

# Origins of Food

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# Advertising

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P How does advertising work?

P Problems with effectiveness of advertising

- ▶ Changing demographics
- ▶ Truthfulness

# Fast Food Nation

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P “What we eat has changed more in the last forty years than in the previous forty thousand.”

▶ Eric Schlosser. 2001. *Fast Food Nation*. Page 7

# How Did Food Production Began In the First Place

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P Know about fast food

P How about food production in general

P May tell us things that are important today

P Basis is the work of Jarred Diamond

▶ *Guns, Germs, and Steel, W. W. Norton Company*

# Transition to Food Production

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- P Occurred independently in several areas
- P Took thousands of years
- P Not a conscious decision
- P Competing economies

# Key Factors in Move to Food Production

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- P Decline in availability of wild food
- P Increase in domesticated wild plants
- P Development of food production technologies
- P Population density
- P Displacement

# Decline in Wild Food

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P Hunting & gathering less rewarding

P Extinction of large animals

- ▶ Climate change
- ▶ Efficiency of hunters

P Debated in Africa, Eurasia & North America

P Island examples

- ▶ New Zealand
  - Moas and seals

# Increase in Domesticated Wild Plants

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P Climate change in th Fertile Crescent and wild cereals

P Raised probability of domestication of cereals

- Wheat and barley

# Development of Food Production Technologies

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## P Wild foods

- ▶ Collection
- ▶ Processing
- ▶ Storage

## P Invention

- ▶ Sickles of flint
- ▶ Mortar and pestle
- ▶ Transport and storage devices
- ▶ Roasting of grains

# Population Density

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P Rise in population & the rise in food production

P Cause and effect up for debate

- ▶ Food production more efficient for large populations

P Autocatalytic cycle

- ▶ Positive feed back loop
- ▶ Paradox more calories per acre less for producers

# Key Factors in Move to Food Production

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# Displacement

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P Food producers displace or kill hunters & gatherers

- ▶ Allowed for professional soldiers
- ▶ Shear numbers

P Forced food production on hunters & gatherers

P Inhibited by geographical or ecological barriers

# Domestication of Plants

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P How did wild plants become crops?

P Range is incredible

- ▶ Almonds
  - Wild precursors are lethal or bad tasting
- ▶ Corn
  - Ancestors don't look the same
  - Dependent on man

P Domestication is consciously or unconsciously causing a genetic change more useful to humans

# Crop Development

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## P Today

- ▶ Genetics
- ▶ Thousands of trials
- ▶ Genetic engineering

## P Domestication took place 10,000 years ago

- ▶ No existing model
- ▶ Action without knowledge
- ▶ Some plants easier than others
  - Peas (8,000 B.C.) v Pecans (1846)

# The Plants Side of the Story

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P Humans just 1 of many species of predator

P Need to propagate

- ▶ Air or water
- ▶ Trick animals
  - Survive the gastrointestinal tract
  - Dodo and trees in south pacific
  - Eating only one method
    - Dropping
    - Rotting
  - Fruit size matters

# The Story of the Almond

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## P Bitterness a plant defense

- ▶ Plants with sweet fruits have bitter seeds
- ▶ Chemical called amygdalin
  - Breaks down to cyanide

## P Aside (pg 126 & 127 Schlosser)

- ▶ Almond flavor (Benzaldehyde)
  - Natural processes
    - Peach & Apricot pits
    - Contains hydrogen cyanide
  - Mixing oil of clove, banana flavour & amyl acetate
    - No cyanide

# Non Bitter Almonds

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P Mutation prevents synthesizing amygdalin

- ▶ Die out in the wild
- ▶ Birds eat seeds

P Inquisitive children note non bitter almonds

P Farmers plant those seeds

P 8000 B.C. wild almonds in Greece

P Domesticated almonds in Tutankhamens tomb 1325 B.C.

# Other Selection Criteria

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P Beside size & taste

P Fleshy or seedless fruits

- ▶ Squashes & Bananas

P Oily seeds or fruits

- ▶ Olives, sesame, mustard, Poppies & flax

P Long fibers

- ▶ Cotton & flax

# One Plant Many Foods

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## P Beets

- ▶ Originally leaves (like chard)
- ▶ Edible root
- ▶ Sugar content

## P Cabbage

- ▶ Leaves (cabbage & kale)
- ▶ Stems (kohlrabi)
- ▶ Buds (brussel sprouts)
- ▶ Flower shoots (cauliflower & broccoli)

# Conscious vs Unconscious

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P All previous criteria fit conscious choice

P Unconscious choices

- ▶ Seed dispersal
  - Pea
- ▶ Germination inhibitors
  - Seed coat
  - Sow/grow/harvest/sow
- ▶ Plant reproduction
  - Selfing

# Easiest to Domesticate

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P Edible & high yield in the wild

- ▶ Fertile Crescent

P Little genetic modification needed

P Simple farming techniques

- ▶ Broadcasting of seed

P Wheat

- ▶ Non shattering stalks
- ▶ Uniform quick germination

# Next Stage of Domestication

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## P Fruits & nut trees

- ▶ 4,000 B.C.
- ▶ Don't yield immediately
- ▶ Planted as cuttings or seeds
- ▶ Cuttings breed true

P Olives, figs, dates pomegranates & grapes

# More Difficult Fruit Trees

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P Can't be grown from cuttings or seed

P Required new technology

- ▶ Grafting invented in China
- ▶ Required conscious experimentation

P Latrine method of discovery not possible

P Non self-pollinating trees

P Apples, pears, plums & Cherries

# Weeds Into Crops

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P Initially many latter crops appear as wild weeds

P Rye, oats, turnips & radishes, beets & leeks, & lettuce

P This sequence of domestication in the Fertile Crescent

# Plant Domestication

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Area	Crop Type				
	Cereals, Other Grasses	Pulses	Fiber	Roots Tubers	Melons
Fertile Crescent	emmer & einkorn wheat, barley	pea, lentil, chickpea	flax		Muskmelon
China	foxtail & broomcorn millet, rice	soy bean, adzuki bean, mung bean	hemp		[muskmelon]
Mesoamerica	corn	common bean, tepary bean, scarlet runner bean	cotton ( <i>G. hirsutum</i> ), Yucca, agave	jicama	squashes ( <i>C. pepo</i> , etc.)
Andes, Amazonia	quinoa, [corn] sorghum, pearl millet, African rice	lima bean, common bean, peanut	cotton ( <i>G. barbadense</i> )	manioc, sweet potato, potato, oca	squashes ( <i>C. maxima</i> , etc.) watermelon bottle gourd
Western Africa and Sahel	[wheat, barley, rice, sorghum, millets]	cowpea, groundnut hyacinth bean,	cotton ( <i>G. herbaceum</i> ) cotton ( <i>G. arboreum</i> ), flax	African yams	cucumber
India	teff, finger millet, [wheat, barley]	[pea, lentil]	[flax]		
Ethiopia	maygrass, little barley, Knotweed, goosefoot			Jerusalem artichoke	squash ( <i>C. pepo</i> )
Eastern United States	sugar cane			yams, taro	
New Guinea					

Crops in square brackets were first domesticated elsewhere

Source: Table 7.1, pp. 126-127, Diamond, J. 1999. *Guns, Germs, and Steel*. New York: W.W. Norton & Company

# General Conclusions About Domestication

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## P Old world

- ▶ Broadcast seeding into prepared seed bed
- ▶ Monocultures
- ▶ Animal domestication helps

## P New world

- ▶ Fields tilled by hand & planted individually
- ▶ No large animal domestication
- ▶ Mixed gardens

## P Substitution of tubers & roots for cereals

# Why Almonds & Not Acorns

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P Three strikes & your out

- ▶ Slow growth
- ▶ Acorns meant to appeal to squirrels
- ▶ Bitterness results from a large number of genes

P Difficult to domesticate given modern science

# Why Production in Only Some Places

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P What factors affect adoption of food production?

P Why some areas sooner than others?

- ▶ Fertile Crescent
- ▶ Other areas

P Two possible answers

- ▶ Local people
- ▶ Local plants

# Natural Factors

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## P Climate

- ▶ Mediterranean
  - Highly variable
    - Wet then dry
  - Available in W. Europe, Africa, Australia, North America

## P Topographic variability

- ▶ High range in elevations

## P Plant diversity

# Wild Grasses

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World Distribution of Large Seeded Grass Species		
Area	Sub Zone Number of Species	Number of Species
West Asia, Europe, North Africa		33
Mediterranean Zone	32	
England	1	
East Asia		6
Sub-Sharan Africa		4
Americas		11
North America	4	
Mesoamerica	5	
South America	2	
North Australia		2
<b>Total</b>		<b>56</b>
Source: Diamond, J. 1999. <i>Guns, Germs, and Steel</i> . New York: W.W. Norton & Co. Page 140		

# Why Eurasia Is So Dominant

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P Was it differences in people or cultures

P Evidence says no

- ▶ Eurasian species quickly adopted where conditions permitted
- ▶ Pets kept everywhere
- ▶ Rapid domestication of the 14
- ▶ Repeated independent domestication of some of the 14
- ▶ Limited modern success in further domestication

# Dates of First Evidence for Domestication

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<b>Species</b>	<b>Dates (B.C.)</b>	<b>Place</b>
Dog	10,000	Southwest Asia, China & North America
Sheep	8,000	Southwest Asia
Goat	8,000	Southwest Asia
Pig	6,000	China, Southwest Asia
Cow	6,000	Southwest Asia, India & North Africa (?)
Horse	4,000	Ukraine
Donkey	4,000	Egypt
Water Buffalo	4,000	China?
Llama & Alpaca	3,500	Andes
Bactrian Camel	2,500	Central Asia
Arabian Camel	2,500	Arabia

Source: *Guns, Germs & Steel*, 1999, Jared Diamond

# Why Domestication Did Not Occur

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P Diet

P Growth rate

P Problems of captive breeding

P Nasty disposition

P Tendency to panic

P Social structure

# Diet

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### P Herbivore vs carnivore

- ▶ Food conversion
  - Feed conversion rate across all species 10%
  - 10,000 pounds of feed for a 1,000 pound cow
  - 10,000 pounds of Herbivore for a 1,000 pound carnivore

### P Finicky diet

- ▶ Koalas

### P Omnivores for food

- ▶ Pigs
- ▶ Dogs

# Growth Rate

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- ▶ Acorn effect
- ▶ Takes 15 years for an elephant to reach adulthood & be useful
  - Capture in the wild is more efficient

# Problems of Captive Breeding

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## P The cheetah effect

- ▶ Female needs 7 day chase to have successful birth
- ▶ Several male cheetahs must give chase

## P Don't like breeding in captivity

- ▶ Vicunas

# Nasty Disposition

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P Large animals kill people

- ▶ Large carnivores--grizzly bears
- ▶ Large herbivore--African buffalo

P Didn't stop us from domesticating the pig

# Tendency to Panic

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P Two fright behaviors

- ▶ Instant flight
- ▶ Herd up & stand their ground

P No species with the first instinct has been domesticated

# Social Structure

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- P Almost all domesticated large mammals
- ▶ Live in herds
  - ▶ Maintain a developed dominance hierarchy
    - Allows humans to be the alpha male or female
  - ▶ Occupy overlapping home ranges rather than exclusive territories