GENERAL BIOLOGY Lecture 38 - Biosphere & Human Impact

I. Biosphere
- A. Components of the biosphere
  - 1. Narrow zone of water (hydrosphere)
  - 2. Lower atmosphere
  - 3. Fraction of the earth's crust in which organisms live
- B. Distribution of living organisms
  - 1. Breakage of one large continent, called Pangea, accidentally distributed species
  - 2. Other factors distributing species
    - a) Climate - prevailing weather conditions
      - 1) Temperature
      - 2) Humidity
      - 3) Wind
      - 4) Cloud cover
      - 5) Rainfall
    - b) Topography - shape of the land
    - c) Species interactions

II. Regions and subdivisions of the biosphere
- A. Nearctic - USA, Canada, Greenland
- B. Neotropical - Middle and South America
- C. Ethiopian - Africa
- D. Palearctic - Europe and Russia
- E. Oriental - India and Asia
- F. Australian - Australia

III. Biomes - distinct vegetational subdivisions of the six major realms
- A. Deserts - evaporation exceeds rainfall
- B. Grasslands - enough rainfall to keep region from becoming a desert, but not enough to support extensive forests
- C. Sclerophyllous (hard, tough evergreen leaves) shrublands and woodlands - semiarid regions that get more rain than deserts, but not much more
- D. Forests - different types (tropical, deciduous, evergreen)
- E. Tundra - treeless plains; low temperature and little rainfall

IV. Human impact
- A. Changes in the atmosphere
  - 1. Air pollution
    - a) Smog - pollutants trapped beneath a layer of warm air in the atmosphere
      - 1) Industrial smog (gray) - from fossil fuel (killed 4,000 people in London in 1952). Cool climates
      - 2) Photochemical smog (brown) - from nitric oxide produced from combustion vehicles (cars). Warm climates
  - 2. Acid deposition - from burning of fossil fuels in power plants and vehicles
    - a) Produce sulfur and nitrogen oxides which are converted to acids
    - b) Acid rain results - has killed all fish in 300 lakes of the Adirondack Mountains of New York
  - 3. Damage to ozone (the ozone "filters out" damaging UV radiation)
    - a) Prime suspect - chlorofluorocarbons [CFC] (propellants in aerosols, and used in making Styrofoam)
    - b) One chlorine from CFC can convert three ozone molecules to oxygen
    - c) Results - depletion of ozone (already detected in Antarctica), skin cancer and cataracts (already apparent)
- B. Changes in the hydrosphere (distribution of water)
- C. Changes in land (forest vs. agriculture & waste management)
- D. Energy
  - 1. Nonrenewable (79%) - oil (32%), coal (26%), natural gas (17%), and nuclear (4%)
  - 2. Renewable (21%) - biomass (15%), and hydropower (6%)
- E. War ????
- F. Recombinant DNA ???? Sustainable Agriculture ????