Oil & Gas Law

Class 1:

Introduction

A Bit About My Background …

- Employment History
  - Long-Term Involvement in the Energy Industry
- Teaching

My Teaching Style

Some of My Former Students

About the Course … Admin

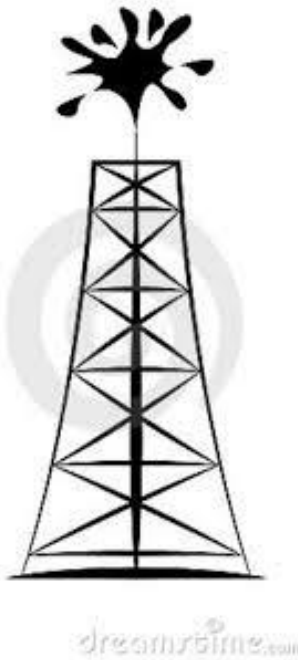
- **FIRST: Constructive Notice!!**
- Availability
- Grades / Class Participation / Attendance
- Class time / Make-up classes
- PPT Slides
- Class Webpage:

  http://www.law.uh.edu/faculty/adjunct/cbrownman/
- Vocabulary Terms
- Assigned Reading / Supplementary

INTRODUCTION:

What IS the Oil & Gas Business?

- A bit of …
  - Chemistry
  - Geology
  - History
  - International Politics and Economics



Oil AND Gas

- **Oil**
  - Measured in "**barrels**"
  - "bbl"
  - 1 bbl = 42 gallons
  - Production in bbl / d
  - Reserves are in bbl
- **Gas**
  - Measured either for its heating content ***OR*** its volume
  - Heating content: **British Thermal Units or "BTUs"**
  - Volume: **Cubic feet or cf**
  - 1 cf = 1,000 Btu
  - 1,000 cf (1 Mcf) = 1,000,000 Btu (1 MMBtu)

World Energy Outlook

- ***"Energy hungry world"***
- ==========
- From 2014 to 2040 …
- Total world energy consumption is forecasted to **increase by 56 percent**
- ==========
  - **OECD Countries: 17 percent**
  - **Non-OECD Countries: 90 percent**

Sources / Users of Oil – World

- 2012: produced about 87.6 MM bbl /d
- **Top Producers** (as of 2011 or 2012)
  - Russia (12.7%), Saudi Arabia (11.3%), U.S. (10.3%), Iran (5.0%) and China (4.8%) → **44.1%**
  - Next 5 collectively produce **25.2%**
- **Top Consumers**
  - U.S. (~18.5 MM bbl /d; ~21% of world production), China (~12%), Japan (~5.5%), India (~4.3%), Russia (~3.8%)

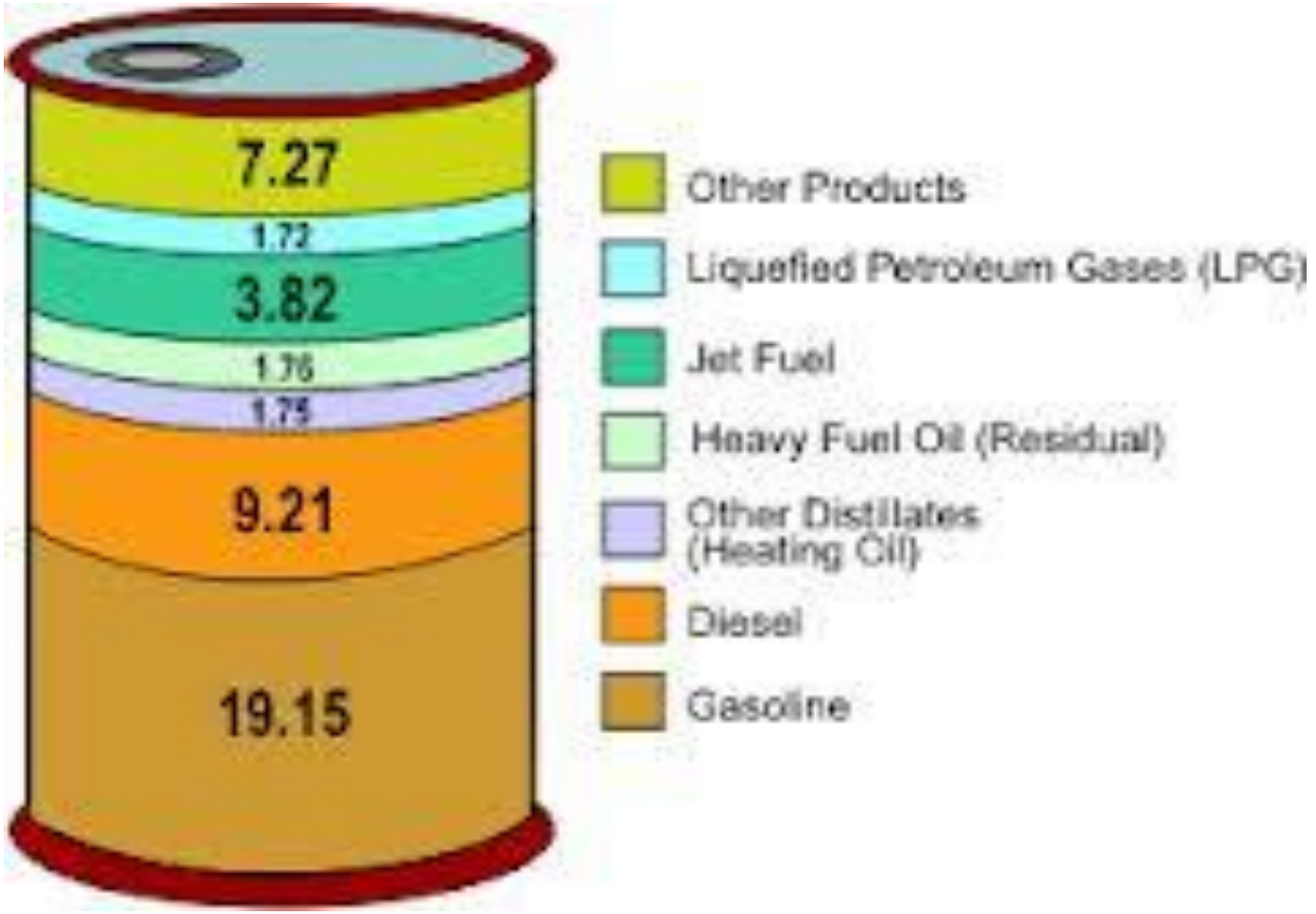
Sources of US Oil

- U.S. (~18.5 MM bbl /d)
  - Domestic production: 11.1 MM bbl /d **(60%)**
  - Imports (net): 7.4 MM bbl /d **(40%)**
    - Canada ~ 34 %
    - Saudi ~ 18 %
    - Venezuela ~ 12 %
    - Russia ~ 6.5%
    - Mexico ~ 6.3%
      - Source: EIA

Natural Gas Data

- 2010 World Nat. Gas Consumption: 113 Tcf
  - 2040: 185 Tcf **[↑ 64%]**
- 2012 US
  - Production – 29.5 Tcf (~80.9 Bcf / d)
  - Consumption – 25.5 Tcf (~69.9 Bcf / d)
    - Electricity generation: 39%
    - Industrial uses: 31%
    - Residential: 18%
    - Commercial: 12%
  - Note: domestic production / consumption almost balance
    - Natural gas: more "home grown" and less transportable … ***WHY?***

1 bbl of Crude Oil =



Surprising Crude Oil Products

- Ink and crayons
- Aspirin and vitamins
- Dishwashing liquids and detergents
- Deodorant, lipstick, toothpaste, perfumes, hair color, shaving cream, nail polish
- Footballs, basketballs, fishing rods, golf balls, tennis rackets, football helmets, skis
- Umbrellas
- Soft contact lenses
- Clothes (incl. shoes, sweaters) and purses
- Toilet seats
- Artificial limbs
- Candles
- Antihistamines
- Artificial turf
- CD's and DVD's
- Guitar strings

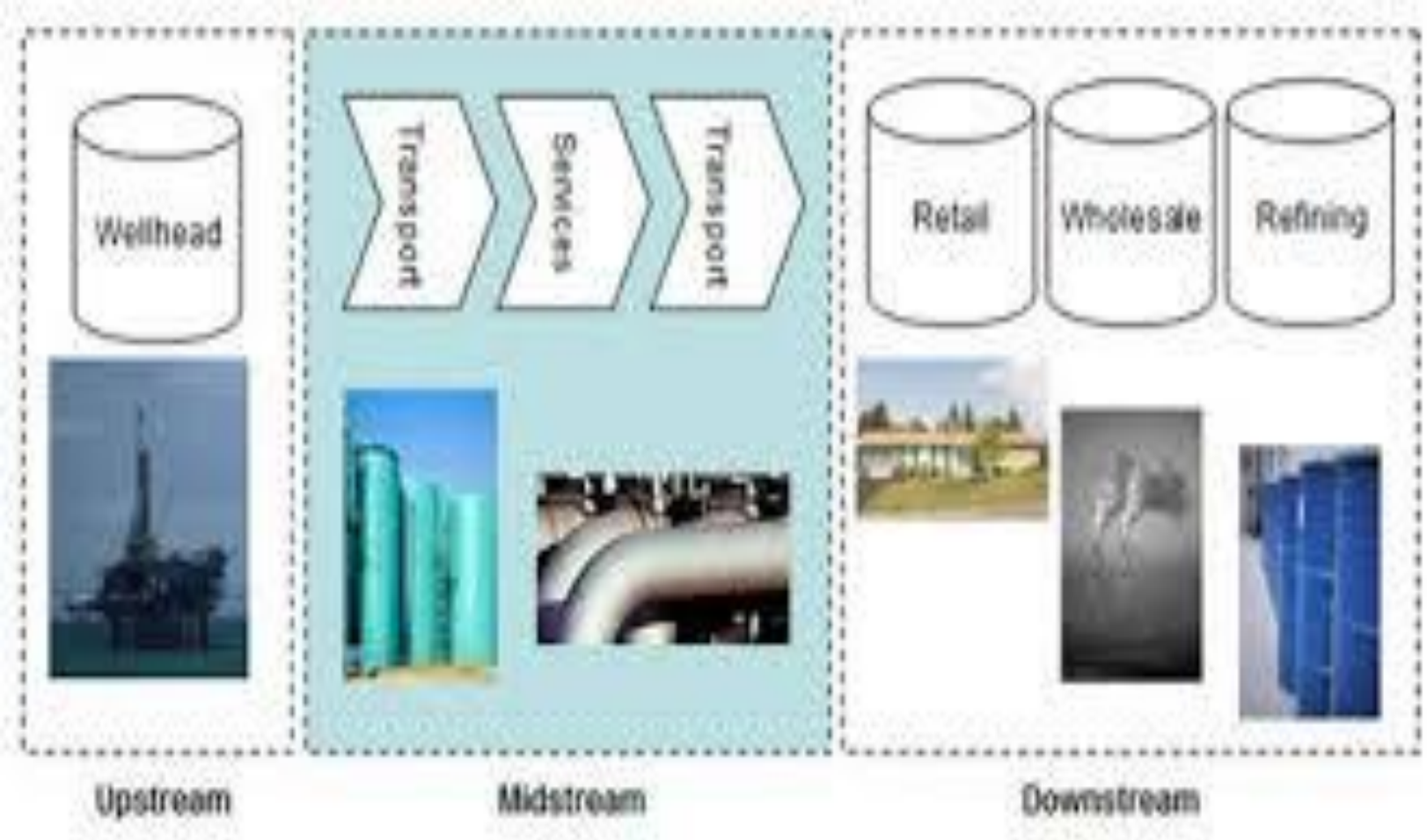
Top Producing States (2011)

- **Crude Oil (bbls)**
  - Texas
  - Alaska
  - California
  - N. Dakota
  - Oklahoma
  - New Mexico
  - Louisiana
  - Wyoming
  - Kansas
  - Colorado
- **Natural Gas (MMcf)**
  - Texas
  - Louisiana
  - Wyoming
  - Oklahoma
  - Colorado
  - Pennsylvania
  - New Mexico
  - Arkansas
  - Utah
  - West Virginia

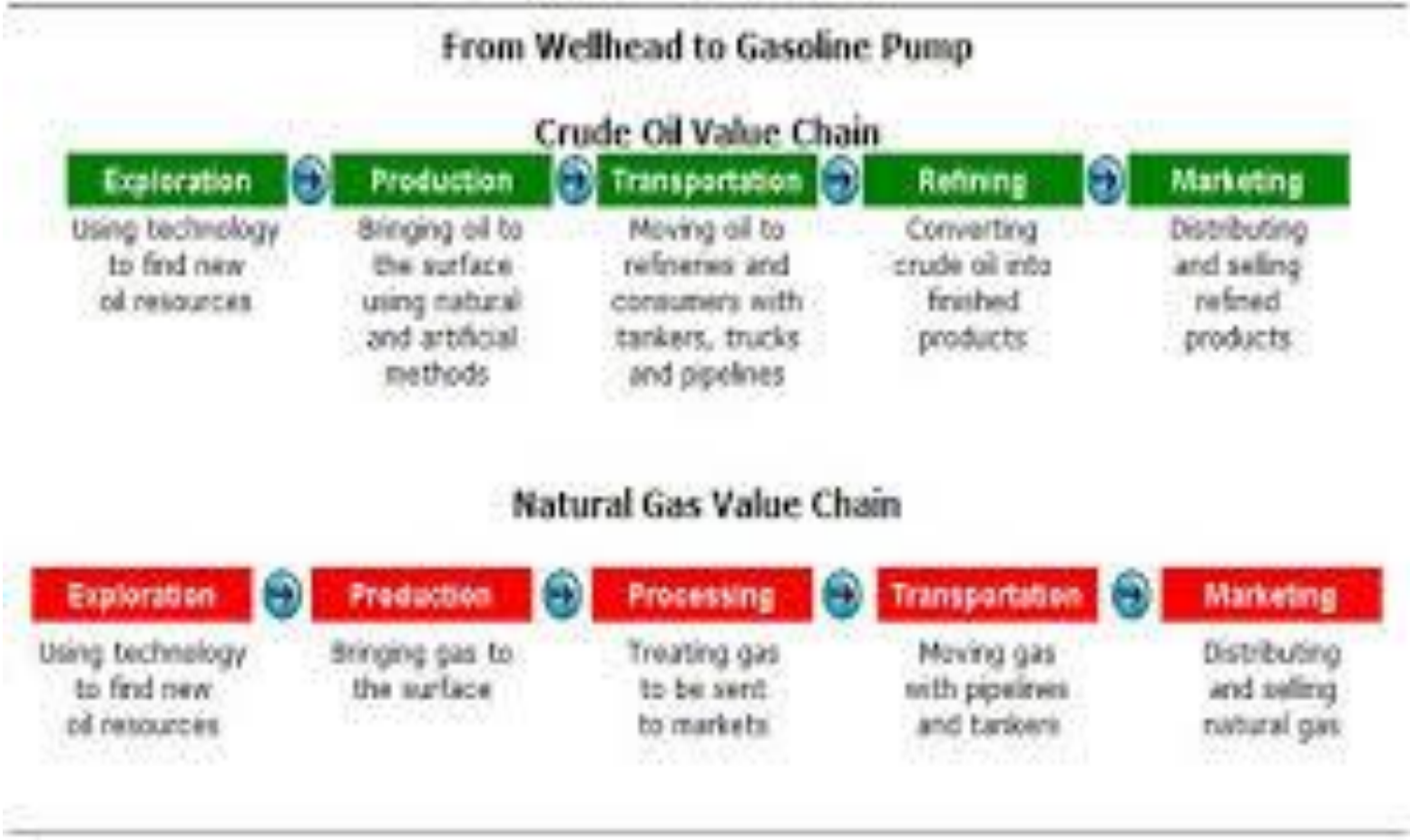
3 Phases of the O&G Industry

- **Upstream**
  - Where we'll spend most of our time
- **Midstream**
  - Affected by types of oil and gas (pp. 24 – 26)
  - Some sales occur here
- **Downstream**
  - This is where the rest of the sales occur

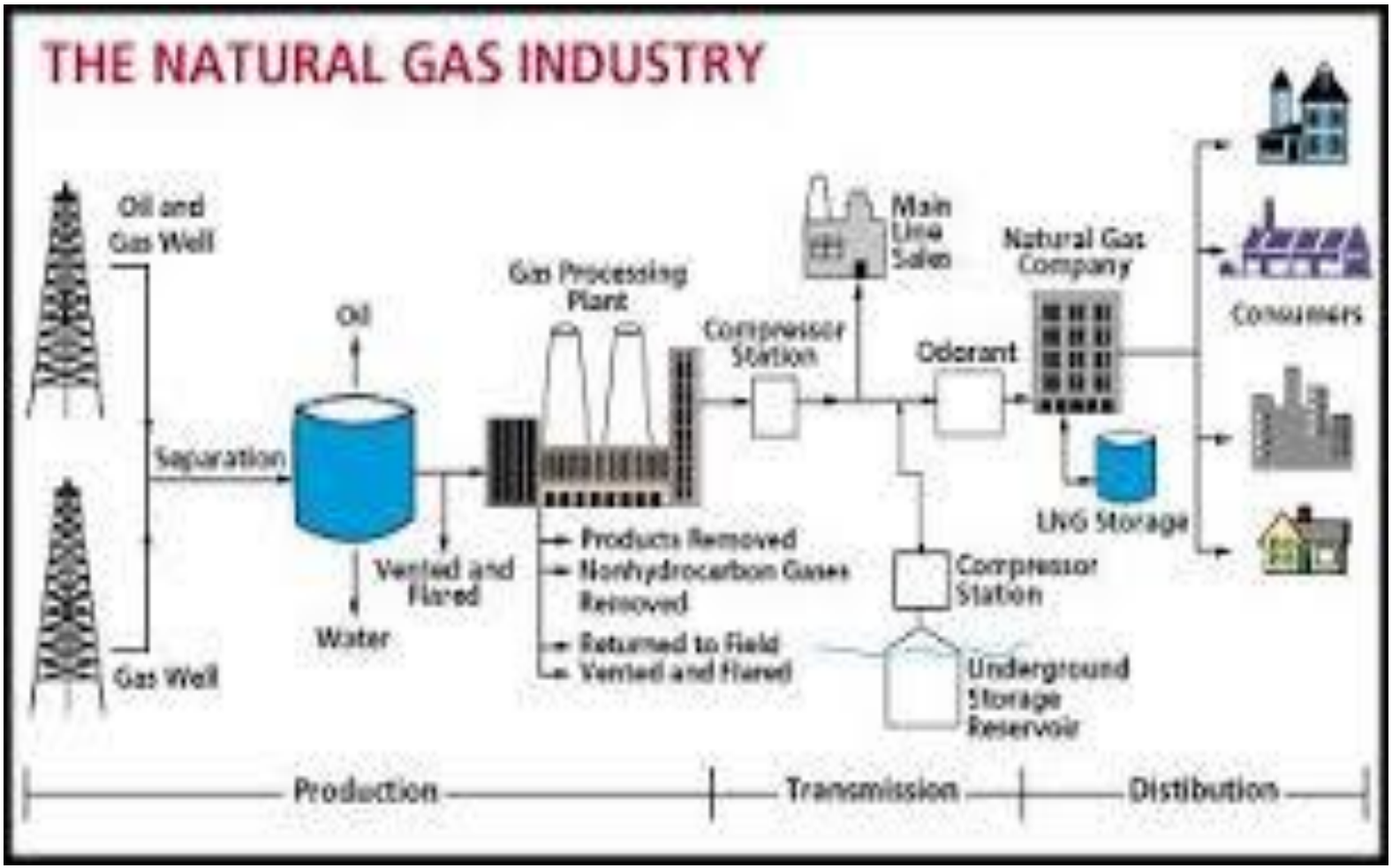
The O&G Industry – 3 Phases



The O&G Industry – 3 Phases



The O&G Industry – 3 Phases



Where Do Oil & Gas Come From?

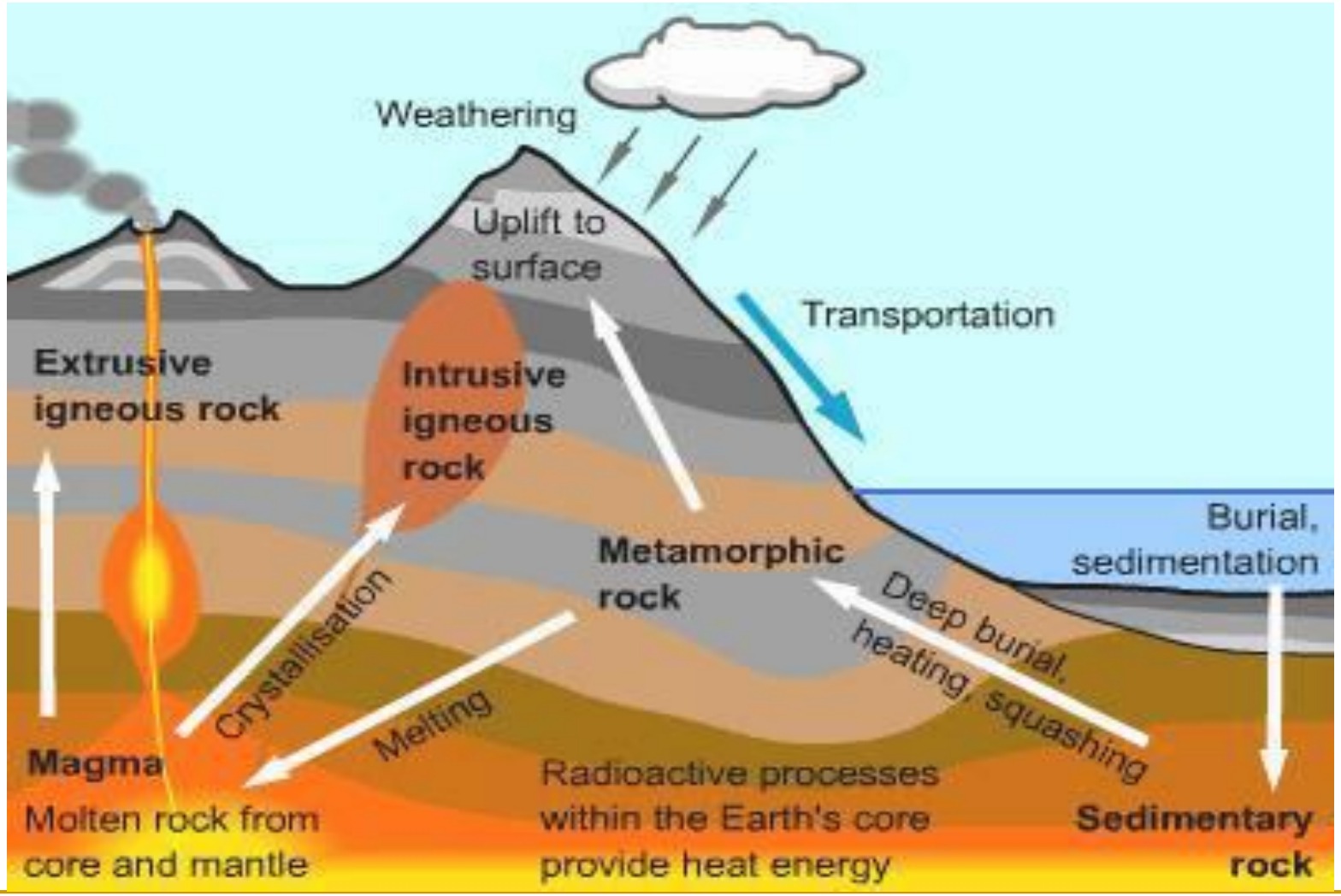
- Let's talk dinosaurs and rocks!!!

Where Do Oil & Gas Come From?

- Just as there's a "water cycle" that ranges from precipitation to evaporation, rocks undergo changes too
- The **"Rock Cycle"**
- A rock is not a rock is not a rock …
- **3 kinds of rocks … what are they?**
  - ***Hint …*** the types are NOT flat, round and jagged

The "Rock Cycle"

The "Rock Cycle" – a 2nd View

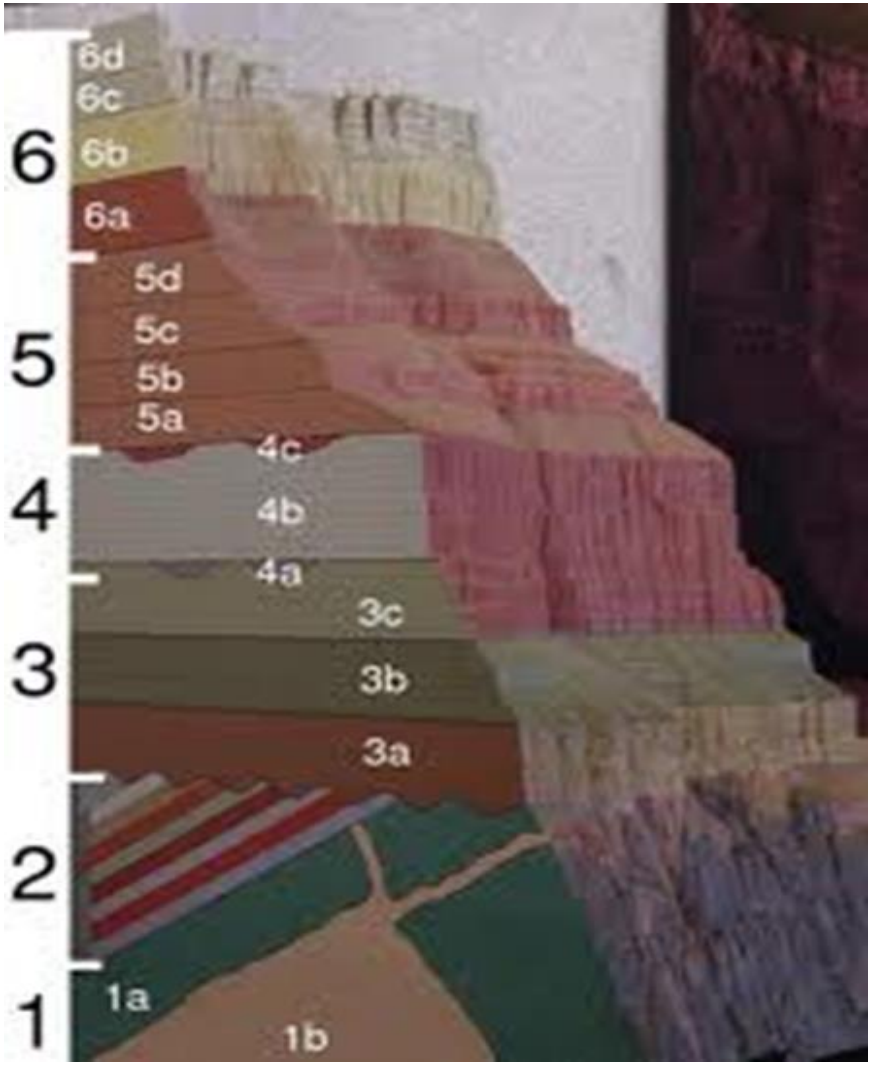


Sources of Oil & Gas – Rock Types

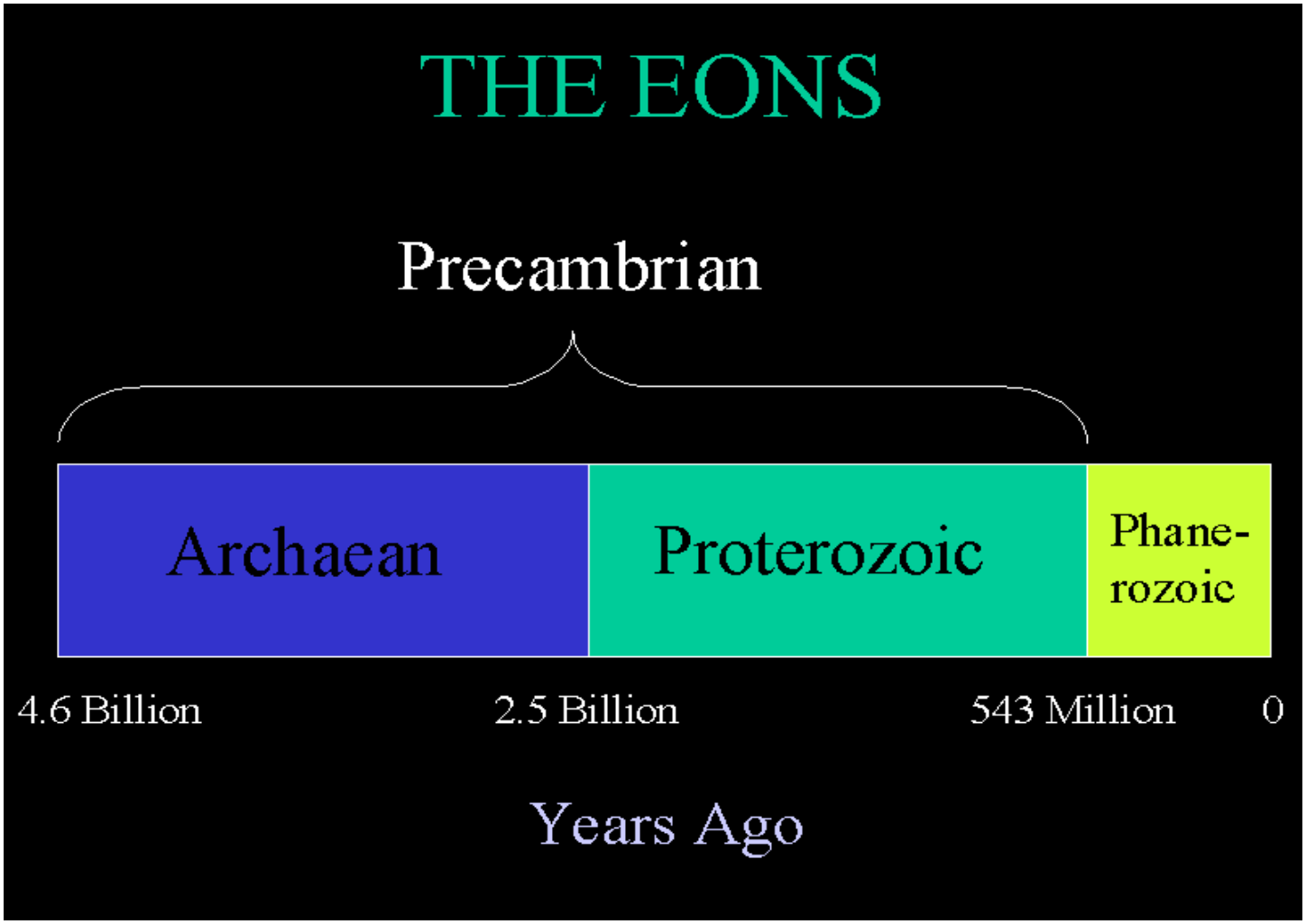
- **Igneous rocks** solidify from a molten or partially molten state
  - Characterized as either extrusive or intrusive, depending on whether they solidified above ground or below the surface
  - Examples: granite; basalt
- **Sedimentary rocks** are formed through erosion and deposition. Wind, water, ice, and chemicals break down existing rock into sediment that is then transported and deposited by wind, water and glaciers.
  - As sediment accumulates over time, it becomes compacted and cementer, eventually forming rock
  - Examples: shale, sandstone, limestone
- **Metamorphic rocks** are those altered by heat/ pressure and/or chemical action of fluids and gases.
  - Examples: slate and marble

Rock Formations and Stratigraphy

- Once rocks form
  - Then they layer
- **Weight**
- **Pressure**
- **Heat**



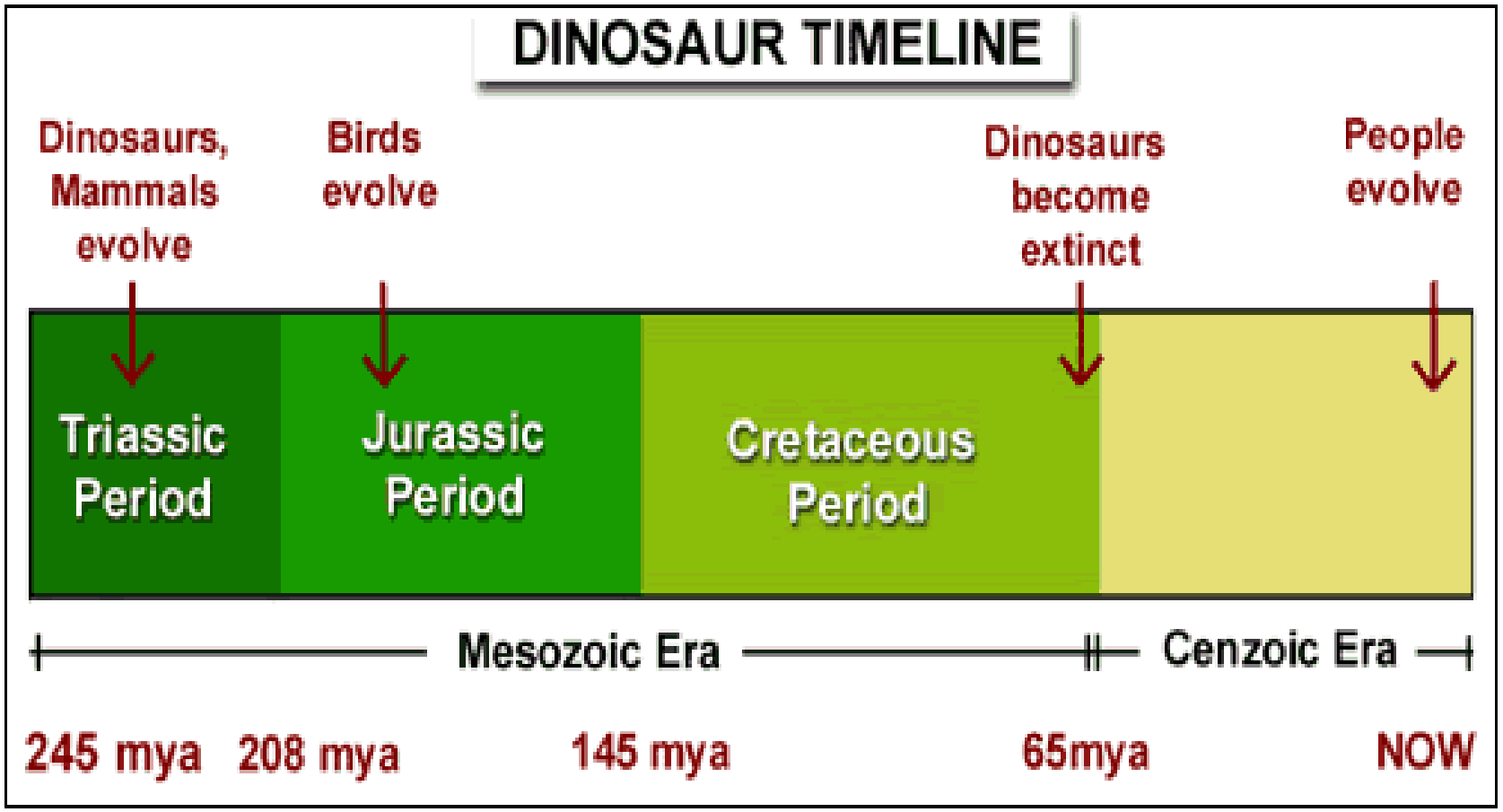
The 2nd Element – Dinosaurs!



Timeline of Eras and Periods Within the Phanerozoic Eon

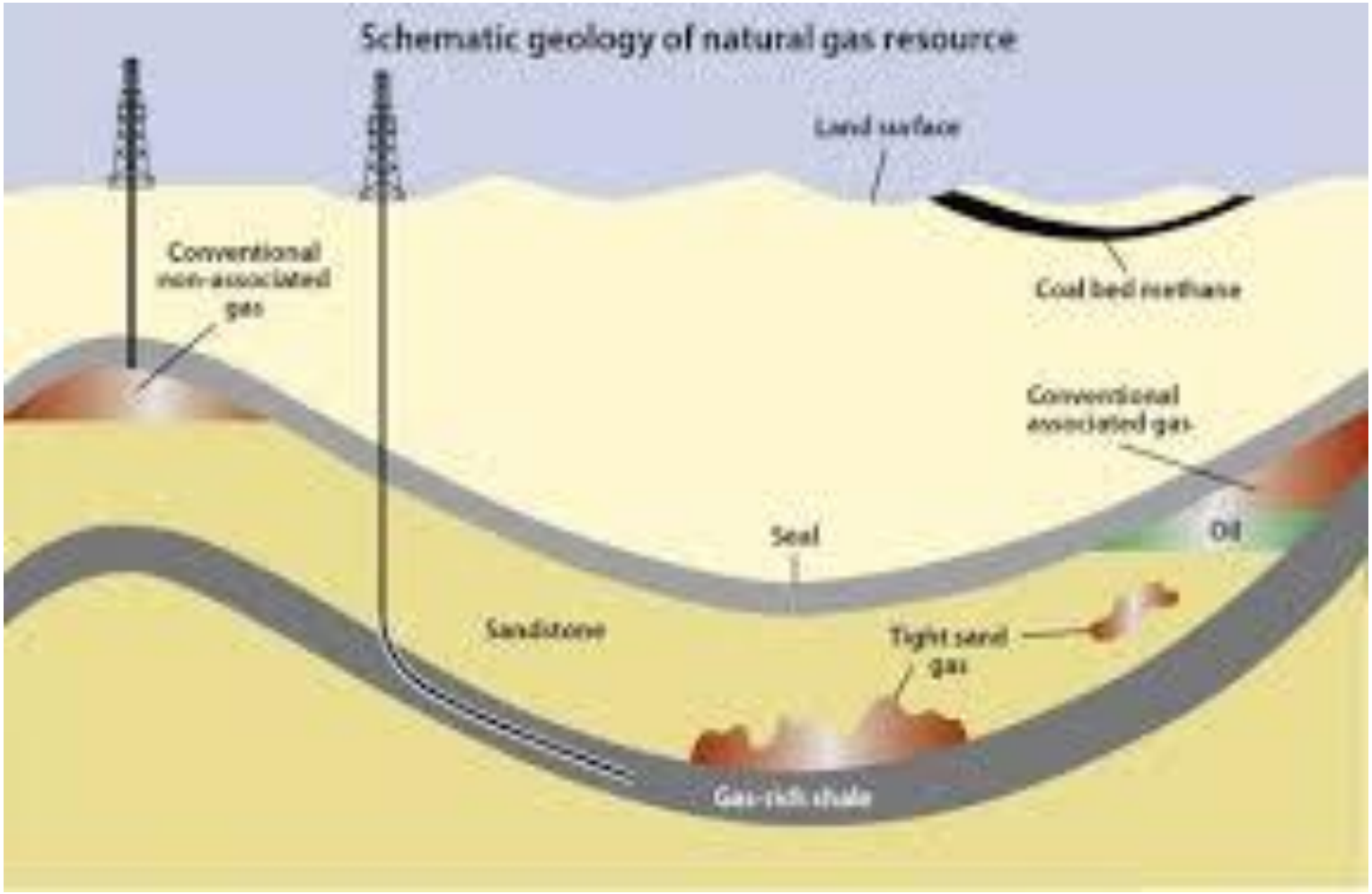
ERA	PERIOD	START OF EACH PERIOD (in millions of years)	FLORA & FAUNA
Cenzoic	Quarternary	1	Modern species of mammals, extinction of large forms, such as mammoth; dominance of human
	Tertiary	54	Rise of birds and placental mammals
Mesozoic	Cretaceous	65	Dominance of flowering plants; extinction of large reptiles and ammonites by end of period
	Jurassic	145	Reptiles dominant on land, sea and in air; first birds; archaic mammals
	Triassic	208	First dinosaurs, turtles, ichthyosaurs, plesiosaurs; cycads and conifers dominant
Paleozoic	Permian	245	Radiation of reptiles, which displace amphibians as dominant group; widespread glaciation
	Carboniferous	286	Ferns as dominant plant group; sharks and crinoids abundant; radiation of amphibians; first reptiles
	Devonian	360	Age of fishes (mostly freshwater); first trees and first amphibians
	Silurian	408	Invasion of the land by plants and arthropods; braciopods; primitive jawless vertebrates
	Ordovician	438	Appearance of vertebrates (armoured fishes); brachiopods and cephalopods dominant
	Cambrian	505	Appearnce of all invertebrate phyla and many classes; dominance of trilobites and brachiopods;

Dinosaur Timeline



Oil & Gas Sources – Rock Movements

- Once the rocks were formed, and the dinosaurs died, then the rocks moved
- Rocks DO move and shift
  - At the surface – create mountains and hills
  - Below the surface – anticlines, synclines, faults, domes
- Oil and gas become "trapped"
- Look at Fig. 4 on p. 12 – **why are the gas, oil and water layered the way they are?**


Schematic geology of natural gas resource
Land surface
Conventional non-associated gas
Coal bed methane
Conventional associated gas
Seal
Oil
Sandstone
Tight sand gas
Gas-rich shale

O & G Production – Drives

- It's all about … ***pressure***
- Types (pp. 21 – 24)
  - Gas drive
  - Solution-Gas drive
  - Water drive
  - Combination drive

Start of the Oil & Gas Industry

- **When and Where?**
- China, 347 A.D.
  - 800 ft. deep, using bamboo poles
  - Oil burned to produce salt
- **1st commercial oil well?**
- Poland, 1853

US Oil & Gas History

- **Earliest US well?**
- Titusville, PA, 1859
- 1st Texas well?
  - "Spindletop",
  - Beaumont, 1901
- Standard Oil Business Trust
  - John D. Rockefeller
  - Teddy Roosevelt
  - "Anti-Trust"
  - Exxon, Mobil, Chevron, Arco, Amoco, Marathon

Year	Volume. (bbls.)
1859	2,000
1869	4,215,000
1879	19,914,146
1889	35,163,513
1899	57,084,428

Next Class …

- Subjects
  - Land Descriptions
  - Public vs. Private Ownership of Minerals
  - Ownership Theories
  - Ad Coelum / Rule of Capture (“RoC”)
  - RoC: Ownership After Extraction
- Assigned Reading
  - Ch. 1 Sec. D & E (pp. 49 – 67; 104 – 115)
  - Pierson v. Post [posted on class webpage]