (b) The HSV cube has maximally saturated colors along the hue axis, with saturation and value at their maximum value. Grays run along the value axis and have no hue or saturation components.



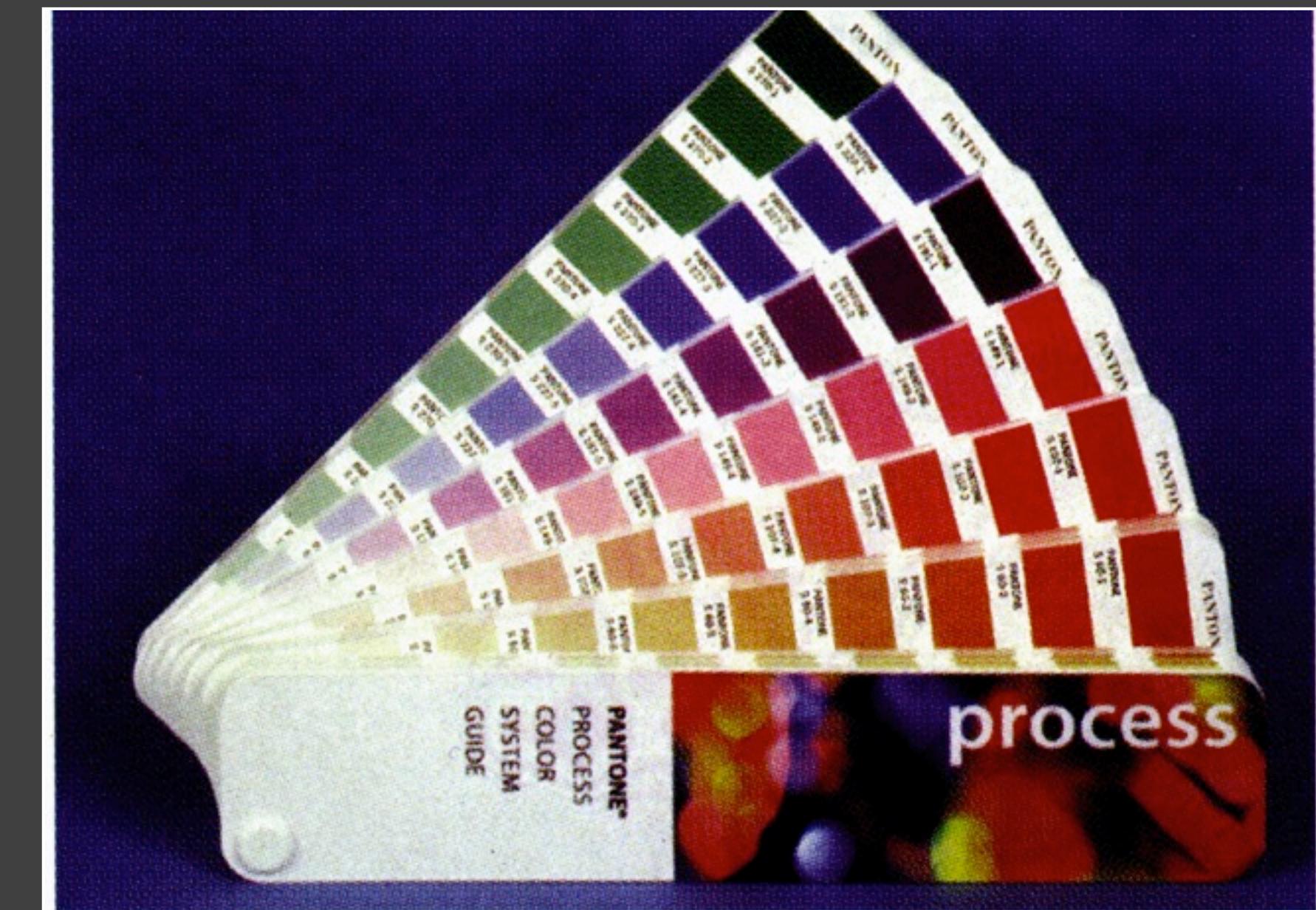
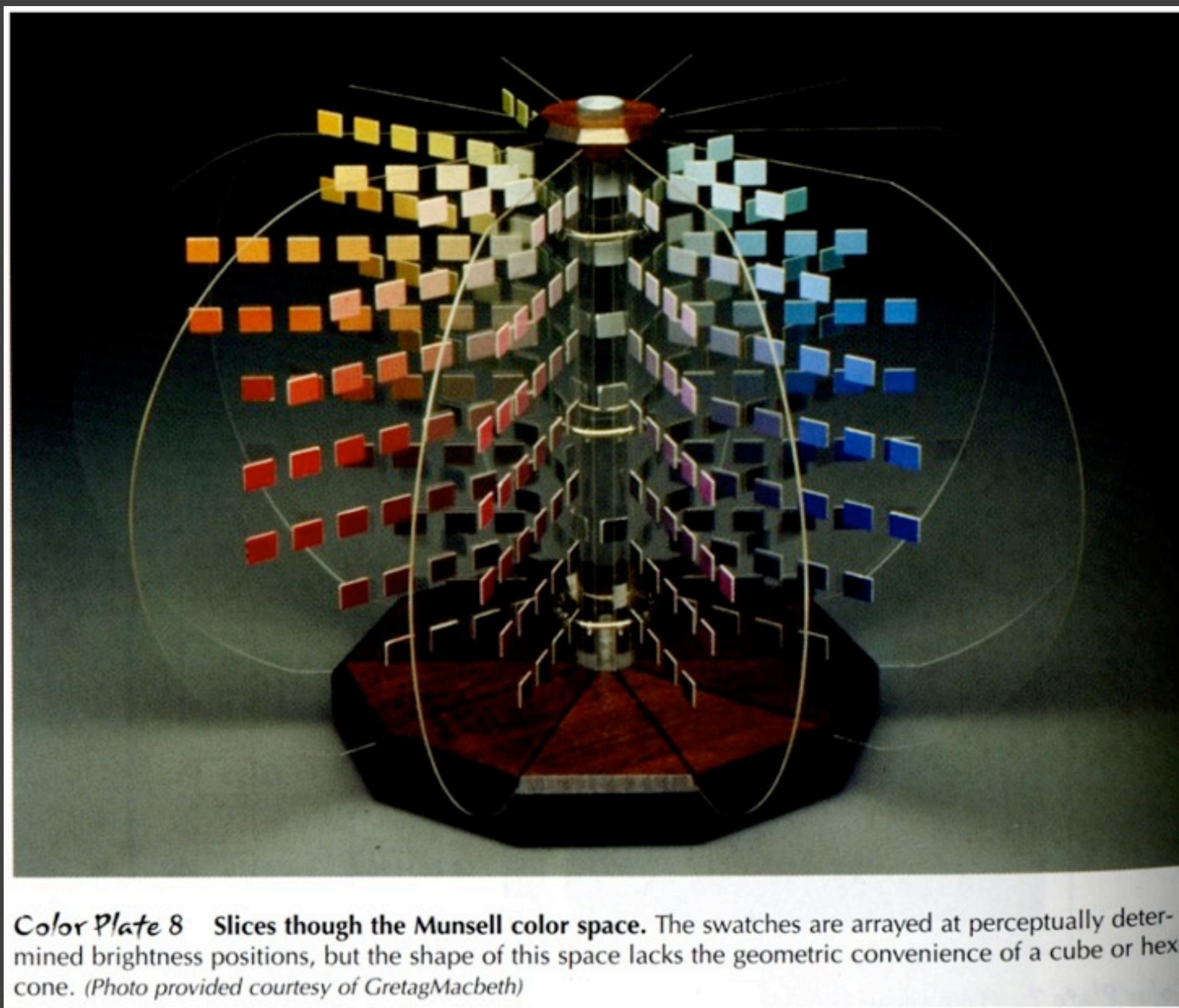
Color Plate 6 **Use of a double-hexcone color space in a 2D color picker.** (a) In a double-hexcone HLS space, the white vertex is pulled up to create a cone symmetrical to the one formed by the black vertex.

(b) MetaCreations Painter uses a circle from the middle of an HSL space with a cross section of the space showing the area between a given hue and the white and black extremes of the double hexcone. (*Painter* is a registered trademark of MetaCreations. These materials copyrighted 1998.)



Human-Centered Colors

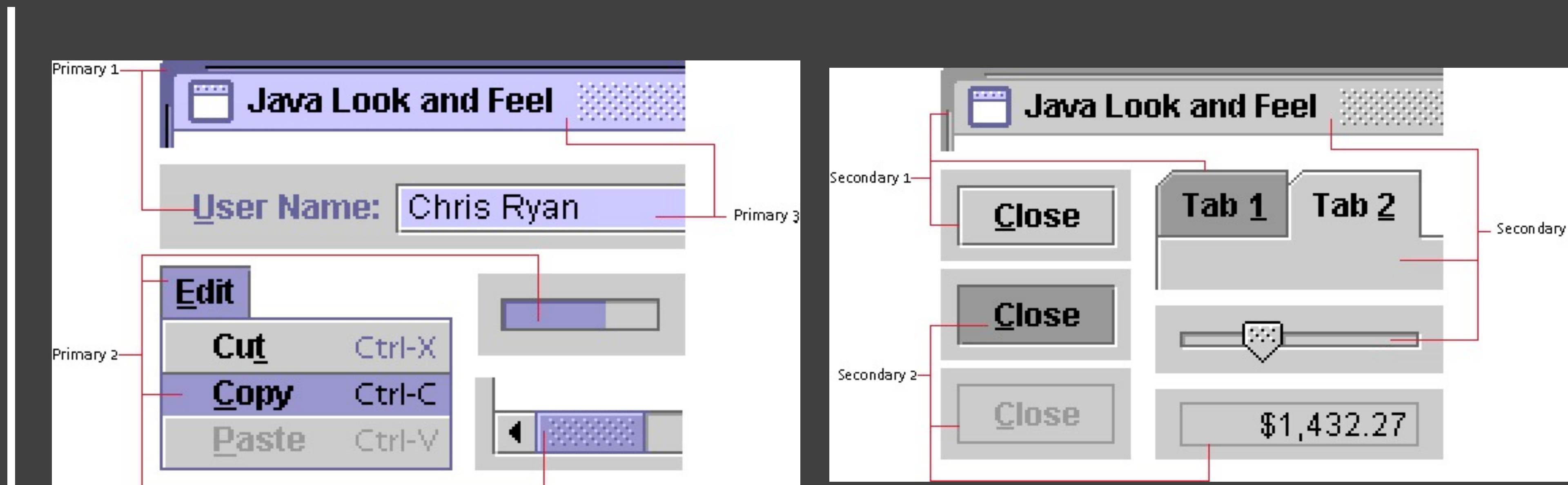
- Munsell (left): Perceptually based
- Pantone (right): Functionally based



Color Plate 3 Color-matching systems.
Color naming and printed reference swatches ensure consistent color matching.

Color (Java L&F)

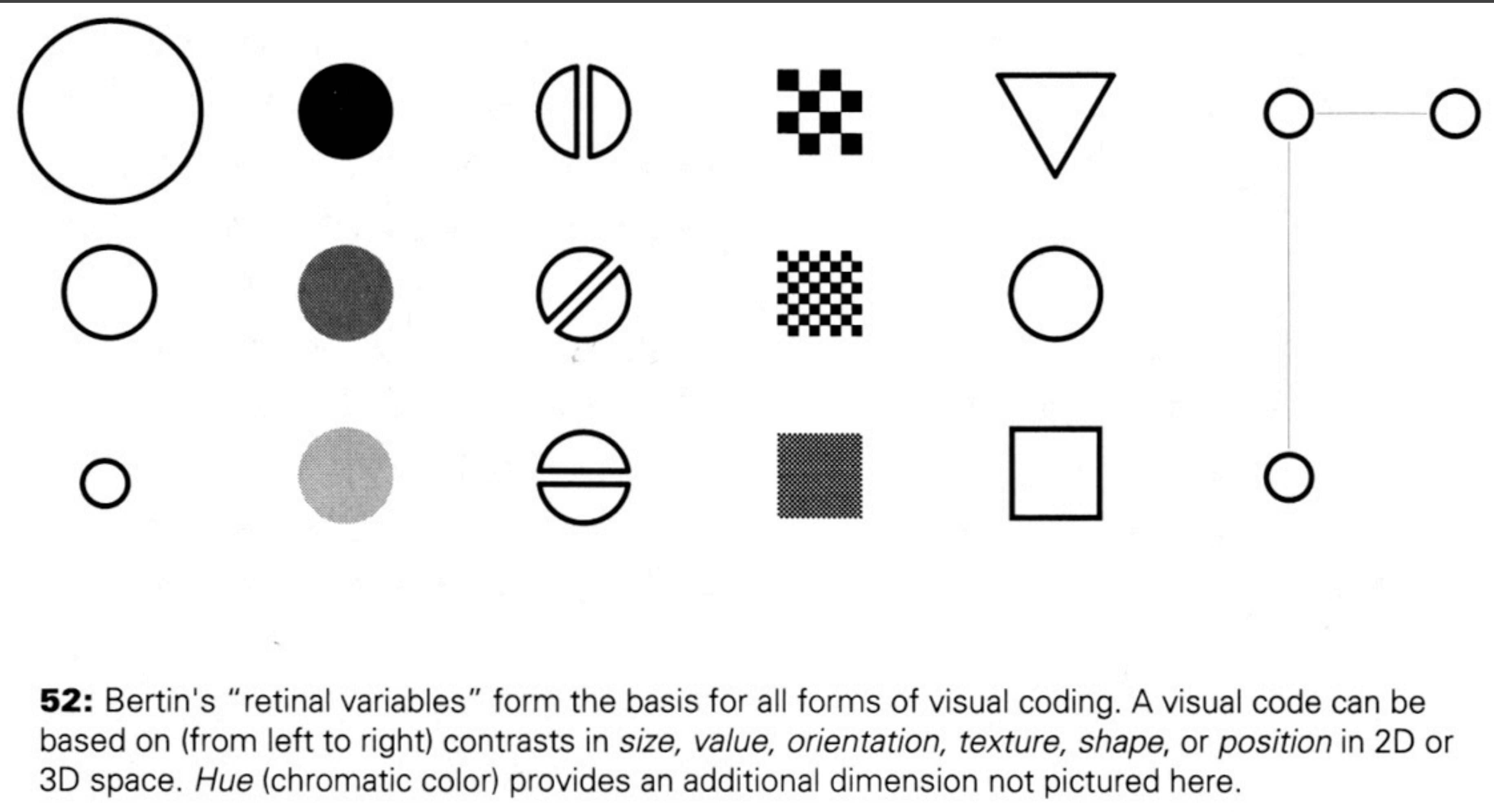
- Six color semantic scheme
- Clean, consistent look
- Easy on eyes (mostly gray)



How to get color right

- Design in grayscale first
- Keep luminance values from grayscale when moving to color

Proportion and Scale



52: Bertin's "retinal variables" form the basis for all forms of visual coding. A visual code can be based on (from left to right) contrasts in *size*, *value*, *orientation*, *texture*, *shape*, or *position* in 2D or 3D space. *Hue* (chromatic color) provides an additional dimension not pictured here.

Alfred Hitchcock, North by Northwest

[SF Gate Home](#)[Today's News](#)[Sports](#)[Entertainment](#)[Technology](#)[Live Views](#)[Traffic](#)[Weather](#)[Health](#)[Business](#)[Bay Area](#)[Travel](#)[Columnists](#)[Classifieds](#)[Search](#)[Index](#)**Jump to:**

►►GO

San Francisco 25th Ethnic Dance Festival



FILM CLIPS Also opening today

[Mick LaSalle, Edward Guthmann, C.W. Nevius](#)



Friday, June 13, 2003

San Francisco Chronicle

[CHRONICLE SECTIONS](#)

- [Printer-friendly version](#)
- [Email this article to a friend](#)

NEW FLICKS ROUNDUP

How about a New Flicks newsletter? [Sign up here.](#)



'RESPIRO'



Drama. Starring Valeria Golino and Francesco Casisa. Directed by Emanuele Crialese. (PG-13. 90 minutes. In Italian and Sicilian with English subtitles. At Bay Area theaters.)

"Respiro" is partly of interest for what it doesn't do. It's set on an Italian island south of Sicily, but it doesn't try to imbue the setting with romance. It's about a sexy young wife and mother who doesn't fit in with her neighbors, but the movie is not an indictment of village provinciality. She may be the prettiest and liveliest person on her island, but she is also a bit crazy.

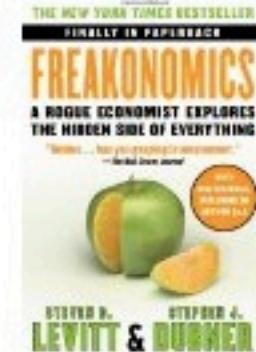
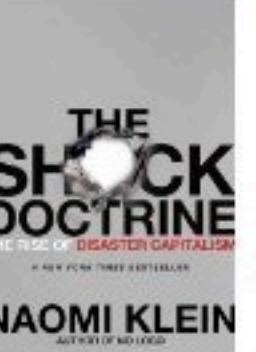
["The Eye"](#)
[Plodding.](#)

["Hollywood Homicide"](#)
[Appealing.](#)

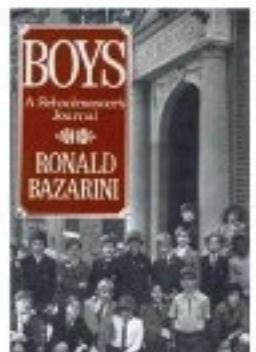
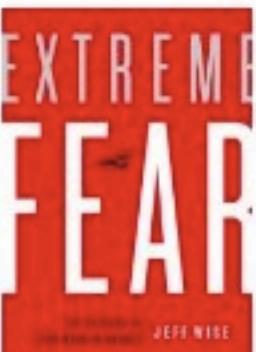
["Manito"](#)
[Low-budget wonder.](#)

["Respiro"](#)
[Haunting.](#)

Customers Who Bought We Feel Fine: An Almanac of Human Emotion Also Bought

 <p>Freakonomics by Stephen J. Dubner Price: \$16.00 \$9.35 ★★★★☆ (1,693) ✓ Used & new from \$7.59</p> <p>Add to Cart</p>	 <p>The Shock Doctrine: The Rise of Disaster Capitalism by Naomi Klein Price: \$16.00 \$10.88 ★★★★☆ (413) ✓ Used & new from \$4.27</p> <p>Add to Cart</p>
---	---

Customers Who Shopped for We Feel Fine: An Almanac of Human Emotion Also Shopped For

 <p>Boys: A Schoolmaster's Journal by Ronald Bazarini Price: \$47.06 \$17.05 ✓ Used & new from \$0.36</p> <p>Add to Cart</p>	 <p>LE PEN PINK by MARVY® LePen Price: \$4.49 \$1.29 ★★★★☆ (1) Used & new from \$0.99</p> <p>Add to Cart</p>	 <p>Extreme Fear: The Science of Your Mind in Danger (MacSci) by Jeff Wise Price: \$27.00 \$17.82 ✓ Used & new from \$17.82</p> <p>Pre-order this item</p>
--	--	--

Web Design Patterns

- Web patterns important and persistent(!)

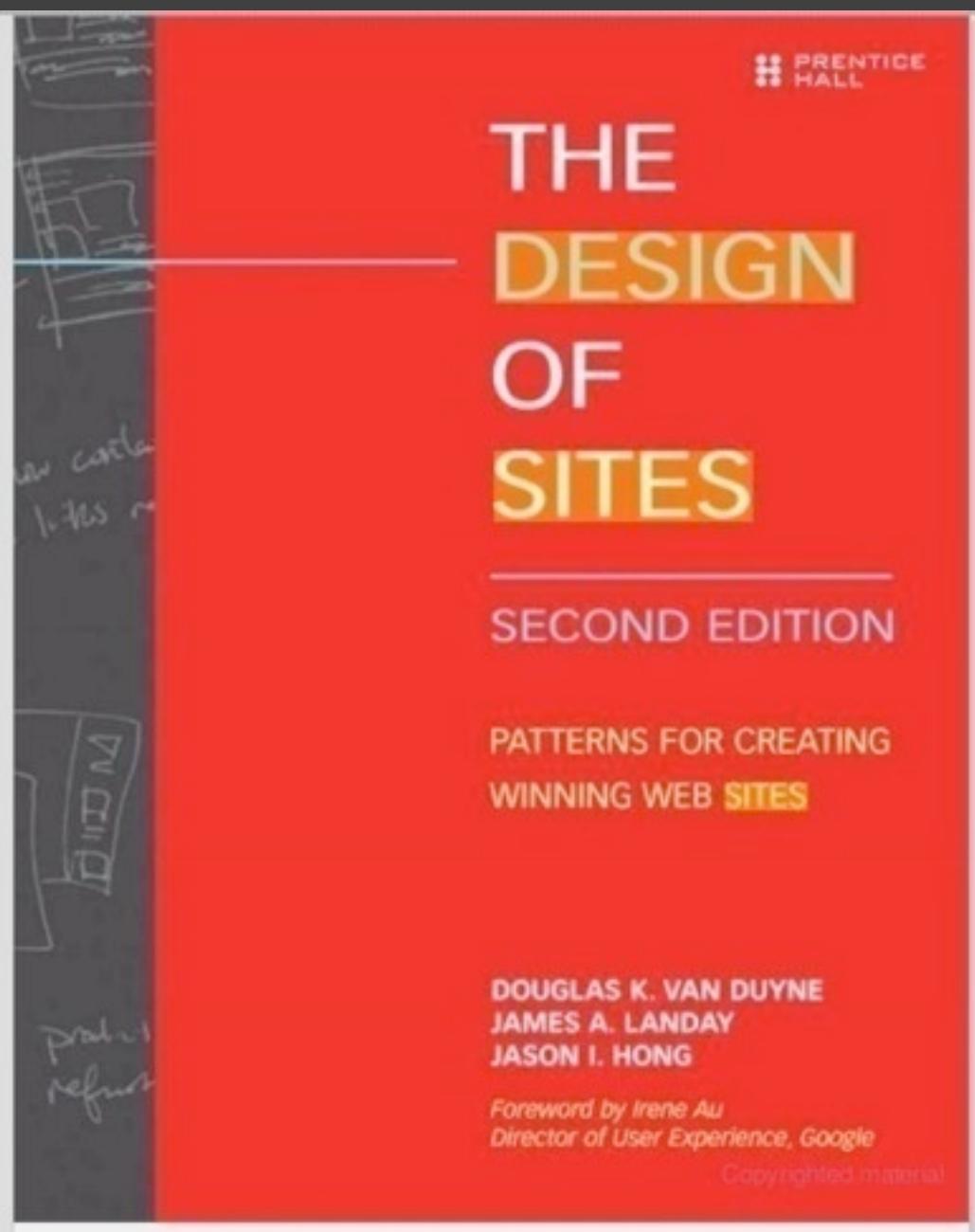


Figure 2.10

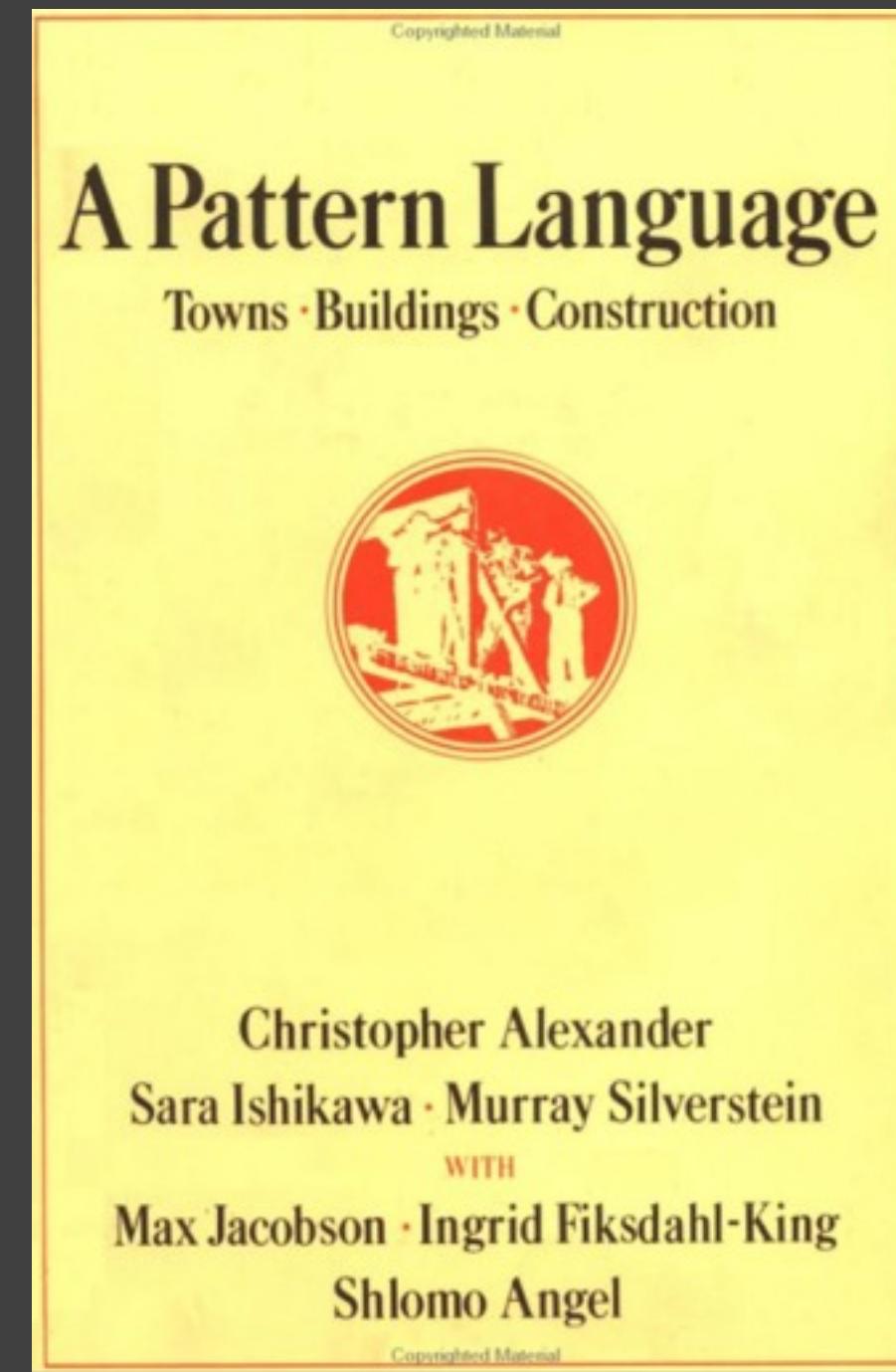
These screen shots illustrate the evolution of the home-pages of CNN, MSN, Yahoo!, and Google from 2001 to 2006. Note that the core structure and the underlying design patterns used by these Web sites have not changed over the years. For the most part, the only major change to these Web sites has been an increase in information density.



The Importance of Patterns

Key options

- Design patterns
- Designing by example
- Users will work well with UI's that build upon concepts that they are familiar with



Further Reading

- Kevin Mullet and Darrell Sano,
Designing Visual Interfaces
- Edward Tufte's books and course
- Anne Spalter,
The Computer in the Visual Arts
- Robin Williams,
The Non-Designer's Design Book
- Typography
 - Jan Tschichold, *The New Typography*
 - Robert Bringhurst,
The Elements of Typographic Style
 - <http://www.adobe.com/type/>

Further Reading

- Color: Charles Poynton, *A Technical Introduction to Digital Video*
 - also his SIGGRAPH course
 - web <http://www.inforamp.net/~poynton/>
- Typography on the web
 - <http://www.pemberley.com/janeinfo/latin1.html>
 - <http://www.microsoft.com/typography/>

Herbert Bayer, World Geographic Atlas

• <http://www.flickr.com/photos/mstoll/sets/72157605938388380/>

Google Maps v. Bing

- <http://www.41latitude.com/post/2072504768/google-maps-label-readability>