Food in Historical Perspective: Dietary Revolutions

• The Agricultural Revolution of the Neolithic Era
• The Search for Spices
• The Industrial Revolution
• Early Technology
  • Domestication
  • Transportation
  • Refrigeration
  • Canning
• The Scientific Revolution
• Modern-Day Adaptations
• Summary
• Highlight: Vegetarian Diets: Then and Now
Eating Culture
An Anthropological Guide to Food
Gillian Crowther
use your up/down arrow keys and/or your space bar to advance the slides

Dietary Revolutions: The Neolithic Revolution

Gillian Crowther

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foraging wild foods in the wilderness

foraging wildly, foods in the supermarket

localvores

globalvores

Food in Historical Perspective: Dietary Revolutions
Food in Historical Perspective: Dietary Revolutions

food collection  \[\text{ca.}, 12,000\text{ ybp}\]  food production

people ate a wide variety of foraged foods  people eat a small number of domesticated plants and animals
Food in Historical Perspective: Dietary Revolutions

Food collection → food production

ca. 12,000 ybp: life expectancy lengthened, population increased
The Agricultural Revolution of the Neolithic Era

- The Search for Spices
- The Industrial Revolution
- Transportation, Refrigeration, and Canning
- The Scientific Revolution
- Modern-Day Adaptations
- Summary
- Highlight: Vegetarian Diets: Then and Now
currently

“only about 1.5% of Americans are full-time farmers”
“... the domestication of plants and animals is one of the major cultural revolutions humans have undergone in order to adapt to their physical and social environments.”

The Cultural Feast, 2nd ed., p. 48
“The agricultural revolution of the Neolithic era laid the groundwork for the subsequent industrial and scientific revolutions.”

- it increased food production
- fostered a global network of food distribution
- reshaped many aspects of modern life

*The Cultural Feast, 2nd ed., p. 48*
About 12,000 years ago (ca. 10,000 B.C.) a dramatic change in the way humans acquired their food began to unfold.
people gradually shifted from food collection (foraging) to food production

The Cultural Feast, 2nd ed., p. 48
“Although the transition took thousands of years (it was more of an evolutionary than a revolutionary process), we consider this a major cultural revolution because of its important long-term impact on how humans interact with their environment”

*The Cultural Feast, 2nd ed., p. 48*
before the advent of agriculture . . .

• people lived in **small groups**
• moved from place to place in search of food
• populations were small
• humans needed to exploit a relatively large territory

*The Cultural Feast, 2nd ed.*, p. 48
“… in a few areas of the New and Old Worlds, foraging groups living on riverbanks and in coastal areas with access to ample shellfish and plant foods were able to develop sedentary lifestyles”

*The Cultural Feast, 2nd ed.*, p. 48
Eight Food “Revolutions”

1. Invention of Cooking
2. Discovery that Food is More Than Sustenance
3. The “Herding Revolution”
4. Snail Farming
5. Use of Food as a Means and Index of Social Differentiation
6. Long-Range Exchange of Culture
7. Ecological Revolution of last 500 years
8. Industrial Revolution of the 19th and 20th Centuries
Eight Food “Revolutions”

1. Invention of Cooking
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nomadism

moving from place to place daily, weekly, or seasonally

The Cultural Feast, 2nd ed., p. 48
nomadism

allowed human groups to include a wide range of foods in their diets without depleting any one resource

*The Cultural Feast, 2nd ed.*, pp. 48-49
“As people began to domesticate plants and animals, and actively manage the production of their food supply the food supply became more stable and abundant . . .

• but it also became less diverse
• this allowed humans to settle in village

The Cultural Feast, 2nd ed., p. 49
settling in villages . . .

• resulted in a rise in population density
• and an overall increase in the total human population
• had significant effects on many other aspects of human life
• provides the foundation for the development of civilization

*The Cultural Feast, 2nd ed., p. 49*
"Neolithic Revolution"

V. Gordon Childe's term for the far-reaching consequences of food production
Ten Classic Characteristics of Early Civilization

After V. Gordon Childe

*Man Makes Himself (Rev. Ed).*
NY: New American Library, 1951

*What Happened in History.*
Baltimore: Pelican Books, 1957
Ten Classic Characteristics of Early Civilization

After V. Gordon Childe

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agricultural revolution

the growing of plants
(agriculture)

and the management of domesticated animals
(animal husbandry)

*The Cultural Feast, 2nd ed.*, p. 49
agricultural revolution
the adoption of food production

the critical factor was domestication

Food in Historical Perspective: Dietary Revolutions

The Cultural Feast, 2nd ed., p. 49
domestication
control over plant and animal reproduction

• genetic transformation of wild species into domesticated species through selective breeding

Food in Historical Perspective: Dietary Revolutions

The Cultural Feast, 2nd ed., pp. 48-49
Eight Food “Revolutions”

1. Invention of Cooking
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7. Ecological Revolution of last 500 years
8. Industrial Revolution of the 19th and 20th Centuries
agriculture
the propagation and exploitation of domesticated plants and/or animals by humans
agriculture
– a cultural activity
agriculture

- a cultural activity
- a cultural activity associated with planting, herding, and processing domesticated species
domestication
- a state of interdependence between humans and selected plant or animal species

pearl millet

South American llama

Understanding Physical Anthropology and Archaeology, 8th Ed., pp. 421, 9th Ed., 347
domestication

– an evolutionary process that requires genetic transformation of a wild species
Domestication: Dogs

- dogs were the first domesticated animals
- first role was to help with hunting
- as other animals were domesticated, dogs were used to herd, as working dogs
- and possibly they acted as camp watch dogs . . .
Domestication: Dogs

- and “garbage disposals”
- and as food
  - Dakota
  - Aztecs
  - China
  - formerly Germany
  - some parts of India
  - and elsewhere
- the burial of a puppy with a Natufian who died 10,000 y.a. suggests dogs earned the role of pet very early
Origin of dogs traced

By Christine McGourty
BBC science correspondent

Dogs today come in all shapes and sizes, but scientists believe they evolved from just a handful of wolves tamed by humans living in or near China less than 15,000 years ago.
MARTIN EDWARD KROMSCHROEDER

Martin Edward Kromschroeder, 40, lifelong Duluth resident died Saturday June 20, 2009 as the result of a tragic ATV accident at the family cabin.

Martin Edward Kromschroeder, 40, lifelong Duluth resident died Saturday June 20, 2009 as the result of a tragic ATV accident at the family cabin.

He was born Dec. 31, 1968 to Thomas and Linda Kromschroeder in Duluth.

Marty went to Chester Park Elementary, Woodland Jr. High School, and Central High School. As a boy Marty was a member of Boy Scout troop 44, played baseball at Central Little League, and was a member of the Chester Bowl Ski Patrol. Marty loved anything with a motor; his truck, boat, snowmobile, and ATV. He was an avid outdoorsman and spent many hours at the family cabin on the lake fishing, and riding on the pontoon enjoying a cold one. Uncle Marty was the "King of the Grill", and he always made breakfast when at the lake.

Marty was an excellent certified mechanic and welder; he was the "go to" guy when you needed things fixed. He enjoyed karaoke, playing pool with his friends and making "special" chili with his mom. Marty loved life and lived it to the fullest, he had a great sense of humor; he will be dearly missed by his

http://www.duluthnewstribune.com/event/obituary/id/123538/
Marty was an excellent certified mechanic and welder; he was the "go to" guy when you needed things fixed. He enjoyed karaoke, playing pool with his friends and making "special" chili with his mom. Marty loved life and lived it to the fullest, he had a great sense of humor; he will be dearly missed by his friends and family, especially his nieces and nephews.

He is preceded in death by his grandparents, William (Irene) Kromschroeder, and Edwin (June) Grecinger.

Marty is survived by his parents, Thomas (Linda) Kromschroeder; two brothers, Craig (Natalie), Richard (Chrysti); sister, Mary (Wayne); many beloved nieces and nephews, Holly, Ellie, Xena, Shana, Sebastian, Ethan, William, Michelle, Thomas, Tyler, Ashley, Anna, Alexander; lifelong friend, Greg Spencer and family; very special friend, Kelly Nelson and her daughter Keely; his beloved dogs, Lucy, Cocoa, Tiffany, and Bailey or “Cowdog”; numerous extended family and friends.

If not for bad luck, Marty wouldn’t have had any at all.

VISITATION: 5:30 to 7:30 p.m. Thursday, June 25, 2009 and also one hour prior to the service at 11 a.m. Friday in the Cremation Society of MN, 4100 Grand Ave, Duluth, 624-5200.

http://www.duluthnewstribune.com/event/obituary/id/123538/
Texquiuiac Dog
• as favorable plant traits developed, foragers would collect more of the plants with the favorable traits
  – this stimulated genetic changes in the plants and eventually produced a cultigen
cultigen
– a plant that is wholly dependent on humans
– a domesticate
cultivars

- wild plants fostered by human efforts to make them more productive
– as selection and isolation from other plants continued, plants became dependent on humans to disperse seeds
Other Important Terms . . .
horticulture

- farming method in which only hand tools are used
- typical of most early Neolithic societies
symbiosis

- mutually advantageous association of two different organisms
- also known as “mutualism”
domestication

• how?
• why?
• where?

Food in Historical Perspective: Dietary Revolutions

The Cultural Feast, 2nd ed., pp. 48-49
Functionalists

- domestication emerged in response to a pressing need

Systems Approach

- there is no single factor that propels domestication -- there are many factors
Environmental Factors in the Development of Agriculture

1. Increased competition for available resources
2. Environmental changes (e.g., increases or decreases in such factors as rainfall, sea level, and temperature)
3. Development of resource-rich regions

- Childe's "Oasis Theory": Humans and domesticable plants and animals concentrate around oases.
- Binford's "Packing Model": Regional "packing" of population leads to broadened staple diet in marginal environments.
- Flannery's "Broad Spectrum Foraging": Differed with Binford over specific causes, but agreed that staple diet choices broadened in marginal environments.
- Henry: Climate change first promoted the development of resource-rich regions; subsequent changes in climate encouraged increases in diet breadth.

Domestication of plants and animals

True agriculture

Environmental Factors in the Development of Agriculture

Understanding Physical Anthropology and Archaeology, 9th Ed., p. 338
Cultural Factors in the Development of Agriculture

- Braidwood’s “Hilly Flanks” or “Nuclear Zone” hypothesis: Domestication and agriculture happened when culture was ready to receive it. It developed in the foothills of the mountains of the Near East as hunter-gatherers gradually appreciated the potential value of plant and animal domestication.

- Cauvin’s “Revolution of Symbols”: Saw value in Braidwood’s hypothesis; reasoned that there was a symbolic transformation of the pre-Neolithic world that promoted the development of human agency and, ultimately, of domestication and agriculture.

- Hodder’s “transformation of nature into culture”: Domestication was the product of both the effects of environmental changes and the exercise of human agency to turn “nature into culture.”

Understanding Physical Anthropology and Archaeology, 9th Ed., p. 340
“. . . contemporary foragers
(see Ch. 5)
manage the plants and animals
in the environments in which
they live, though not to the extent
farmers and herders do.”

The Cultural Feast, 2nd ed., p. 49
Ch. 4 “The Edible Earth: Managing Plant Life for Food”
“... it is though that women were responsible for much of the development of agriculture”

- they probably did much of the gathering of plants and capturing of small animals
- were probably more attuned to the plants in the environment
- tend to stay closer to the home base than men
- were in a position to observe the growth of plants from seeds
- were in a position to care for captured animals

*The Cultural Feast, 2nd ed., p. 49*
“… people switched very slowly from harvesting wild species to planting selected varieties.”

- at first, the cultivated varieties served only as supplements to the wild plants and animals they consumed
- through time, people grew increasingly dependent on cultivated plants and animals
- eventually agriculture produced the vast majority of foods eaten

*The Cultural Feast, 2nd ed., p. 49*
Archaeological Evidence for Domestication
Origin and Approximate Dates of Domestication for Selected Plants and Animals

**Asia**
- Banana (*Musa*), 2,000 ya
- Chickpea (*Cicer*), 8,000 ya
- Millet (*Setaria*), 9,000 ya
- Orange (*Citrus*), 2,000 ya
- Peach (*Prunus*), 6,000 ya
- Rice (*Oryza*), 7,000 ya
- Soybean (*Glycine*), 3,000 ya

**Southwest Asia/Near East**
- Apple (*Malus*), 3,000 ya
- Barley (*Hordeum*), 10,500 ya
- Cattle (*Bos*), 9,000 ya
- Chickpea (*Cicer*), 8,000 ya
- Date (*Phoenix*), 4,500 ya
- Goat (*Capra*), 10,500 ya
- Horse (*Equus*), 6,000 ya
- Lentil (*Lens*), 10,000 ya
- Pea (*Pisum*), 8,500 ya
- Pig (*Sus*), 9,500 ya
- Pistachio (*Pistacia*), ?
- Sheep (*Ovis*), 10,000 ya
- Wheat (*Triticum*), 10,500 ya

**Mediterranean**
- Asparagus (*Asparagus*), 2,200 ya
- Broccoli (*Brassica*), 1,900 ya
- Cabbage (*Brassica*), 2,000 ya
- Grape (*Vitis*), 6,000 ya
- Lettuce (*Lactuca*), 6,000 ya
- Olive (*Olea*), 5,000 ya
- Pear (*Pyrus*), 2,500 ya
- Rabbit (*Oryctolagus*), 3,000 ya

**Africa**
- Coffee (*Coffea*), ?
- Millet (*Pennisetum*), 4,000 ya
- Musk melon (*Cucumis*), 5,000 ya
- Sorghum (*Sorghum*), 4,500 ya
- Watermelon (*Citrullus*), 4,000 ya
- Yam (* Dioscorea*), ?

**North America**
- Goosefoot (*Chenopodium*), 3,000 ya
- Gourd (*Cucurbita*), 5,000 ya
- Marsh elder (*Iva*), 3,000 ya
- Sunflower (*Helianthus*), 3,000 ya

**Mexico/Central America**
- Amaranth (*Amaranthus*), 6,000 ya
- Avocado (*Persea*), 2,500 ya
- Cacao (*Theobroma*), 1,500 ya
- Chili pepper (*Capsicum*), 5,500 ya
- Common bean (*Phaseolus*), 7,000 ya
- Maize (*Zea mays*), 4,500 ya
- Squash (*Cucurbita*), 7,500 ya
- Tomato (*Lycopersicon*), ?
- Turkey (*Agriocharis*), 2,500 ya

**South America**
- Cashew (*Anacardium*), ?
- Chili pepper (*Capsicum*), 4,500 ya.
- Coca (*Erythroxylon*), ?
- Guinea pig (*Cavia*), 4,000 ya
- Lima bean (*Phaseolus*), 7,000 ya

**Llama (*Lama*), 7,000 ya
- Manioc (*Manihot*), 4,200 ya
- Muscovy duck (*Cairina*), 3,000 ya
- Papaya (*Carica*), ?
- Peanut (*Arachis*), 4,000 ya
- Pineapple (*Ananas*), ?
- Potato (*Solanum*), 4,000 ya
- Quinoa (*Chenopodium*), 3,500 ya
- Sweet potato (*Ipomoea*), 4,500 ya
- Tobacco (*Nicotiana*), ?
diffusion

“A dialectical model of Neolithic Origins”

www.archatlas.dept.shef.ac.uk/OriginsFarming/Farming.php
diffusion
the spread of something from one group to another through contact or exchange

Early farming in the Americas, showing the spread of maize agriculture (purple)
Food in Historical Perspective: Dietary Revolutions

• Development of Agriculture in the Tehuacán Valley
  • Nutritional Consequences of the Agricultural Revolution: A Comparison of Foragers and Agriculturalists
  • Social and Political Consequences of the Agricultural Revolution

• Highlight: Vegetarian Diets: Then and Now
examples:
Tehuacán, Puebla, Mexico
pre-Columbian Kentucky

• the changes toward dependence on agriculture was not always swift
• in the short term, it was not always healthful

The Cultural Feast, 2nd ed., p. 49
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*The Cultural Feast, 2nd ed., p. 49*
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*The Cultural Feast, 2nd ed., p. 49*
Tehuacán, Puebla, Mexico

America’s First Cuisines, Ch. 2
Early farming in the Americas

Tehuacán Valley, Puebla, Mexico

maize
4,500 ybp
Bering Strait

56-mile-wide portion of the North Pacific Ocean that separates Asia from North America

_Cultural Feast 2nd ed., p. 50_
New paths to the Americas

Many archaeologists now believe that people arrived in the New World much earlier than previously thought—perhaps as long ago as 30,000 years.

Paths of progress
Seafaring settlers may have worked their way along the North Pacific Rim in small boats more than 22,000 years ago, then gradually migrated to the interior.

European crossing?
There is even speculation based on genetic evidence in a small percentage of contemporary Native Americans, that prehistoric Europeans may have traveled to the Americas across North Atlantic ice sheets long before Columbus’s voyages.
Miocene-Pliocene Routes of Animal Migrations
The Kennewick Man

8,400 ybp
Fossil Feces Is Earliest Evidence of N. America Humans

David Wolman
for National Geographic News
April 3, 2008

It's no load of crap: Scientists have discovered the earliest evidence of humans in North America—in 14,300-year-old fossilized feces.

The discovery of the preserved scat fragments, known as coprolites, levels a major blow against the popular Clovis-first theory of how people first came to the Americas.

Since the summer of 2002, University of Oregon archaeologist Dennis Jenkins and his research team have uncovered about 700 coprolite samples from a group of bone-dry caves in the desert of central Oregon, including several from humans.

After repeated radiocarbon dating and DNA analyses, the scientists concluded that the oldest of the human-produced material was deposited at least a thousand years before the so-called Clovis culture, according to a paper appearing in this week's issue of the journal Science.

"Clearly Older Than Clovis"

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"Clearly Older Than Clovis"

Searching for Signs of Early Man

Archeologists at Monte Verde, site of the oldest human artifacts in the Americas, hope that a second site in the same area will offer even older remains.
A cliff offers a view of the rocky shoreline in an inlet bay south of Monte Verde, Chile, the site of the oldest known settlement in the Americas.

A new study shows that settlers at Monte Verde harvested seaweed and other marine plants from a coastline more than 50 miles (80 kilometers) away some 14,000 years ago.
This coprolite, or fossilized chunk of feces, was found in Oregon's Paisley 5 Mile Point Caves.

Scientists have dated the remains to 14,300 years ago—the oldest evidence yet found of humans in North America.

**Fig. 1—Areal Concepts**

Key: 1. Territory of "Cultural" Mesoamerica. 2. Geological Middle America.
maguey cactus
aka
“agave”
(The Cultural Feast, 2nd ed., p.50)
and
“century plant”

tlachiquero
(Soltero Dorantz)
“Aztec Ingredients”
agua miel will be fermented into pulque
pulque
An elderly Aztec woman drinking *pulque*

Codex Mendoza

mid 16th century
Gusanos de maguey
Gusanos de maguey

more gusanos

Gusanos de maguey
Santa Maria Maquixco, Mexico, Mexico is situated in Temascalapa, Mexico, Mexico, its geographical coordinates are 19° 47' 0" North, 98° 50' 0" West and its original name is Santa María Maquixco.
Tinacaleros, Los Cides, Hidalgo, Mexico
In Mexico, producers are warning that the so-called "nectar of the gods" is in danger of extinction.

The popularity of the pre-Hispanic alcoholic drink, pulque, is fading in favour of more conventional beverages such as beer and rum.

Mario Grajedo wobbles slightly as he perches on a stool by the side of the road in Ixmiquilpan in Mexico's Hidalgo state.

This is pulque heartland. On the simple table in front of him is a large maize tortilla covered in hot sauce.

Beside it is a jug of the milky liquid.

Eating with one hand, he swigs deeply using the other.
cactus

*America’s First Cuisines*, Ch. 4
harvesting tunas
Nopale Cactus and Tunas, Hidalgo, Mexico
Compound of the 9 Brothers, near Matawala, San Luis Potosi, Mexico

nopales
“prickly pear” cactus

nopales from the Nahuatl word nōpalli for the pads, or nostle (nōchtli) for the fruit
Compound of the 9 Brothers, near Matawala, San Luis Potosi, Mexico
maize

America’s First Cuisines, Ch. 4
Compound of the 9 Brothers, near Matawala, San Luis Potosi, Mexico
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Compound of the 9 Brothers, near Matawala, San Luis Potosi, Mexico
Aztecs fishing
Florentine Codex
late 16th century
Compound of the 9 Brothers, near Matawala, San Luis Potosi, Mexico
back to

Tehuacán, Puebla

America’s First Cuisines, Ch. 2
### Important Mexican and South American Sites and Regions

<table>
<thead>
<tr>
<th>Site</th>
<th>Dates (ya)</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tehuacán Valley (Mexico)</td>
<td>12,000–historic times</td>
<td>Valley in the state of Puebla, Mexico, that was the focus of a major 1960s archaeological field investigation of the origins of agriculture; project results include an excellent stratigraphic sequence of excavated early sites</td>
</tr>
<tr>
<td>San Andrés (Mexico)</td>
<td>7,100</td>
<td>Soil cores extracted from this site yielded maize pollen, which suggests that lowland farmers were cultivating fields in the rain forest more than 1,000 years before maize evidence is known from the highlands of Mexico</td>
</tr>
<tr>
<td>Guílán Naquitz (Mexico)</td>
<td>10,200–9,200</td>
<td>Small cave in Oaxaca occupied by 4–6 persons; early dated contexts for pumpkin-like squashes and maize cobs</td>
</tr>
<tr>
<td>Guitarrero Cave (Peru)</td>
<td>11,500–10,700?</td>
<td>Early evidence of cultivated plants in Andean South America</td>
</tr>
<tr>
<td>Paloma (Peru)</td>
<td>7,900–5,000</td>
<td>Coastal preceramic village mostly dependent on marine resources; planting some crops, such as bottle gourds, squashes, and beans</td>
</tr>
</tbody>
</table>

© 2007 Thomson Higher Education
TEHUACÁN VALLEY is a narrow desert zone in the mountains on the boundary between the states of Puebla and Oaxaca. It is one of the three areas in southern Mexico searched during the search for early corn on the grounds of dryness (which helps to preserve ancient plant materials) and highland location (corn originally having been a wild highland plant).
Aztecs sowing
Florentine Codex
late 16th century
Aztecs harvesting maize
Florentine Codex
late 16th century
Pollen

microscopic male gametes produced by flowering plants.

ANTIOQUITY OF CORN in the New World was conclusively demonstrated when grains of pollen were found in drilling cores taken from Mexico City lake-bottom strata estimated to be 80,000 years old. Top two photographs (magnification 435 diameters) compare the ancient corn pollen (left) with modern pollen (right). Lower photographs (magnification 4,500 diameters) reveal similar ancient (left) and modern (right) pollen surface markings. The analysis and photographs are the work of Elso S. Barghoorn of Harvard University.

Richard S. Mac Neish, *Scientific American*, 1964
THREE NEW WORLD GRASSES are involved in the history of domesticated corn. Wild corn (reconstruction at left) was a pod-pop variety in which the male efflorescence grew from the end of the cob. Teosinte (center) and Tripsacum (right) are corn relatives that readily hybridized with wild and cultivated corn. Modern corn came from such crosses.

EVOLUTION OF CORN at Tehuacán starts (far left) with a fragmentary cob of wild corn of 5000 B.C. date. Next (left to right) are an early domesticated cob of 4000 B.C., an early hybrid variety of 3000 B.C. and an early variety of modern corn of 1000 B.C. Last (far right) is an entirely modern cob of the time of Christ. All are shown four-fifths of natural size.

MAIN VARIETIES OF CORN changed in their relative abundance at Tehuacán between the time of initial cultivation during the Coxcatlán culture phase and the arrival of the conquistadors. Abundant at first, wild corn had become virtually extinct by the start of the Christian era, as had the early cultivated (but not hybridized) varieties. Thereafter the hybrids of the tripsacoid complex (produced by interbreeding wild corn with introduced varieties of corn-Tripsacum or corn-teosinte hybrids) were steadily replaced by two still extant types of corn, Nal-Tel and Chapalote. Minor varieties of late corn are not shown.
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consequences of “Neolithic” (food production) activities

- new settlement patterns
- new technologies
- profound biocultural effects
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The relative abundance at Tehuacán before the Ajapán culture phase and the arrival of cultivated (not hybridized) varieties. Thereafter, interbreeding wild corn with introgressed varieties of late corn are not...
consequences of “Neolithic” (food production) activities

- new settlement patterns
  - new technologies
  - profound biocultural effects
become extinct about 11,000 ybp perhaps as a result of overhunting or the human impact on the environment as a result of burning
<table>
<thead>
<tr>
<th>Time Period</th>
<th>Social Organization</th>
<th>Economic Activity</th>
<th>Population</th>
</tr>
</thead>
<tbody>
<tr>
<td>Early Japantla (5,000 - 1500 B.C.)</td>
<td>A number of microbands; pithouse village (?)</td>
<td>Increasing amount of domesticates</td>
<td>900</td>
</tr>
<tr>
<td>Coxcatlán and early Abejas phases (5000 - 3000 B.C.)</td>
<td>Semisedentary microbands migrating by season but frequently separating into microband camps</td>
<td>Plant collectors doing an increasing amount of agriculture due to new domestication</td>
<td>Ten times original population (120 - 240)</td>
</tr>
<tr>
<td>El Riego and early Coxcatlán (6800 - 5000 B.C.)</td>
<td>Microbands that coalesce once a year to form seasonal macrobands</td>
<td>Plant collectors who occasionally hunted and trapped</td>
<td>Four times the original population (48 - 96)</td>
</tr>
<tr>
<td>Ajuereado and early El Riego (11,000 or 10,000 - 7200 B.C.)</td>
<td>&quot;Original population&quot; three microbands of four to eight people (12 - 24)</td>
<td>&quot;Original population.&quot;</td>
<td></td>
</tr>
</tbody>
</table>

10,000 ybp people obtained all of their food from hunting and gathering.
Seed collection and smaller game became more important in the diets.
and the transition from foraging to domestication of plants and animals began
The first evidence for cultivated plants in this region comes ca. 7,000 ybp. The diets still contained a large proportion of wild plants, but meat consumption had dropped considerably.

<table>
<thead>
<tr>
<th>Area</th>
<th>Level of organization</th>
<th>Amount of domesticates</th>
<th>Population</th>
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<td>Early Ajapán (5,000 - 1500 B.C.)</td>
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over the next 5,000 years the Tehuacán inhabitants relied more and more heavily on cultivated crops
<table>
<thead>
<tr>
<th>Location</th>
<th>Type Description</th>
<th>Agriculture Type</th>
<th>Population Changes</th>
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<td>Sacred or ceremonial centers</td>
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<td>Ceremonial centers or villages with temples with ceremonially affiliated villages (100-300 village population)</td>
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</table>
by about the time of Christ domesticated plants made up almost their entire diet

animals contributed only a small portion to the nutrient intake
over time the Mexican diet became even more narrowly focused

- corn
- beans
- squash

became the core
2009

**PHASE**

<table>
<thead>
<tr>
<th>Venta Salada phase (A.D. 700 - 1520)</th>
<th>TEHUACÁN VALLEY POPULATION ESTIMATE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Palo Blanco (200 B.C. - A.D. 700)</td>
<td>Five thousand times original population (60,000 - 120,000)</td>
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The Tehuacán sequence is one of the best in the world to show, how over thousands of years, there was a slow transition during which they changed from a foraging to an agricultural existence.
“the gradual way in which the production of food developed may have been due, in part, to the nutritional risks inherent in an agricultural way of life”

(p. 51)
Development of Agriculture in the Tehuacán Valley

- diets of hunters and gatherers include a wide variety of plants and animals and, therefore, tend to be nutritionally well-balanced

- agriculturalists typically rely on a limited number of cultivated crops

*The Cultural Feast, 2nd ed., p. 51*
if the crops do not contain a balance of nutrients necessary for survival, as is often the case,

wild foods must often be used as supplements

*The Cultural Feast, 2nd ed.*, p. 51
in Mexico, full dependence on agriculture had to wait until a group of foods were domesticated that could sustain human populations as adequately as the more traditional diet obtained through foraging.
not until corn, beans, and squash were combined did agriculture adequately meet the protein energy and vitamin needs of humans

*The Cultural Feast, 2nd ed.*, p. 51
Development of Agriculture in the Tehuacán Valley

corn, beans, and squash

with

pulque and chilis

provide a "perfect" diet

The Cultural Feast, 2nd ed., p. 51
and then there’s nixtamalization

America’s First Cuisines, Ch. 2
nixtamalization
the process that starts with soaking
the ripe maize grains and then
cooking them with lime or wood
ashes

America’s First Cuisines, Ch. 2
nixtamalization allows the transparent skin on the grain to be removed (the pericarp) making the grain easier to grind

America’s First Cuisines, Ch. 2
nixtamalization enhances the protein value of the maize for human beings

America’s First Cuisines, Ch. 2
nixtamalization

“So superior is nixtamalized maize to the unprocessed kind that it is tempting to see the rise of Mesoamerican civilization as a consequence of this invention....”

America’s First Cuisines, p. 14
but corn alone does not provide sufficient protein to sustain life

- it is deficient in lysine and tryptophan

- amino acids that must be present to make up the complete protein essential in human diets
but when corn is combined with beans they provide a high-quality protein mixture capable of supporting human populations

- beans are a good source of lysine and tryptophan

*The Cultural Feast, 2nd ed.*, p. 51
Development of Agriculture in the Tehuacán Valley

squash seeds also make a good protein supplement to a corn diet

*The Cultural Feast, 2nd ed.*, p. 51
Development of Agriculture in the Tehuacán Valley

proteins
proteins

see FOCUS 3.1

“A Protein Primer”

The Cultural Feast, 2nd ed., p. 52
proteins

the word protein comes from the Greek word πρώτειος (proteios) "primary"

- first described and named by the Swedish chemist Jöns Jakob Berzelius in 1838
- the central role of proteins in living organisms was not fully appreciated until 1926, when James B. Sumner showed that the enzyme urease was a protein
- the first protein to be sequenced was insulin
proteins

“... organic compounds made of amino acids arranged in a linear chain and joined together by peptide bonds between the carboxyl and amino groups of adjacent amino acid residues”

• the sequence of amino acids in a protein is defined by the sequence of a gene, which is encoded in the genetic code
• amino acids are the building blocks of protein
  • human tissue contains 22 different amino acids
    • 13 can be made by the body
    • 9 of the 22 must be obtained from foods
    • these are “essential amino acids” (EAAs)
proteins
“… are essential parts of organisms and participate in every process within cells”
“Many proteins are enzymes that catalyze biochemical reactions and are vital to metabolism.”

Wikipedia
proteins

“... also have structural or mechanical functions, such as actin and myosin in muscle and the proteins in the cytoskeleton, which form a system of scaffolding that maintains cell shape.”
proteins

“Other proteins are important in cell signaling, immune responses, cell adhesion, and the cell cycle.”
“... necessary in animals' diets, since animals cannot synthesize all the amino acids they need and must obtain essential amino acids from food.”

“Through the process of digestion, animals break down ingested protein into free amino acids that are then used in metabolism.”
Development of Agriculture in the Tehuacán Valley

- protein is found in a variety of foods
  - meat
  - fish
  - dairy products
  - eggs
  - beans
  - grains
  - nuts
  - vegetables
Development of Agriculture in the Tehuacán Valley

- **amino acids** are the building blocks of protein
  - human tissue contains 22 different amino acids
  - 13 can be made by the body
  - 9 of the 22 must be obtained from **foods**
    - these are “**essential amino acids**” (EAAs)

*The Cultural Feast, 2nd ed., p. 52*
amino acids are the building blocks of protein

- human tissue contains 22 different amino acids
- 13 can be made by the body
- 9 of the 22 must be obtained from foods

these are “essential amino acids” (EAAs)
“all proteins are not created equal”

- animal foods contain all 9 EEAs
  - are easily utilized by the body
“all proteins are not created equal”

• most plant foods contain limited amounts of one or two amino acids
  • for this reason single-item diets, such as those made up almost solely of corn or yams, can lead to protein deficiency
“all proteins are not created equal”

- but if a diet contains several different plant foods, protein deficiency does not occur
  - some plant foods have generous amounts of amino acids that others are lacking

*The Cultural Feast, 2nd ed., p. 52*
protein complementation

• if plant foods are combined, the strengths of one can complement the weaknesses of another

• and together they make a high-quality protein

*The Cultural Feast, 2nd ed.*, pp. 51-52
Development of Agriculture in the Tehuacán Valley

protein complementation

• as long as the protein from plant sources is reasonably varied and there are enough calories, plant sources of protein can provide adequate protein

*The Cultural Feast, 2nd ed., pp. 51-52*
protein complementation

in addition to plant foods complementing one another, the body also has a reserve of amino acids that can be used to complement dietary proteins
the reserve of amino acids comes from

• enzymes secreted into the intestine to digest proteins

• intestinal cells sloughed off into the intestine

• a pool of free amino acids in the intracellular spaces of the skeletal muscle
plant food can be divided into three broad groups based on EEAs’ strengths and weaknesses

1. **whole grains**
   - wheat, rye, barley, rice, corn, etc.

2. **legumes, nuts and seeds**
   - legumes = beans, peas

3. **vegetables**

*The Cultural Feast, 2nd ed., pp. 51-52*
Development of Agriculture in the Tehuacán Valley

vegetables and legumes generally compensate for the EEAs underrepresented in the grain group

1. whole grains
   • wheat, rye, barley, rice, corn, etc.

2. legumes, nuts and seeds
   • legumes = beans, peas

3. vegetables

*The Cultural Feast, 2nd ed.*, pp. 51-52
even within groups, the proteins often complement each other to some extent, because all foods have a slightly different collection of amino acids

1. whole grains
   • wheat, rye, barley, rice, corn, etc.

2. e.g., legumes, nuts and seeds
   • legumes = beans, peas

3. vegetables

*The Cultural Feast, 2nd ed.*, pp. 51-52
dairy products, eggs, and meats can improve the protein efficiency of any of the groups

1. whole grains
   • wheat, rye, barley, rice, corn, etc.

2. legumes, nuts and seeds
   • legumes = beans, peas

3. vegetables

*The Cultural Feast, 2nd ed., pp. 51-52*
Development of Agriculture in the Tehuacán Valley

before scientists discovered the need for essential amino acids, complementary protein combinations evolved spontaneously as the basis of many cuisines

• Chinese
  • soy products and rice

• African
  • sorghum / millet and cowpeas

• India
  • lentil curry and rice

• Italy
  • pasta and beans (pasta e fagioli)

• Southern U.S.A.
  • soup beans and corn bread

*The Cultural Feast, 2nd ed.*, p. 52
Development of Agriculture in the Tehuacán Valley

... back to early agriculture in the Americas

*The Cultural Feast, 2nd ed.*, p. 51
diffusion
the spread of something from one group to another through contact or exchange

Early farming in the Americas, showing the spread of maize agriculture (purple)

Understanding Physical Anthropology and Archaeology, cf. 9th Ed., p. 358
Early Farmers in the Americas

the Pueblos benefited from the diffusion of agriculture from the Mesoamerican area
Early farming in the Americas

*Understanding Physical Anthropology and Archaeology, 9th Ed.*, p. 358
Early farming in the Americas

Understanding Physical Anthropology and Archaeology, 9th Ed., p. 358
Village farming cultures of the American Southwest, showing trade routes (red)

Understanding Physical Anthropology and Archaeology, 9th Ed., p. 359
Pueblos

Spanish term for "town" referring to multiroom residence structures built by village farmers in the American Southwest

Pueblo Bonito, Chaco Canyon, New Mexico
Other Early Farmers in the Americas

- Hopewell
- Mississippian
Hopewell

a culture centered in southern Ohio between 2,100 and 1,700 ybp but influencing a much wider region through trade and the spread of a cult centered on burial ritualism
Early farming in the Americas

Understanding Physical Anthropology and Archaeology, 9th Ed., p. 358
Mississippian
flint hoe blade
used by Mississippian farmers
"Community Life" by Michael Hampshire

Courtesy of Cahokia Mounds State Historic Site
Collinsville, Illinois
examples:

Tehuacán, Puebla, Mexico

pre-Columbian Kentucky

• the changes toward dependence on agriculture was not always swift
• in the short term, it was not always healthful
examples:

- Tehuacán, Puebla, Mexico
- pre-Columbian Kentucky

- the changes toward dependence on agriculture was not always swift
- in the short term, it was not always healthful

*The Cultural Feast, 2nd ed., p. 49*
Food in Historical Perspective: Dietary Revolutions

- Development of Agriculture in the Tehuacán Valley
- Nutritional Consequences of the Agricultural Revolution: A Comparison of Foragers and Agriculturalists
- Social and Political Consequences of the Agricultural Revolution

- Highlight: Vegetarian Diets: Then and Now
with hunters and gatherers

times of food scarcity certainly exist but

famine is a relatively infrequent occurrence

• and chronic malnutrition is even rarer

*The Cultural Feast, 2nd ed., p. 54*
with the advent of agriculture, the picture changes …

• dependence on a small number of cultivated crops or domesticated animals increases the risk of widespread famine
with the advent of agriculture, the picture changes …

• a less diversified diet makes it far harder to achieve an adequate balance of essential nutrients
  • especially protein and certain vitamins

*The Cultural Feast, 2nd ed., p. 54*
with the advent of agriculture, the picture changes …

• vitamin deficiency diseases are especially problematic in grain-dependent communities
Comparing Health Paradigms

Interview with Claire Cassidy, PhD, LAc

By Daniel Redwood, DC

Claire M. Cassidy, PhD, LAc, is among the most original thinkers in the field of comparative medicine. She has written extensively in academic journals and textbooks about the methods known as complementary and alternative medicine (CAM) and their relationship to mainstream or biomedicine. She has a special ability to translate complex ideas into language that non-experts can readily understand. Trained as a medical anthropologist, she later became a licensed acupuncturist and now practices in Bethesda, Maryland.

Dr. Cassidy is an associate editor of The Journal of Alternative and Complementary Medicine and has over 65 professional publications to her credit including books, chapters, and articles. She is the author of the textbook, Contemporary Acupuncture and...
Claire Cassidy (1980)

• assessed the nutritional impact of the introduction of agriculture on pre-Columbian Native Americans

• examined skeletal remains of two precontact villages in Kentucky

*The Cultural Feast, 2nd ed.*, p. 54
Claire Cassidy (Ed.)
(1980)

Nutrition and Health in Agriculturalists and Hunters and Gatherers

NY: Redgrave

The Cultural Feast, 2nd ed., p. 54
Indian Knoll: foragers, ca. 5,000 ybp
Hardin Village: agriculturalists, ca. 1,000 ybp
had very different diets

*The Cultural Feast, 2nd ed., p. 54*
Indian Knoll

**foragers**

ca. 5,000 ybp

- people ate large quantities of river mussels and snails
- and deer, small mammals, wild turkeys, box turtles, fish, and occasionally dog

Hardin Village

agriculturalists

c.a. 1,000 ybp

*The Cultural Feast, 2nd ed., p. 54*
Indian Knoll

**foragers**

*ca. 5,000 ybp*

- similar sites suggest they also ate hickory nuts, walnuts, acorns, elderberries, persimmons, sunflower seeds, and other wild berries

Hardin Village

**agriculturalists**

*ca. 1,000 ybp*

*The Cultural Feast, 2nd ed.*, p. 54
Indian Knoll

foragers
cia. 5,000 ybp

Hardin Village

agriculturalists
cia. 1,000 ybp

• people relied primarily on cultivated **corn, beans, and squash**

• **supplemented** with deer, eel, small mammals, wild turkeys, box turtles, and wild plants

*The Cultural Feast, 2nd ed.*, p. 54
Claire Cassidy (1980)

- compared 296 skeletons from Hardin Village and 285 skeletons from Indian Knoll in Kentucky
- data on health was derived from careful analysis of the bones and teeth …

*The Cultural Feast, 2nd ed.*, p. 54
Indian Knoll
foragers
c. 5,000 ybp

Hardin Village
agriculturalists
c. 1,000 ybp

• life expectancies for both sexes at all ages were lower at Hardin Village

*The Cultural Feast, 2nd ed., p. 54*
• infant mortality was higher at Hardin Village
Indian Knoll

- foragers
- ca. 5,000 ybp

Hardin Village

- agriculturalists
- ca. 1,000 ybp

• iron-deficiency anemia of sufficient duration to cause bone changes was absent at Indian Knoll
• but was present at Hardin Village
  • 50% of cases occurred in children under 5

*The Cultural Feast, 2nd ed.*, p. 54
Indian Knoll

foragers
ca. 5,000 ybp

• growth arrest episodes at Indian Knoll were periodic and more often of short duration and were possibly due to food shortages in late winter

• those at Hardin Village occurred randomly and were more often of long duration, probably indicative of disease as a causative agent

Hardin Village

agriculturalists
ca. 1,000 ybp

*The Cultural Feast, 2nd ed., p. 54*
Indian Knoll

- foragers
- ca. 5,000 ybp

Hardin Village

- agriculturalists
- ca. 1,000 ybp

• more children suffered infections at Hardin Village

_The Cultural Feast, 2nd ed., p. 55_
The syndrome of periosteal inflammation was more common at Hardin Village.

- a swelling of the outermost layer of the bone.

*Indian Knoll* foragers ca. 5,000 ybp

*Hardin Village* agriculturalists ca. 1,000 ybp

*The Cultural Feast, 2nd ed.,* p. 55
tooth decay was rampant at Hardin Village and led to early abscessing and tooth loss

• decay was unusual at Indian Knoll and abscessing occurred later in life because of severe wear to the teeth

Indian Knoll
foragers
ca. 5,000 ybp

Hardin Village
agriculturalists
ca. 1,000 ybp

The Cultural Feast, 2nd ed., p. 55
Indian Knoll

foragers

ca. 5,000 ybp

Hardin Village

agriculturalists

ca. 1,000 ybp

• the differences in tooth wear rate and carries rate are very likely attributable to dietary differences between the two groups.

*The Cultural Feast, 2nd ed.*, p. 55
Indian Knoll: foragers (ca. 5,000 ybp)
- Better life expectancies
- Lower infant mortality
- No iron-deficiency anemia
- Growth arrests periodic and short
- Fewer infections
- Less bone inflammation
- Less tooth decay and abscessing

Hardin Village: agriculturalists (ca. 1,000 ybp)

*The Cultural Feast, 2nd ed.*, p. 55
<table>
<thead>
<tr>
<th>Indian Knoll</th>
<th>Hardin Village</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>foragers</strong></td>
<td><strong>agriculturalists</strong></td>
</tr>
<tr>
<td><em>ca. 5,000 ybp</em></td>
<td><em>ca. 1,000 ybp</em></td>
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- Cassidy concluded that the **agricultural Hardin Villagers were less healthy**
- *in Cassidy’s opinion* most of the health conditions were related to dietary factors
  - especially the lack of animal protein in the agriculturalists’ diet

*The Cultural Feast, 2nd ed., p. 55*

*The Cultural Feast, 2nd ed.*, p. 55
Ch. 4 “The Edible Earth: Managing Plant Life for Food” raises the question “Why did they bother?”
consequences of 
“Neolithic”
(food production) 
activities

- new settlement patterns
- new technologies
- profound biocultural effects
Social and Political Consequences of the Agricultural Revolution

• population growth
  • establishment of large, sedentary villages
    • opportunity for increased social interaction
  • but with added health risks

*The Cultural Feast, 2nd ed.*, p. 55
The Cultural Feast

Hardin Village
agriculturalists
c. 1,000 ybp

Indian Knoll
foragers
c. 5,000 ybp

- despite a higher incidence of malnutrition and disease in the agricultural population, domestication of plants and animals was associated with population growth

*The Cultural Feast, 2nd ed., p. 55*
• “Hardin Village, like millions [sic.] of agricultural communities, increased significantly, growing from 100 to 300 people over a 150-year period.”

*The Cultural Feast, 2nd ed.*, p. 55
Biocultural Consequences: Population

around the world
population size
and density
increased
with the agricultural revolution
Biocultural Consequences: Population

World population growth

Understanding Physical Anthropology and Archaeology, 9th Ed., p. 365
Biocultural Consequences: Population

demographic increase
pertaining to the size or rate of increase of human populations
Biocultural Consequences: Population

carrying capacity
population the environment can sustain
“Thus, although overall health was poorer, food production allowed a much larger population to live together than the previous way of life could sustain.”

The Cultural Feast, 2nd ed., p. 55
Biocultural Consequences: Population

- people clustered into villages
- women had more children
- even early settlements quickly reached considerable size
Monks Mound, Cahokia, Illinois
ca. A.D. 800-1000

www.d.umn.edu/cla/faculty/troufs/anth1602/pcmississippian.html#title
Social and Political Consequences of the Agricultural Revolution

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• establishment of large, sedentary villages
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Social and Political Consequences of the Agricultural Revolution

- population growth
- establishment of large, sedentary villages
  - opportunity for increased social interaction
- but with added health risks

*The Cultural Feast, 2nd ed., p. 55*
• early food producers faced health risks due to close proximity to domesticated animals
  - dogs carry rabies
  - horses carry tetanus
  - pigs and poultry carry influenza
  - AIDs was derived from chimpanzees
Biocultural Consequences: Population

around the world

population size
and density
increased
with the agricultural revolution
Agricultural Societies of Near East Asia Europe
Origin of Domestication for Selected Plants

- **Wheat**: 10,500 ybp
- **Rice**: 7,000 ybp
- **Maize**: 4,500 ybp
- **Millet**: 4,000 ybp
- **Manioc**: 4,200 ybp

Although in India, **millet** was actually important first.
### Origin and Approximate Dates of Domestication for Selected Plants and Animals

<table>
<thead>
<tr>
<th>Region</th>
<th>Plant/Animal</th>
<th>Approximate Date</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>North America</strong></td>
<td>Goosefoot (Chenopodium), 3,000 ya</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Gourd (Cucurbita), 5,000 ya</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Marsh elder (Iva), 3,000 ya</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Sunflower (Helianthus), 3,000 ya</td>
<td></td>
</tr>
<tr>
<td><strong>Mexico/Central America</strong></td>
<td>Amaranth (Amaranthus), 6,000 ya</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Avocado (Persea), 2,500 ya</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Cacao (Theobroma), 1,500 ya</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Chili pepper (Capsicum), 5,500 ya</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Common bean (Phaseolus), 7,000 ya</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Maize (Zea mays), 4,500 ya</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Squash (Cucurbita), 7,500 ya</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Tomato (Lycopersicon), ?</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Turkey (Meleagris), 2,500 ya</td>
<td></td>
</tr>
<tr>
<td><strong>South America</strong></td>
<td>Cashew (Anacardium), ?</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Chili pepper (Capsicum), 4,500 ya</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Coca (Erythroxylon), ?</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Guinea pig (Cavia), 4,000 ya</td>
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<td>Yam (Dioscorea), ?</td>
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Near Eastern Farmers

• Jericho, Palestine
• Çatalhöyük, Anatolia, Turkey
• Jarmo, Iraq
• Ali Kosh, Iran
Early Neolithic sites of the Fertile Crescent

Understanding Physical Anthropology and Archaeology, 9th Ed., p. 349
Early Neolithic sites of the Fertile Crescent

*Understanding Physical Anthropology and Archaeology, 9th Ed.*, p. 349
Time line for Ch.16 "Food Production"

Understanding Physical Anthropology and Archaeology, 9th Ed., p. 333
Lorenzo Ghiberti's 15th Century visualization of the attack on the walls of Jericho
Map of Jericho in 14th century Farhi Bible

Dwelling foundations unearthed at Tell es-Sultan in Jericho

Jericho

http://faculty.smu.edu/dbinder/jericho.html
http://ancientneareast.tripod.com/Jericho_Tell_Sultan.html
Early Neolithic sites of the Fertile Crescent

Understanding Physical Anthropology and Archaeology, 9th Ed., p. 349
Time line for Ch.16 "Food Production"

Understanding Physical Anthropology and Archaeology, 9th Ed., p. 333
Çatalhöyük, Anatolia, or Turkey

Wild bull horns on pillars in Building 77

Çatalhöyük

www.catalhoyuk.com/
Mural of an aurochs, a deer, and humans from Çatalhöyük sixth millennium B.C.

http://en.wikipedia.org/wiki/%C3%87atalh%C3%B6%20%C3%B6y%C3%BCk
geological obsidian source. The results of this obsidian characterization research have made substantial contributions to unraveling the complex interactions at play throughout the course of prehistory in the ancient Near East. This research, highlighted in selected projects shown on the map and timeline, has illuminated the shifting nature of trade and cultural contact over a 7500 year period in the ancient Near East.
Uruk trade network

www.freebuck.com/articles/elliott/00elliottfoundations.htm
These are modern Obsidian points. This black volcanic glass was the economic fuel that powered Catal Huyuk.

The Religion of Obsidian

A remarkable wallpainting uncovered at Catal Huyuk throws an interesting light on the city's economic and religious foundations. "Painted on the north and east wall of a shrine... soon after 6200 B.C .... it represents that rarest of all genres of early painting, a landscape, and needless to say it is unique," writes Mellaart. The painting consists of a stylized portrayal of the terraced houses of the city itself, with a geologically perceptive rendition of an erupting, twin-peaked volcano. The painting clearly represents an actual eruption of Hasan Dag, a twin-peaked, then-active volcano eight miles to the east of the city, which dominated the skyline on a
The results of this obsidian characterization research have made substantial contributions to unraveling the complex interactions at play throughout the course of prehistory in the ancient Near East. This research, highlighted in selected projects shown on the map and timeline, has illuminated the shifting nature of trade and cultural contact over a 7500 year period in the ancient Near East.
Early Neolithic sites of the Fertile Crescent

Understanding Physical Anthropology and Archaeology, 9th Ed., p. 349

Early Neolithic community in northern Iraq
the oldest known farming community in the world
ca. 7000 B.C.
Jarmo, Iraq
• Ali Kosh
  – early site in the Fertile Crescent
Early Neolithic sites of the Fertile Crescent

Understanding Physical Anthropology and Archaeology, 9th Ed., p. 349
Pottery types from Deh Luran, Iran.

Hole, Flannery and Neely, “Prehistory and Human Ecology Of the Deh Luran Plain: An Early Village Sequence from Khuzistan, Iran.” Ann Arbor: 1969, fig. 69.
• Near Eastern Farmers
  • Jericho, Palestine
  • Çatalhöyük, Anatolia, Turkey
  • Jarmo, Iraq
  • Ali Kosh, Iran

• Ancient Egypt
Egypt

- the Old Kingdom times marked the beginning of Nile valley civilization (4,575 - 4,150 ybp)

- the merger of Nile valley societies under one king created the world's first nation state
Hieroglyphics
the picture-writing of ancient Egypt

Royal Egyptian Hunting marsh birds from a papyrus boat

*Understanding Physical Anthropology and Archaeology, 9th Ed., p 463*
- Decorated predynastic pottery jar,
  Nile valley,
  Egypt
amber
fossil pine pitch or resin,
long valued for jewelry or offerings

amber lotus

Amber jewelry has been found in Egypt from as far back as 2,600 B.C.

www.aeraweb.org/artifacts.asp
Eight Food “Revolutions”

1. Invention of Cooking
2. Discovery that Food is More Than Sustenance
3. The “Herding Revolution”
4. Snail Farming
5. Use of Food as a Means and Index of Social Differentiation
6. Long-Range Exchange of Culture
7. Ecological Revolution of last 500 years
8. Industrial Revolution of the 19th and 20th Centuries
Agricultural Societies
of Near East
Asia
Europe
Origin of Domestication for Selected Plants

- **rice** 7,000 ybp
- **manioc** 4,200 ybp
- **maize** 4,500 ybp
- **millet** 4,000 ybp
- **wheat** 10,500 ybp

REM in India **millet** was actually important first.
Origin and Approximate Dates of Domestication for Selected Plants and Animals

**North America**
- Goosefoot (Chenopodium), 3,000 ya
- Gourd (Cucurbita), 5,000 ya
- Marsh elder (Iva), 3,000 ya
- Sunflower (Helianthus), 3,000 ya

**Mexico/Central America**
- Amaranth (Amaranthus), 6,000 ya
- Avocado (Persea), 2,500 ya
- Cacao (Theobroma), 1,500 ya
- Chili pepper (Capsicum), 5,500 ya
- Common bean (Phaseolus), 7,000 ya
- Maize (Zea mays), 4,500 ya
- Squash (Cucurbita), 7,500 ya
- Tomato (Lycopersicon), ?
- Turkey (Agriotheras), 2,500 ya

**South America**
- Cashew (Anacardium), ?
- Chili pepper (Capsicum), 4,500 ya
- Coca (Erythroxylon), ?
- Guinea pig (Cavia), 4,000 ya
- Lima bean (Phaseolus), 7,000 ya

**Eastern Mediterranean**
- Asparagus (Asparagus), 2,200 ya
- Broccoli (Brassica), 1,900 ya
- Cabbage (Brassica), 2,000 ya
- Grape (Vitis), 6,000 ya
- Lettuce (Lactuca), 6,500 ya
- Olive (Olea), 5,000 ya
- Pear (Pyrus), 2,500 ya
- Rabbit (Oryctolagus), 3,000 ya

**Asia**
- Banana (Musa), 2,000 ya
- Chicken (Gallus), 8,000 ya
- Millet (Setaria), 9,000 ya
- Orange (Citrus), 2,000 ya
- Peach (Prunus), 6,000 ya
- Rice (Oryza), 7,000 ya
- Soybean (Glycine), 3,000 ya

**Southwest Asian Near East**
- Apple (Malus), 3,000 ya
- Barley (Hordeum), 10,500 ya
- Cattle (Bos), 9,000 ya
- Chickpea (Cicer), 8,000 ya
- Date (Phoenix), 4,500 ya
- Goat (Capra), 10,500 ya
- Horse (Equus), 6,000 ya
- Lentil (Lens), 10,000 ya
- Pea (Pisum), 8,500 ya
- Pig (Sus), 9,500 ya
- Pistachio (Pistacia), ?
- Sheep (Ovis), 10,000 ya
- Wheat (Triticum), 10,500 ya

**Africa**
- Coffee (Coffeea), ?
- Millet (Pennisetum), 4,000 ya
- Muskmelon (Cucumis), 5,000 ya
- Sorghum (Sorghum), 4,500 ya
- Watermelon (Citrullus), 4,000 ya
- Yam ( Dioscorea), ?
One of the earliest Neolithic settlements of southern Asia, Pakistan

includes one of the earliest examples of dentistry
Agricultural Societies of Near East Asia Europe
Origin of Domestication for Selected Plants

wheat 10,500 ybp
rice 7,000 ybp
maize 4,500 ybp
millet 4,000 ybp
manioc 4,200 ybp
### Origin and Approximate Dates of Domestication for Selected Plants and Animals

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<th>Region</th>
<th>Plant/Animal</th>
<th>Approximate Date (y.a.)</th>
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</table>
Time line for Ch.16 "Food Production"

Understanding Physical Anthropology and Archaeology, 9th Ed., p. 333
megaliths
monumental structures made of very large stones, characteristic of western Europe
Carnac, France

http://pages.infinit.net/celte/chateau.html
consequences of
“Neolithic”
(food production)
activities

- new settlement patterns
- new technologies
- profound biocultural effects
Food in Historical Perspective: Dietary Revolutions

- Development of Agriculture in the Tehuacán Valley
- Nutritional Consequences of the Agricultural Revolution: A Comparison of Foragers and Agriculturalists
- Social and Political Consequences of the Agricultural Revolution

- Highlight: Vegetarian Diets: Then and Now
Social and Political Consequences of the Agricultural Revolution

**surplus food**

- fostered trade with people in other ecological zones
- allowed access to previously unknown commodities
- for the first time in history not everyone had to be involved in food-getting activities

*The Cultural Feast, 2nd ed., p. 55*
Social and Political Consequences of the Agricultural Revolution

surplus food

• fostered trade with people in other ecological zones
• allowed access to previously unknown commodities
• for the first time in history not everyone had to be involved in food-getting activities

*The Cultural Feast, 2nd ed., p. 55*
maize
manioc
potatoes, sweet potatoes, yams
beans
peanuts
squash
pineapples
avocados
tomatoes
chocolate
vanilla
chile

America’s First Cuisines, Chs. 2 and 3
Maya trade
Bonampak
• barter and exchange flourished

• new social order distinguished landowners and tenant farmers
Social and Political Consequences of the Agricultural Revolution

• some people also succeeded in trade and the acquisition of surplus wealth
  • giving rise in many places to an affluent and powerful merchant class
Social and Political Consequences of the Agricultural Revolution

- surplus food
  - fostered trade with people in other ecological zones
  - allowed access to previously unknown commodities
- for the first time in history not everyone had to be involved in food-getting activities

*The Cultural Feast, 2nd ed.*, p. 55
non-farmers could engage in specialized crafts
Social and Political Consequences of the Agricultural Revolution

- people began to master

  - basket making
    - ceramics
    - bronze and metal casting
    - brick making
    - masonry
    - other skills
Day's Place, Frozen Sap, Lake Mille Lacs

Minnesota Historical Society
Woman and Blueberries
Patrick DesJarlait (1912-1972)
Minnesota Historical Society
economic system allows individuals to devote full time to occupations like …

basket making

Prehistoric basketry techniques
(Jean Connor)
Social and Political Consequences of the Agricultural Revolution

- people began to master
  - basket making
- **ceramics**
  - bronze and metal casting
  - brick making
  - masonry
  - other skills

*The Cultural Feast, 2nd ed., p. 55*
Biocultural Consequences: Technology

- basket and skin containers were replaced with ceramic vessels
  - baskets were likely lined with clay, and eventually fired
  - fire pits likely naturally were fired as part of the cooking process
Biocultural Consequences: Technology

- pottery made it easier to prepare and boil grains into digestible foods
Reay Tannahill,
(NY: Three Rivers Press, 1988)
Comal
Codex Mendoza, folio 60r
The three hearthstones supporting the *comal*(li)
Codex Mendoza, folio 60r
Biocultural Consequences: Technology

- pottery made it easier to prepare and boil grains into digestible foods
- prehistoric people at the Fish Lake Dam site just north of Duluth may have invented pottery in order to parch wild rice
"Rice Gatherers"
Seth Eastman, 1867
Minnesota Historical Society
Woman parching rice
Minnesota Historical Society
economic system allows individuals to devote full time to occupations like …

pottery making

Classic Maya cylindrical jar with bird motif and glyphs,
9th p. 411
• prehistoric decorated pottery vessel from Arizona
- **bandkeramic**
  - "lined pottery," referring to a Neolithic ceramic ware widely encountered in central Europe and to the culture that produced it
Early Neolithic sites of the Fertile Crescent

*Understanding Physical Anthropology and Archaeology, 9th Ed., p. 349*
Pottery types from Deh Luran, Iran.

Hole, Flannery and Neely, “Prehistory and Human Ecology Of the Deh Luran Plain: An Early Village Sequence from Khuzistan, Iran.” Ann Arbor: 1969, fig. 69.
Social and Political Consequences of the Agricultural Revolution

• people began to master
  • ceramics
  • bronze and metal casting
  • brick making
  • masonry
  • other skills
Copper Age

"Ötzi" "The Iceman"
Bronze Age

- period of early Old World civilizations associated with the widespread use of metal tools after 5,500 y.a.

Cast bronze ritual vessel of the Shang dynasty, China
economic system allows individuals to devote full time to occupations like ...

metalworking

Inca gold
economic system allows individuals to devote full time to occupations like ... metalworking

Inca gold ceremonial mask
Mycenaean Bronze Age axe, or winged palstave
Social and Political Consequences of the Agricultural Revolution

- population growth
- establishment of large, sedentary villages
- opportunity for increased social interaction
- but with added health risks

*The Cultural Feast, 2nd ed., p. 55*
Social and Political Consequences of the Agricultural Revolution

• surplus food

• food surplus could be used in times of shortages
Joseph interprets the dream of the Pharaoh
Peter von Cornelius
Seven Years of Plenty, Seven Years of Famine

www.mycatholictradition.com/saints-of-old-joseph2.html
Aztecs storing maize
Florentine Codex
late 16th century
Social and Political Consequences of the Agricultural Revolution

• surplus food

• excess production served as capital that fostered new socioeconomic transactions

The Cultural Feast, 2nd ed., p. 55
Ten Classic Characteristics of Early Civilization

2. Social means of collecting “surplus” production

Small Sumerian clay table is a 4,000-year-old tax receipt with cuneiform impressions on both sides

*Understanding Physical Anthropology and Archaeology, 9th Ed.*, p. 389
Social and Political Consequences of the Agricultural Revolution

- as population increased
  - competition for limited resources occurred
    - water
    - land
    - other basic resources
Social and Political Consequences of the Agricultural Revolution

• political/religious/military hierarchies took over the tasks of ...
  
  • organizing production
  
  • maintaining order in an increasingly complex society
  
  • defending the community

*The Cultural Feast*, 2nd ed., pp. 55-56
Social and Political Consequences of the Agricultural Revolution

- political/religious/military hierarchies control over various tasks …

- led to the rise of states and empires

*The Cultural Feast, 2nd ed., pp. 55-56*
Social and Political Consequences of the Agricultural Revolution

- states and empires began to have ...
  - specialized laborers
  - private property
  - class systems
  - organized governments

_The Cultural Feast, 2nd ed., p. 56_
Social and Political Consequences of the Agricultural Revolution

- people became divided for the first time into …
  - priests, warriors, and artisans groups
  - rich and poor
  - upper and lower classes
  - rulers and ruled

*The Cultural Feast, 2nd ed., p. 56*
Ten Classic Characteristics of Early Civilization

10. A privileged ruling class of religious, political, and military leaders organizes and directs the entire system

Hieroglyphic inscription of a royal Egyptian hunting marsh birds from a papyrus boat, 9th ed. p. 393.

King Tut
Montezuma’s Dinner:
An Essay on the Tribal Society of the North American Indians

Lewis Henry Morgan

NY: Heritage Press
1876

Mocezuma II
Aztecs stone altar dedicated to corn
Museum of Anthropology
16 February 1923

[Image of a golden statue]

[Hyperlink to article]
4 November 2007

http://news.bbc.co.uk/2/hi/science/nature/7077423.stm
Social and Political Consequences of the Agricultural Revolution

with social stratification heterogeneous diets appeared …

• not everyone who lived in the same area ate similar foods

• food patterns of a region varied considerably among people of different rank or status
by the end of the 15th century ...

- agriculture had brought cities and complex political systems to most parts of the world
- trade networks linked many parts of the world
- the age of exploration was about to begin

*The Cultural Feast, 2nd ed.*, p. 56
Social and Political Consequences of the Agricultural Revolution

... and food played a critical role in the political developments of this era ...
Food in Historical Perspective: Dietary Revolutions

- The Agricultural Revolution of the Neolithic Era
- **The Search for Spices**
- The Industrial Revolution
- Early Technology
  - Transportation
  - Refrigeration
  - Canning
- The Scientific Revolution
- Modern-Day Adaptations
- Summary
- Highlight: Vegetarian Diets: Then and Now
Food in Historical Perspective: Dietary Revolutions

- The Agricultural Revolution of the Neolithic Era
- The Search for Spices
- The Industrial Revolution

changed

the history of the world forever

- Highlight: Vegetarian Diets: Then and Now
Food in Historical Perspective: Dietary Revolutions

• The Agricultural Revolution of the Neolithic Era
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• Summary
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Food in Historical Perspective: Dietary Revolutions

• **Summary**

• **Highlight: Vegetarian Diets: Then and Now**
Food in Historical Perspective: Dietary Revolutions

foraging wild foods in the wilderness

localvores

foraging wildly, foods in the supermarket

globalvores
Food in Historical Perspective: Dietary Revolutions

• The Agricultural Revolution
  • The Search for Spices

• The Industrial Revolution
  • Transportation, Refrigeration, and Canning

• The Scientific Revolution
  • Modern-Day Adaptations
  • Summary
  • Highlight: Vegetarian Diets: Then and Now
About 12,000 years ago (ca. 10,000 B.C.) a dramatic change in the way humans acquired their food began to unfold.
Food in Historical Perspective: Dietary Revolutions

Food collection

People ate a wide variety of foraged foods

Food production

ca. 12,000 ybp

People eat a small number of domesticated plants and animals
nomadism

allowed human groups to include a wide range of foods in their diets without depleting any one resource

*The Cultural Feast, 2nd ed.*, pp. 48-49
diets of hunters and gatherers include a wide variety of plants and animals and, therefore, tend to be nutritionally well-balanced

agriculturalists typically rely on a limited number of cultivated crops

*The Cultural Feast, 2nd ed., p. 51*
Food in Historical Perspective: Dietary Revolutions

Food collection → food production

*ca.*, 12,000 ybp

Life expectancy lengthened
Population increased
settling in villages …

• resulted in a rise in population density
• and an overall increase in the total human population
• had significant effects on many other aspects of human life
• provides the foundation for the development of civilization

The Cultural Feast, 2nd ed., p. 49
European exploration during the 15th century led to a search for spices and the exchange of food between regions, leading to diversified diets and globalization of food.
Industrial Revolution

factories

18th and 19th centuries

nutritional status changed for the worse initially as people moved from farms to overcrowded cities

Food in Historical Perspective: Dietary Revolutions
Food in Historical Perspective: Dietary Revolutions

• The Exchange of Food Between the Old and New Worlds

• Summary
• Highlight: Vegetarian Diets: Then and Now
The Exchange of Food Between the Old and New Worlds

“…The movement of foods across Asia and Europe and then across the Atlantic Ocean (in both directions) reminds us that the process of globalization with respect to food is not a new one.”

• humans have had a globalized food system for a long time

*The Cultural Feast, 2nd ed., p. 60*
Food in Historical Perspective: Dietary Revolutions

Industrial Revolution

18th and 19th centuries

factories

industrial cities

nutritional status changed for the worse initially as people moved from farms to overcrowded cities
The Industrial Revolution

“The *industrial revolution* … was only possible as a result of agricultural change.”

- brought farms and villages into existence
- gave birth to factories and industrial cities

*The Cultural Feast, 2nd ed.*, p. 60
The Industrial Revolution

“The industrial revolution … was only possible as a result of agricultural change.”

• created densely populated industrialized cities

• dramatically changed the dietary patterns in the new urban centers

*The Cultural Feast, 2nd ed., p. 60*
the shifts in livelihoods and locations were dramatic

• the nutritional status changed for the worse initially as people moved from farms to overcrowded cities

The Cultural Feast, 2nd ed., p. 62
Food in Historical Perspective: Dietary Revolutions

- Transportation
- Refrigeration
- Canning

... gradually improved diets by ...

1. making food cheaper
2. expanding the variety of foods available
3. keeping foods fresh longer
“The scientific revolution ultimately led to our current level of knowledge about human nutrition and enabled us to exert an unprecedented control over food supply, health, and physical well-being.”

• Summary
• Highlight: Vegetarian Diets: Then and Now
Scientific Revolution

19th and 20th centuries

current level knowledge of nutrition enables unprecedented control over food supply, health, physical well being
Scientific Revolution

19th and 20th centuries

good effects:
- pasteurization...
- increased food safety

current level knowledge of nutrition

good effects
Scientific Revolution

19th and 20th centuries

current level knowledge of nutrition

bad effects

negative effects:
milling of grains led to widespread vitamin deficiencies in some parts of the world ...
pasteurization

1860s Louis Pasteur lays the groundwork of the science of microbiology

increased the safety of food

re-cooling the liquids preserves freshness

The Cultural Feast, 2nd ed., p. 68
• white bread …

milling of grains led to widespread vitamin deficiencies in some parts of the world

*The Cultural Feast, 2nd ed., p. 66*
milling of grains led to widespread vitamin deficiencies in some parts of the world
discovery of vitamins

Food in Historical Perspective: Dietary Revolutions

19th and 20th centuries

new understanding of food and its effects on health
Eating Culture
An Anthropological Guide to Food
Gillian Crowther
Dietary Revolutions: The Neolithic Revolution

Gillian Crowther