Interfaces: Life at the Screen

- Goals of this module
  - Defining interfaces as
    - points of entry
    - controlled gateways
    - cultural/epistemological boundaries between different ways of seeing
  - Elements of good interface design
    - Good interfaces form junctions between worlds
    - Probably dependent on “closure” (defined as an interim, socially-broad agreement on the shape, purpose, and utility of a designed object or system)
    - Note well: design doesn’t just *present* what is there, it inherently directs how the viewer makes sense of things within
- Problems in human-computer interfaces
  - Pre-GUI modes of representing information
  - With interfaces as [implicitly] cultural divides, an unrecognized problem for computer scientists

Interfacings

- Goals of this module (continued…)
  - Basics of Usability
    - feedback loops
    - “naturalness”
    - [see readings: Norman & Tog in particular]
  - Interfaces as cultural boundaries (recap)
  - What IT interface designers need to know
    - “user-centered” design
    - strive for “seamlessness” and flow across modes of work, applications, tasks
    - seek a transparent mapping between gestures, thoughts, and what’s on the screen (ie, facilitate “closure”)
  - Local vs general cultures and meanings
  - Problems of virtuality
  - Clarifying who is who, what is what: authentication and warranting
  - “Featuritis” and the plague of mature markets

Interfaces to Information

- What is the field called human-computer interaction (HCI)?
  - Rooted in “human factors” research in WW2
  - A cousin to ergonomics: does for the mind what ergonomics does for the body
- General examples of interfaces
  - Usuals: daily life, bureaucracies, old “industrial-era” systems
    - punch-in clocks,
    - next phase, thanks to mechanical engineering: “inherently safe” machines
  - Cultural: from the “primitive” to the “modern”
    - problems of cinema, TV, etc.: localities of meaning—*The Gods Must be Crazy*
  - Architects and planners: architects as disciplinarians
    - Importance of the Americans with Disabilities Act
  - Computing and network: [simplest] CLIs and GUIs

Everyday-Life Interfaces

- Doors, telephones, appliances
  - What's the "learning curve" on a rental car, a cell phone?
  - Why are the labels on stereo + TV controls impossible to read?
  - How about those icons on appliances? Braille on a drive-up ATM?
- Tasks can be "delegated" from humans to things
  - the "sleeping policeman"
  - adds an extra wrinkle to interface design
- Bureaucracies public and private: the queue
  - Lester Thurow and the "job queue"—interfaces as barriers to social mobility for those without the proper "tickets"
  - The politics of gate-keeping
  - Traff c

Easy Lessons from Everyday Life

- Which side of the door—"Push" or "Pull"?—lessons from Donald Norman
  - Does it "come naturally"?
  - Does it need a text to explain its basic mode of use?
  - Does it have useable "affordances?
- Where's the power?
- Critical concept: the inventor also invents the user—or, at least her gestures and modes of access, and her ways of understanding the new object
- The need for a sign is a bad sign… and the bad conf gurations are sometimes too obvious!

The Semantics of Interfaces

- Innovation and the problem of closure: can interfaces be "routinized" when a technology is not yet "closed"?
  - Cory Knobel sees the emergence of a standard as emblematic of closure
  - perhaps making a standard does reflect consensus
- Modernism and the alienness of the primitive or simply different
  - local/"primitive"/different fosters innovation
  - working or leisuring in real and IT environments should help make meanings—we need a feedback loop
- Cabinets of curiosties, museums, libraries, and freak shows: content and arrangement makes meanings

Interfaces are Inherently Based on Symbolic Representations or "Codings"

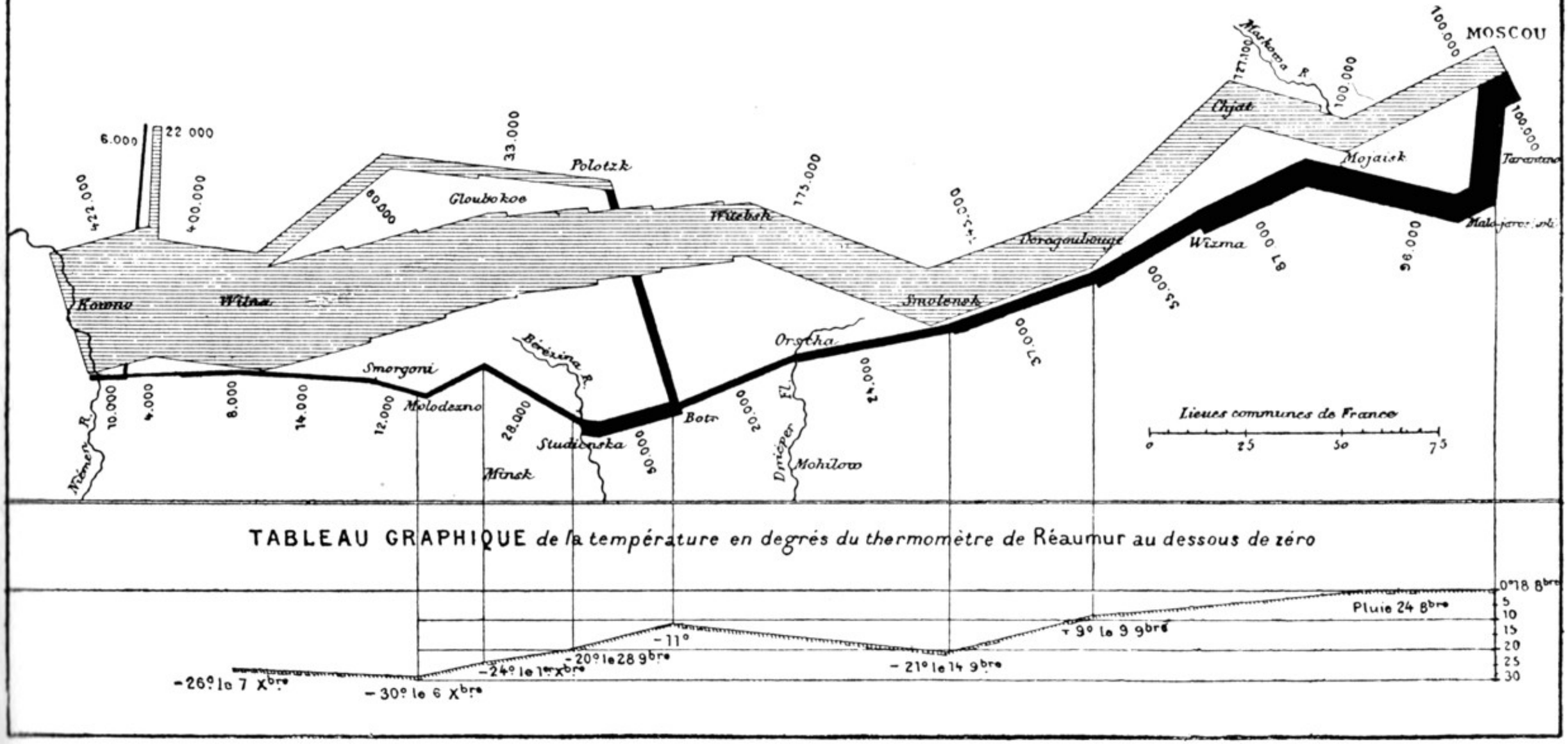
- Not so complicated initially: words represent things or actions
- Icons function similarly—perhaps they are deep, psychologically elemental
- At the same time, there are limits to symbolic representation
  - domains where we lack common or rigorous "languages:" smell
  - things that cannot be made explicit: tacit knowledge (craft knowledge vs. engineering)

Information Interfaces

- Lead guru is Edward Tufte, and Norman (of course)
  - Breakthrough book: *The Visual Display of Quantitative Information*; ironically, couldn't find a publisher, so self-published
  - Similar notions to those in HCI: cognitive mapping, simplicity, etc.
  - Very good critique of "chart junk," the visual noise that confuses readers
  - Also good on maps, and how they should easily orient the viewer
- More examples of poor representational schemes…

CARTE FIGURATIVE des pertes successives en hommes de l'Armée Française dans la campagne de Russie 1812-1813.

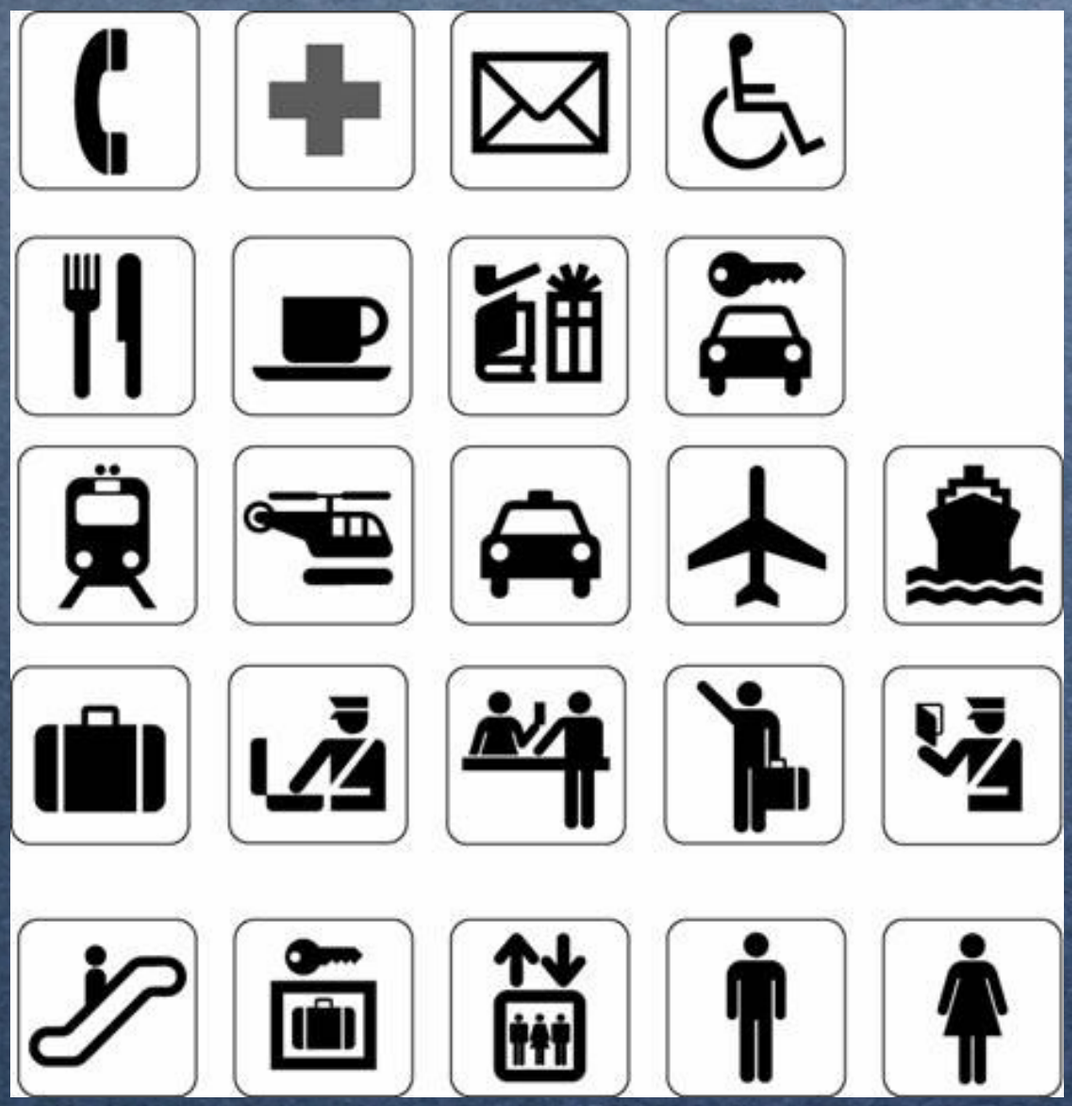
Dressée par **M. Minard**, *Inspecteur Général des Ponts et Chaussées en retraite.*



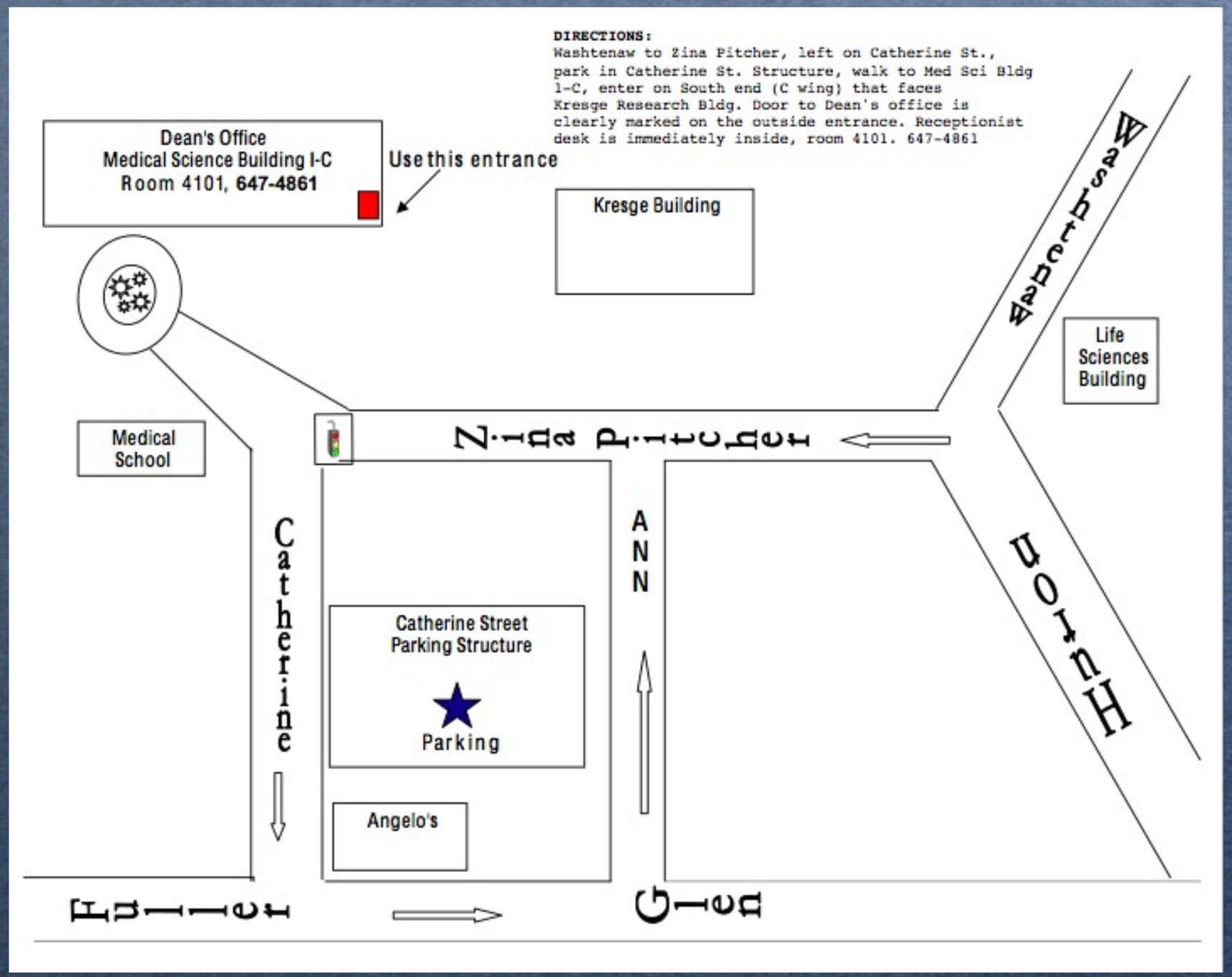
Xbre = December 9bre = November 8bre = October

Source: http://it.coe.uga.edu/studio/seminars/visualization/minardmap.html

An Information Interface to Span a Language Barrier…



Source: http://iws.ccccd.edu/acano/lectures/ARTC1305_Logos_f les/image024.jpg



Source: University of Michigan

This is a Map??

Unnecessary Redesign…

Four Physical-Space, Work-Flow Cases

- Redesigning the reading room in the French National Archives
  - workflow, and who was consulted
  - stairs that make you fall (Gehry's Guggenheim Bilbao as well)
- The new Italian caffé on East University
  - information flows
  - tasking and work flows
- Retail check-out lines and end caps
- Patient care on the hospital floor
  - The residents' info system and the problem of hand-offs
  - HIPPA and flow issues
- Info flows *must* match work flows

Computer and Network Interfaces

- Early
  - Paper, tape, and cards (keyboard clicks as feedback elements)
  - Monitors
- CLIs and GUIs
  - How geeky, how silly?
    - CLIs and geek discipline: extraordinary demand for visualization
    - Bob, Clippy and other idiocies; “lickable” MacOS X <http://toastytech.com/guis/bob.html>
  - What metaphors?
    - File systems, trash cans (the Mac’s trashcan?!), touch-screens (note McDonald’s)
    - Space and shopping malls
    - They must make sense, often inherited from older technologies: Volume/folder/document metaphor inherited from old paper ﬁling systems.
    - others?

Basics of IT Usability

- Necessity for feedback & minimal time lag from system to user
  - Mouse-tracking at minimum, but other ways as well
  - Aural (sound), haptic (touch)
- Ideally, interfaces should minimize user effort to f gure things out
  - things should come “naturally”
  - obvious value here of cognitive & experimental psychology

Interfaces as Cultural Divides

The two sides of the screen:

Computer scientists, engineers, and tech types, for whom sheer technical functionality, “technical sweetness” and elegance of code are socially-rewarded subcultural norms —not unlike elegant buildings that don’t work well

versus

Users, who have myriad different needs and priorities and need devices to work for them

Bridging the CS-User Divide

- "User-centered design"
  - Go beyond user-testing of interfaces by using the user's perspective as a starting point of design
  - Involve users at the front end of the design cycle
- Seek a seamless user experience
  - Stop forcing users from having to think about which app is needed to do what task (reduce task- and mode- switching)
  - Improve inter-application communications so that assets in one application can be dropped into another (Apple's Cyberdog, ca. 1992)
- Make the computer an "invisible" tool, allowing users to focus on goals, not tools
  - Keep in mind that every socially successful technology "disappears" into the infrastructure of everyday life
  - Background the technology, foreground the social side

This page inspired by Ben Schneiderman, *Leonardo's Laptop* (Cambridge, MA: MIT Press, 2002)

The Dilemmas of Local Meaning

- According to anthropologists, people make meanings locally and “build out and up”
- Implication for HCI is that branching scenarios from any given location in an information space have to start from a notion of meeting the user where she is
- Thus, a problem: if all “localities” are different how to assure accessibility?
  - Too local: who will “get it”?—reflects too much of a local subculture
  - Too general: vacuous beyond belief, like network news—lots of bland niceities, but no way to get depth or control over the user experience
- Solution: deft negotiation between very local and very specific, a compromise
  - Too local: the linux dilemma
  - Too general: Microsoft’s Bob
  - Frederick Taylor’s error: there’s not “one best way”
  - Akin to developing a political or advertising message

Real vs. Virtual: Distance Issues

- First-level: Social and semantic
  - Trust & Attribution
  - Gestures
  - Eye contact
  - Authenticity and meaning
- Second level: symbolic and tacit
  - The unsaid
  - Power, camera angles, and perspective
  - Time lags: inattention or “pregnant pauses”?

Authentication

- Who is who?
- Early modes of authentication
  - Words of honor & oaths
  - Signatures
- Modern methods
  - Passwords & SSH mechanisms
  - Kerberos & PKIs/PGP, now shibboleth
  - VPNs and closed systems
  - Biometrics: linking bodies and information
    - Flaky fingerprints and DNA as the “gold standard”(?)
    - 146 legal exonerations by DNA as of August 2004

Warranting

- Def nitions: making trust
- Trademarks, licenses, seals, stamps, and notaries: the public off cial & process
- Reputation and private means; whom do you trust…? (Branding, Goebbels, & Enron)
- Spam, Ponzi schemes, and the perils of modern computing: the ephemeral scammer.
- Mistaking mind-share for honesty

Conclusion: What Makes Good Interfaces?

- Good "cognitive mapping:" interactions should seem transparent and natural
  - conforming to a sense of appropriate workflow
    - mapped to metaphors we're more accustomed to
- Minimize complexity & avoid featuritis
- Provide feedback, perhaps in a multisensory way (operating room example)
- Minimal lag between action and machine response
- Make systems muti-modal, as people normally multitask