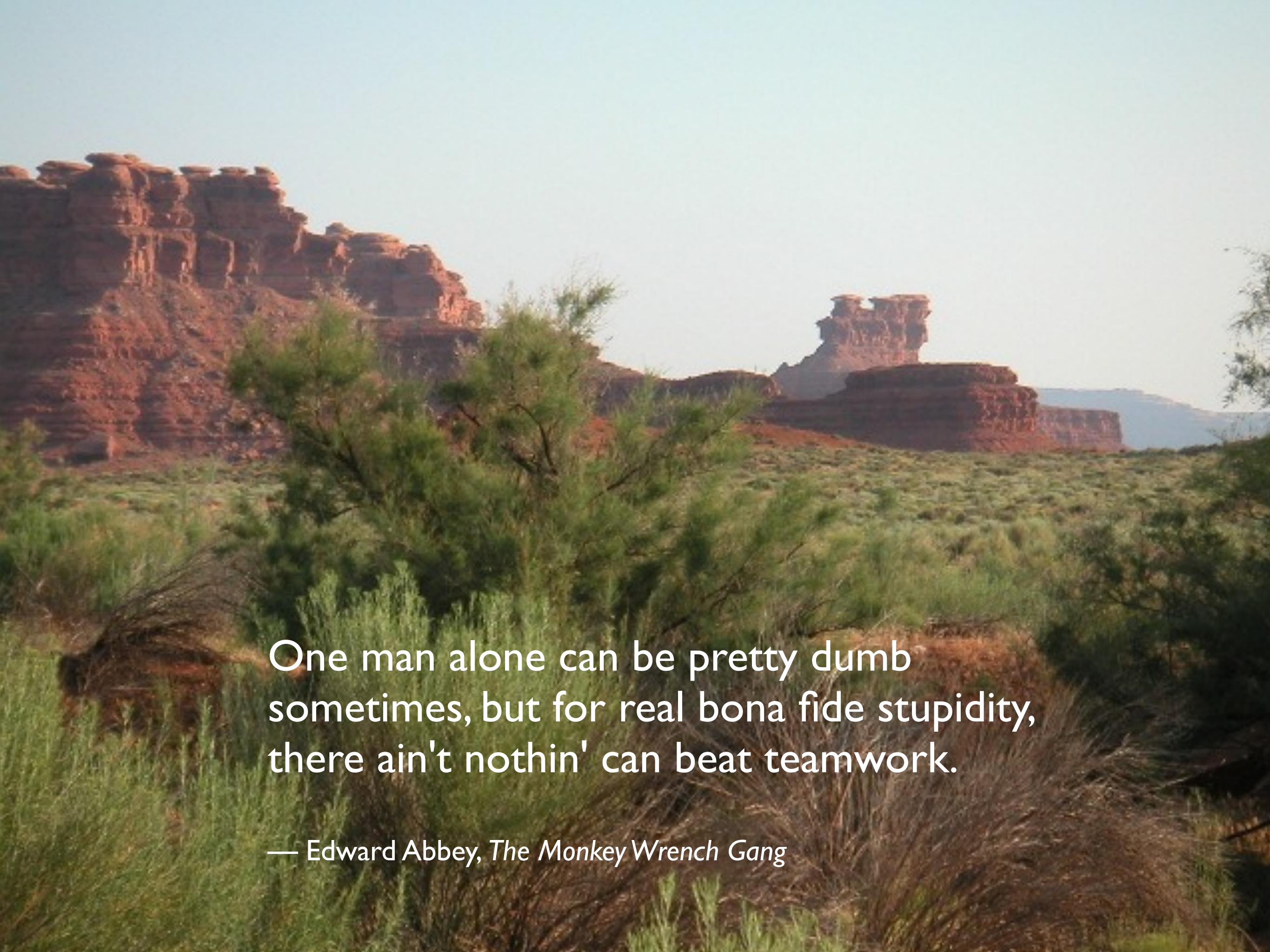


CS 5500

Spring 2013

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A landscape photograph of a desert canyon. In the foreground, there are green shrubs and bushes. In the middle ground, there are red rock formations, including a prominent butte with a flat top. The background shows more red rock formations under a clear blue sky.

One man alone can be pretty dumb
sometimes, but for real bona fide stupidity,
there ain't nothin' can beat teamwork.

— Edward Abbey, *The Monkey Wrench Gang*

The Surgical Team

(chapter 3 of *The Mythical Man-Month*)

These studies revealed large individual differences between high and low performers, often by an order of magnitude.

— Sackman, Erickson, and Grant

The Surgical Team

small teams are more productive

small teams are too small

The Surgical Team

chief programmer

copilot

administrator

editor

secretaries

program clerk

toolsmith

tester

language lawyer

Hierarchy

Scaling Up

system architecture

system architect

Aristocracy, Democracy, and System Design (chapter 4 of *The Mythical Man-Month*)



Reims Cathedral, 1914 (now public domain)

http://en.wikipedia.org/wiki/File:Shell_Explosion_Cathedral_at_Rheims_retouched_image.jpg

Conceptual Integrity

function

simplicity

straightforwardness

consistency

expectation

Conceptual Integrity

Terminal — bash — 80x5

```
larceny
larceny v0.97 "Funny in the Head" (Aug 19 2009 04:24:46, precise:Posix:unified)
larceny.heap, built on Wed Aug 19 04:26:48 EDT 2009
>
```

fft1.tif

$$\begin{aligned} X_k &= \sum_{n=0}^{N-1} x_n e^{-2\pi i n k / N} \\ &= \sum_{j=0}^{N/2-1} \left(x_{2j} e^{-2\pi i 2jk / N} + x_{2j+1} e^{-2\pi i (2j+1)k / N} \right) \\ &= \sum_{j=0}^{N/2-1} x_{2j} e^{-2\pi i 2jk / N} + \sum_{j=0}^{N/2-1} x_{2j+1} e^{-2\pi i (2j+1)k / N} \\ &= \sum_{j=0}^{N/2-1} x_{2j} e^{-2\pi i 2jk / N} + e^{-2\pi i k / N} \sum_{j=0}^{N/2-1} x_{2j+1} e^{-2\pi i 2jk / N} \\ &= \sum_{j=0}^{N/2-1} x_{2j} e^{-2\pi i jk / (N/2)} + e^{-2\pi i k / N} \sum_{j=0}^{N/2-1} x_{2j+1} e^{-2\pi i jk / (N/2)} \end{aligned}$$

Music : Songs Albums Artists Genres Playlists Radio Match

All Artists
Compilations
Alan Jackson
Alberto Mesirca
Alfred Scholz: Mozart Festiva...

Alan Jackson

Alan Jackson (The Grea...
2 Gone Country
5 Tall, Tall Trees

Conceptual Integrity

function

simplicity

straightforwardness

consistency

expectation

Aristocracy and Democracy

```
0000004E  31C0          xor eax,eax
00000050  51            push ecx
00000051  52            push edx
00000052  56            push esi
00000053  50            push eax
00000054  6A14         push byte +0x14
00000056  50            push eax
00000057  89D1         mov ecx,edx
00000059  8B4601       mov eax,[esi+0x1]
0000005C  8B4005       mov eax,[eax+0x5]
0000005F  8B58FF       mov ebx,[eax-0x1]
00000062  81FB16030000  cmp ebx,0x316
00000068  750C         jnz 0x76
0000006A  89C3         mov ebx,eax
0000006C  FF95F4010000  call dword near [ebp+0x1f4]
00000072  90            nop
00000073  90            nop
00000074  EBE3         jmp short 0x59
00000076  FF4D08       dec dword [ebp+0x8]
00000079  7509         jnz 0x84
0000007B  FF95F8010000  call dword near [ebp+0x1f8]
```

Aristocracy and Democracy

external constraints focus design effort

Agile Processes and Test-First Design

How does conceptual integrity emerge?