GEOLOGY 115

COLORED GEMSTONES

A - Z

AGATE

- Cryptocrystalline aggregate of quartz
- Translucent to opaque
- Banded, multicolored
- Lots of named types
  - Ex. Botswana Agate
  - Ex. Mexican Lace Agate
- Good jewelry stone

AMBER/AMETRINE

- AMBER
  - Organic, fossilized resin from Baltic or Dominican Republic
  - Soft, sensitive to chemicals
  - Many enhancements and imitations
- AMETRINE
  - Bi-colored variety of quartz from Bolivia
  - Can be cut to separate or blend colors
  - Synthetics are made

AMETHYST

- Purple, single crystal quartz
- Many shades such as:
  - Siberian
  - Rose d' France
- Good jewelry stone
- Brazil, Uruguay & Zambia major sources
- Fashioned in many ways
- Birthstone for February

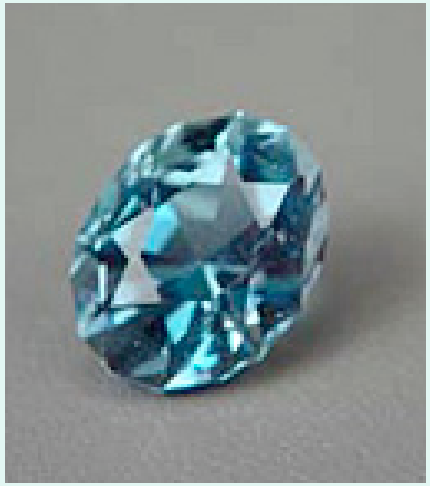
AMMOLITE/ANDALUSITE

- AMMOLITE:
  - **Fossilized ammonite shell, Canada is major source**
  - **Iridescent**
  - **Stabilized for durability**
- ANDALUSITE
  - **Pleochroic**
  - **Lesser known jewelry stone**
  - **H = 7.5**
  - **Brazil is major source**

APATITE

- APATITE
  - **Delicate gem: H = 5, cleavable, heat sensitive**
  - **Phosphate mineral (similar to that in your teeth)**
  - **Yellow, green and blue green**
  - **Cat’seyes occur**

AQUAMARINE



- BLUE GREEN TO BLUE BERYL
  - H = 7.5 Good jewelry stone
  - Colors from pale to medium dark
  - Transparent to opaque
  - Fashioned many ways
  - Brazil is major source, Africa, for darker stones
  - Generally heated
  - March Birthstone

AXINITE/AZURITE

- AXINITE
  - Rare collector stone
  - H = 7, RI = 1.68, would be good jewelry stone if common
  - Mexico is major source
- AZURITE
  - Very soft H = 3.5
  - Useable in jewelry if “silicated”
  - Color from copper

BARITE/BENITOITE

- BARITE
  - Fragile collector stone, (not rare)
  - H = 3
  - Cleavable
- BENITOITE
  - Rare collector stone, (not excessively fragile)
  - One mine site, in California
  - High dispersion

BRAZILIANITE/CALCITE

- BRAZILIANITE
  - **Fragile collector gem**
  - **Major source is Brazil**
  - **Idiochromatic- yellow**
- CALCITE
  - **Common as component of limestone, marble**
  - **Fragile collector gem in single crystal form**
  - **BR = .172**
  - **Extreme facet doubling**
  - **Used in dichroscopes**

CHALCEDONY

- Cryptocrystalline aggregate of quartz
- Single color, translucent
  - Several named forms: Holly and other blue chalcedonies, chrysoprase, gem silica, carnelian
- Excellent jewelry stone

CHRYSOBERYL

- Durable and brilliant jewelry stone, H = 8.5
- Most common in yellow shades
- Cat'seyes highly valued
- Color change variety is Alexandrite
- Sri Lanka is today's main source, some from Africa
- Rare bright green form colored by Vanadium

CITRINE

- Yellow to orange variety of single crystal quartz
- Usually heated amethyst
- Good jewelry stone H = 7
- Major source is Brazil
- Alternate November Birthstone

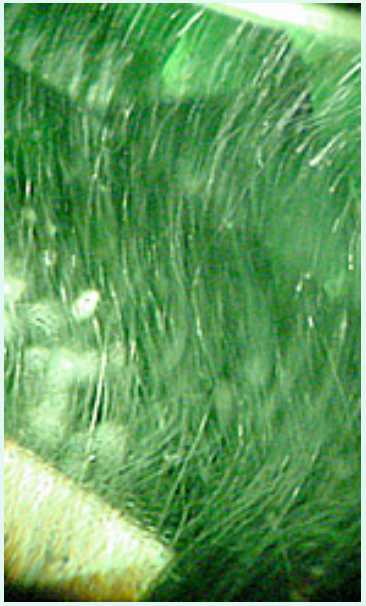
CORAL

- Two types both organic:
  - Calcareous or stony coral
    - Calcium carbonate
    - White, pink, red
    - Often dyed or simulated
  - Proteinaceous coral
    - Made of hair-like protein
    - Heat sensitive
    - Black, gold,blue
    - Sometimes bleached

CUPRITE/DANBURITE

- Cuprite
  - Rare and fragile collector stone
  - Dense SG = 6.0
  - Semi-metallic luster
- Danburite
  - Lesser known gem, but good jewelry stone H = 7, tough
  - Colorless, yellow and rarely pink
  - Many sources

DEMANTOID GARNET



- Most valuable form of garnet, especially if Russian origin
- Green to yellow green color
- High dispersion and luster
- Horsetail inclusions diagnostic of Russian source, increase value

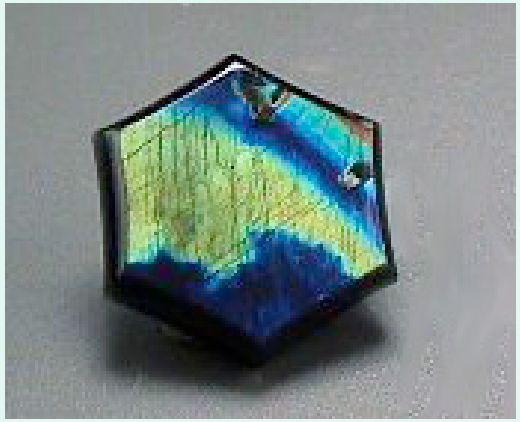
DIASPORE/DIOPSIDE

- Diaspore
  - Rare color change variety from Turkey
  - Light pink-tan to light teal green
  - Reasonably durable
- Diopside
  - Chrome green type is popular as simulant of Tsavorite, but more delicate
  - Cat’seye variety occurs

EMERALD

- Chromium or Vanadium containing beryl of medium or darker color (lighter = green beryl)
- Virtually always oiled
- Gentle-care gem
- Major sources are Colombia, Zambia and Brazil
- May Birthstone

FELDSPAR-1



- Amazonite
  - Microcline
  - Colored by lead
  - H = 6
- Labradorite
  - Plagioclase
  - Directional shiller
  - Spectrolite has vivid colors

FELDSPAR-2

- Moonstone
  - Orthoclase
  - Shows adularescence
  - Near transparent to opaque
  - Blue and “true” rainbow most valuable
- Sunstone
  - Oligoclase
  - Shows aventurescense
  - Transparent material from Oregon, with and without “shiller”
  - Translucent and opaque from Tanzania and India

FLUORITE/FOSSIL ORGANISMS

- Fluorite
  - Soft and cleavable
  - Many colors
  - Widely distributed
- Fossil Organisms
  - Animals, plants, microbes
  - Many processes of fossilization
    - Petrifaction
    - Impressions
    - Casts

GARNET (ALMANDITE/PYROPE)

- Traditional garnet varieties
- Medium dark to dark red with brownish tones
- Can be very dark
- Historically important
- Good jewelry stone
- Birthstone for January (all forms)

GOLDEN BERYL/GROSSULAR GARNET

- Golden Beryl (Heliodor)
  - Often irradiated white beryl (Goshenite)
  - Good jewelry stone
- Grossular Garnet
  - Colorless, yellow, orange and light green
    - **Colorless is rare "leucogarnet" collector stone**
    - **Orangey Hessonite has "treacle" inclusions that are diagnostic**

GASPEITE/GLASS(NATURAL)

- Gaspeite
  - Iron and Nickel carbonate mineral
  - Unique color popular in "Southwestern" jewelry
  - Sources: Canada, Australia
- Natural Glass
  - Several types
    - **Moldavite & other tektites**
    - **Libyan Desert Glass**
    - **Obsidian**
  - Bubbles and swirl inclusions

HAUYNITE/HEMIMORPHITE

- Hauynite
  - Ultra-rare collectors stone
  - Constituent mineral of lapis lazuli
- Hemimorphite
  - Zinc containing mineral
  - Fluoresces bright orange
  - Similar in appearance and sometimes confused with Smithsonite

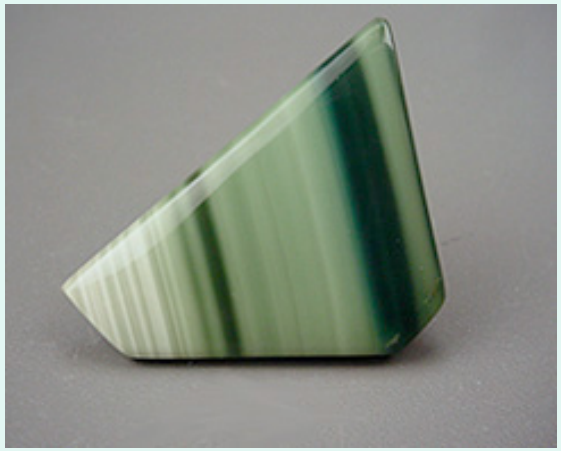
IOLITE

- Extremely pleochroic gem
- Good jewelry stone H = 7
- Frequently too light or too dark
- Major sources: Sri Lanka, India, Madagascar

JADE

- Jadeite
  - More valuable type
  - More saturated colors, greater translucency possible
- Nephrite
  - Wider range of colors
  - Less expensive
- Both are sometimes bleached, dyed and/or stabilized (more likely with jadeite)
- Both are exceptionally tough aggregates

JASPER



- Cryptocrystalline quartz aggregate
- Opaque solid color or patterned
- Many named types
  - Imperial, Biggs, Bloodstone, Mookaite, Plum Blossom
- Excellent jewelry stone

KORNERUPINE/KUNZITE

- Kornerupine
  - **Rare collector stone, mostly olive green to brown**
  - **Rarest are African stones with teal/lavender pleochroism**
  - **Tough enough for some jewelry use**

Kunzite

- **Pink spodumene**
- **Cleavable so gentle wear needed**
- **Moderate fading due to light**

KYANITE/LARIMAR

- Kyanite
  - Rare material in gem quality
  - Noted for directional hardness H = 5 & 7
- Larimar
  - Gem blue variety of mineral pectolite
  - Found only in Dominican Republic

LAPIS LAZULI

- A rock, not a single mineral
- Ancient gem
- Often contains white calcite and/or golden pyrite inclusions
- Highest grade from Afghanistan
- “Denim” lapis from Chile
- Simulants exist

MALACHITE/MAWSITSIT

- Malachite
  - Soft copper mineral
  - Idiochromatic green due to copper content
  - Characteristic banded appearance
- Mawsitsit
  - Burmese jade containing rock
  - Single location
  - Excellent jewelry stone

MORGANITE/MYRICKITE

- Morganite
  - Light pink beryl
  - Usually heated
  - Excellent jewelry stone
- Myrickite
  - Name for rare type of chalcedony inter-grown with mercury sulfide mineral, cinnabar
  - White to brown or grey with red/orange
  - One major locale, in California

OPAL

- Amorphous hydrated silica gel
- Many varieties
  - Precious with color play
  - Common without
- Many locales
  - Australia, Mexico, Brazil, Peru, Nigeria, USA
- Fragile gem, H = 6
  - Fragility related to water content
  - Assembled stones and stabilization possible, synthetics & imitations, too
- October Birthstone

PEARL

- Pearls today are cultured, natural rare
- Saltwater and Freshwater types
- Bead and tissue nucleation processes
- Different body colors and surface iridescence (orient)
- Many enhancements, bleaching, dyeing, irradiation
- Simulants (“faux” still popular
- June Birthstone

PERIDOT

- Gem grade olivine
- Idiochromatic, colored by iron
- Relatively good jewelry stone H = 6.5 not fragile
- Major locales
  - Arizona, Pakistan, China, Norway, historically Egypt
- Birthstone for August

PETALITE/PIETERSITE

- Petalite
  - Colorless fragile collector gem
  - Fairly common mineral but not in transparent form
- Pietersite
  - Brecciated tiger'seye quartz
  - Brown, blue-grey, chatoyance with brown, red or black matrix
  - Major source: Namibia
  - Minor source: China

QUARTZES

- Numerous varieties: rose, smoky, milky, girasol, star, cat'seye, dendritic, rutilated, etc.
- All make good jewelry stones
- Some highly collectable
- Few enhancements
  - Rose and smokey can be irradiated

RHODONITE/RHODOCROSITE

- Rhodonite
  - Characteristic pink and black color,
  - Rare transparent form, nearly impossible to cut
- Rhodocrosite
  - Pink and white translucent to opaque material is common
  - Transparent material rare and delicate
  - Major sources: Argentina and Montana

RUBY

- Red, chromium containing variety of medium to dark red, corundum
  - No agreed upon line between ruby and pink sapphire
- The most valuable jewelry stone
  - Best stones (Burmese) are very slightly purplish to pure spectral vivid red, with visible fluorescence
- Enhancements, synthetics and simulants on market
- Good-excellent jewelry stone
- Birthstone for July

SAPPHIRE

- Titanium and Iron containing corundum
- Various sources and shades of blue: Ceylon, Australian, Burmese, Kashmir
- Numerous enhancements, synthetics and simulants
- Superb jewelry stone
- Most popular colored stone
- Birthstone for September

SAPPHIRE-FANCY

- Any color corundum except blue or red
  - Pure Al_20_3 is white sapphire
  - Various chromophores for colors: golden, pink, purple, green, padparashah
- Many sources
- Superb jewelry stone
- May be enhanced, synthetic or simulated

SCAPOLITE/SERPENTINE

- Scapolite
  - Colorless, yellow and light purple are natural
  - Dark purple from irradiation
  - Cat’seyes occur
- Serpentine
  - Magnesium containing aggregate silicate
  - H = 5
  - Historical jade simulant

SILLIMANITE/SINHALITE

- Sillimanite
  - Opaque to transparent forms
  - Cat'seyes valued
  - Rare, but good jewelry stone
- Sinhalite
  - Until 1952 thought to be brown peridot
  - Major source is Sri Lanka (Sinhalia = sanskrit)
  - Rare collector's stone, tough enough for some jewelry applications

SMITHSONITE/SODALITE

- Smithsonite
  - Soft carbonate mineral
  - Collector stone
  - Often botryoidal, sometimes chatoyant or drusy
- Sodalite
  - Soft, H = 5, silicate mineral
  - A constituent of lapis
  - A natural simulant of lapis
  - Idiochromatic in blue shades

SPESSARTITE/SPHALERITE

- Spessartite
  - High RI garnet
  - Orange to brownish or reddish
  - Pure orange “Mandarin” from Namibia most valuable
- Sphalerite
  - Zinc containing mineral
  - Very fragile H = 3.5 perfect cleavage
  - Diamond-like RI and dispersion
  - Red, orange, yellow and green

SPINEL

- Historically important ruby and sapphire simulant
- Beautiful, underappreciated gem in its own right
- Durable and bright gem, excellent for jewelry
- Comes in most colors except white and green
- Synthetics widely used as imitation birthstones

SPHENE/SUGILITE

- Sphene (Titanite)
  - Soft and somewhat fragile
  - High RI and very high dispersion
  - Pleochroic with high BR
- “Sugilite”
  - Purple rock with varying amounts of sugilite mineral and chalcedony
  - Most valuable material is translucent
  - Single location, S. Africa

TAAFFEITE/TANZANITE

- Taaffeite (tar-fite)
  - One of the rarest gems on Earth
  - Mistaken for spinel, until Gemologist Count Taaffe found it to be DR
  - H = 8
- Tanzanite
  - Heated zoisite, highly pleochroic
  - One locale, supply diminishing
  - Too soft and fragile for daily use rings, but gentle use OK
  - Newly adopted Birthstone for December

TOPAZ

- Hard but fragile gem, careful use in jewelry
- Pure mineral is white
- Blue topaz is result of irradiation, then heating, of white
  - Alternate Birthstone for December
- Precious topaz ranges from light yellow through peach and apricot shades to the deep orangey red of “Imperial”
  - Traditional Birthstone for November

TOURMALINE

- Complex borosilicate mineral group: major sources = Brazil/Africa
  - **Many species and varieties: achroite, indicolite, rubellite, dravite, watermelon, Liddacoatite, elbite, schorl**
- Good jewelry characteristics, H = 7.5 not extemely fragile
- Comes in every color from white through black in various grades
- Name from “turmali” = rainbow

TSAVORITE/TURQUOISE

- Tsavorite
  - Variety name for medium dark to dark green transparent grossular garnet
  - Found only in two locales in Africa
  - Relatively good jewelry stone, but not for daily wear rings
- Turquoise: December Birthstone
  - Blue to green copper phosphate mineral
  - Sensitive to chemicals, sometimes stabilized or waxed. Simulants exist.
  - With or without black to brown matrix
  - Many sources, but highest quality historically from Persia, today from Arizona

VARISCITE/VESUVIANITE

- Variscite
  - Soft hydrous aluminum phosphate
  - Colored by chromium or iron
  - Sources: Utah and Nevada
- Vesuvianite (idocrase)
  - Silicate mineral
  - Named for type locale Mt. Vesuvius
  - Many colors
  - H = 6.5

ZIRCON

- Historically important, good jewelry stone
- H = 7.5, High RI
- Heated stones: blues, yellows, reds and whites mostly, can be brittle
- Blue is December Birthstone
- Reputation unfairly tarnished by erroneous association with synthetic CZ

THAT'S ALL FOLKS!