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Isometric System

Normal Class

Cubic System:

$$a_1 = a_2 = a_3$$

$$\alpha = \beta = \gamma = 90^\circ$$

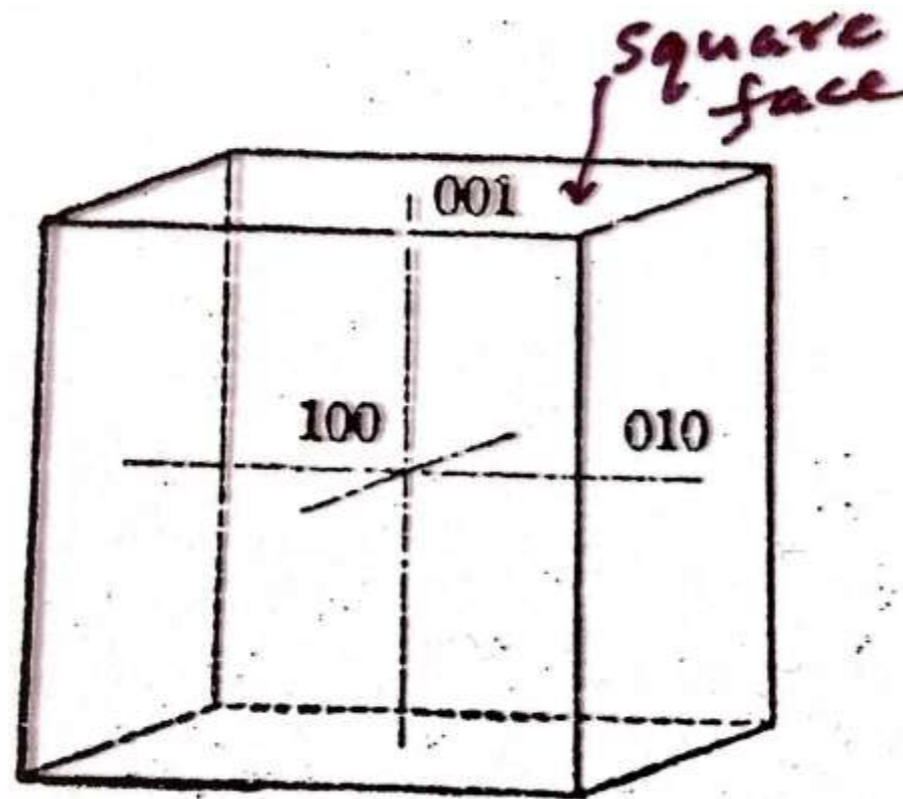
Cubic system has three symmetry classes:

1. Galena type/ Hexoctahedral class/ Normal class
2. Pyrite type/ Diploidal class
3. Tetrahedrite type/ Hexatetrahedral class

Normal Class

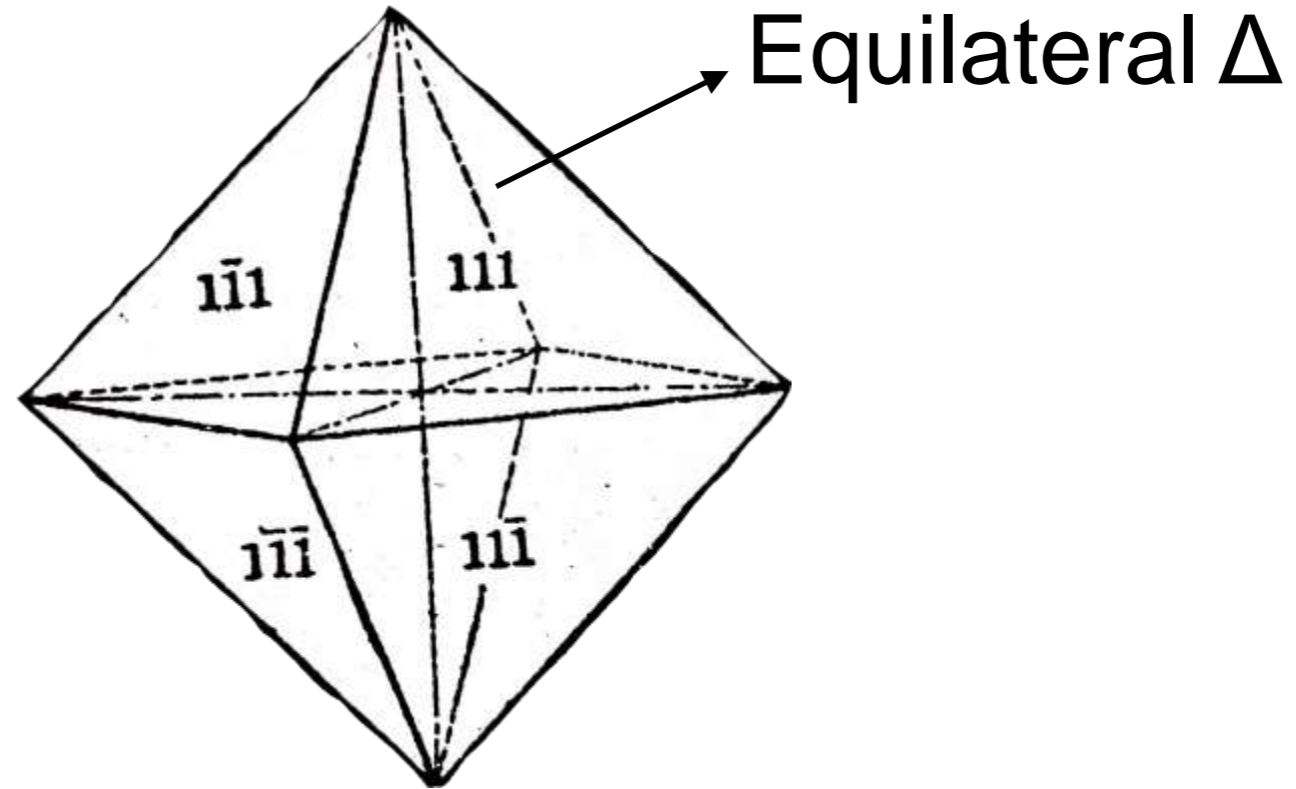
- shows highest degree of symmetry of all the crystal classes of Isometric system.
- also known as Galen type.
- forms in this class are: Cube, Octahedron, Dodecahedron, Tetrahexahedron, Trisoctahedron, Trapezohedron, and Hexoctahedron.

Cube



- 6 square faces
- 9 planes of symmetry
- 13 axes of symmetry
- Each face is parallel to an axial plane of symmetry.
- Symbol of the form (100)
- Examples: fluorite, galena, pyrite

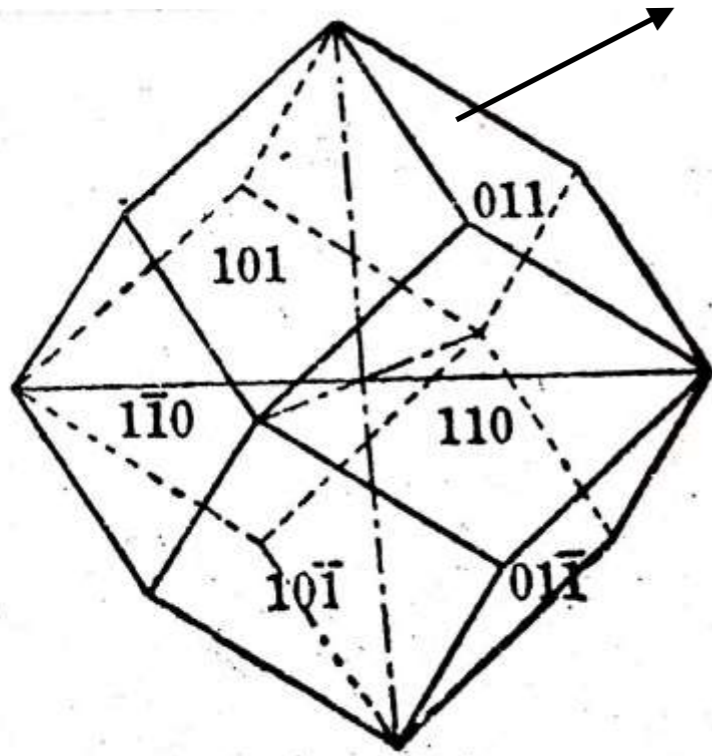
Octahedron



- 8 triangular faces; equilateral triangles
- Each face intersects all the three axes at equal distance
- Examples: diamond, spinel, gold
- Symbol of the form (111).

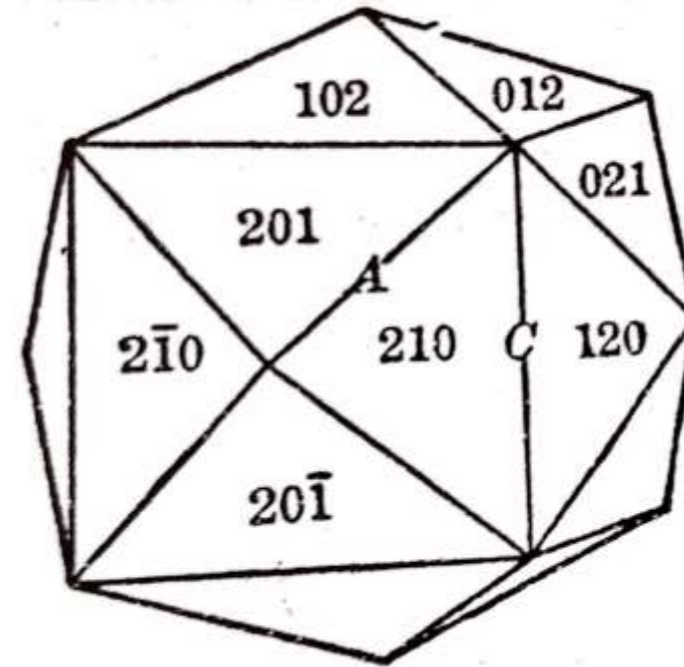
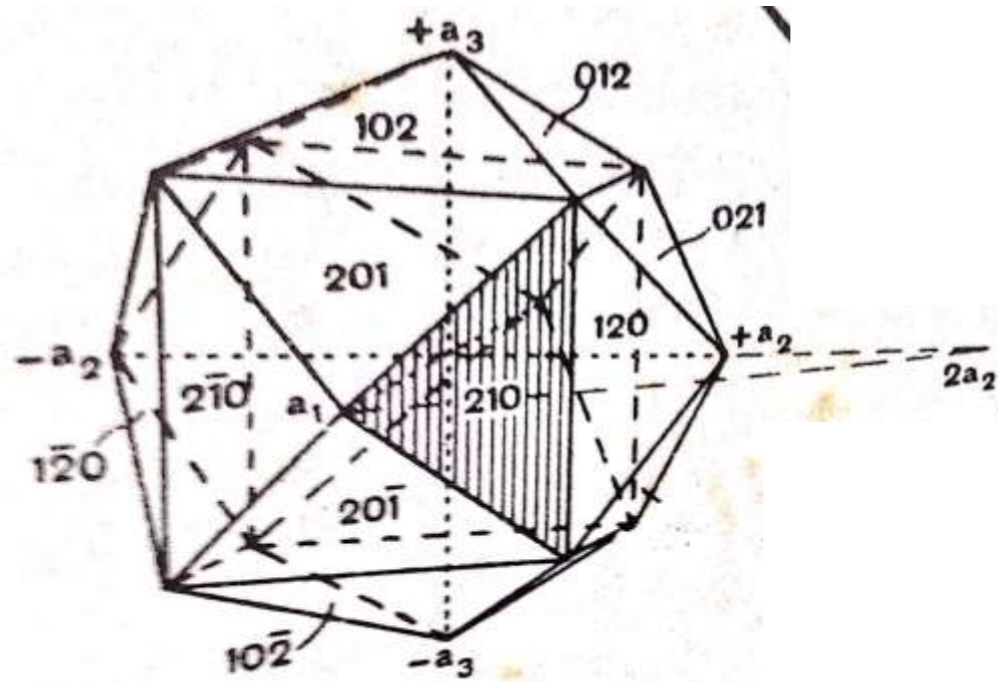
Dodecahedron

Rhomb faces



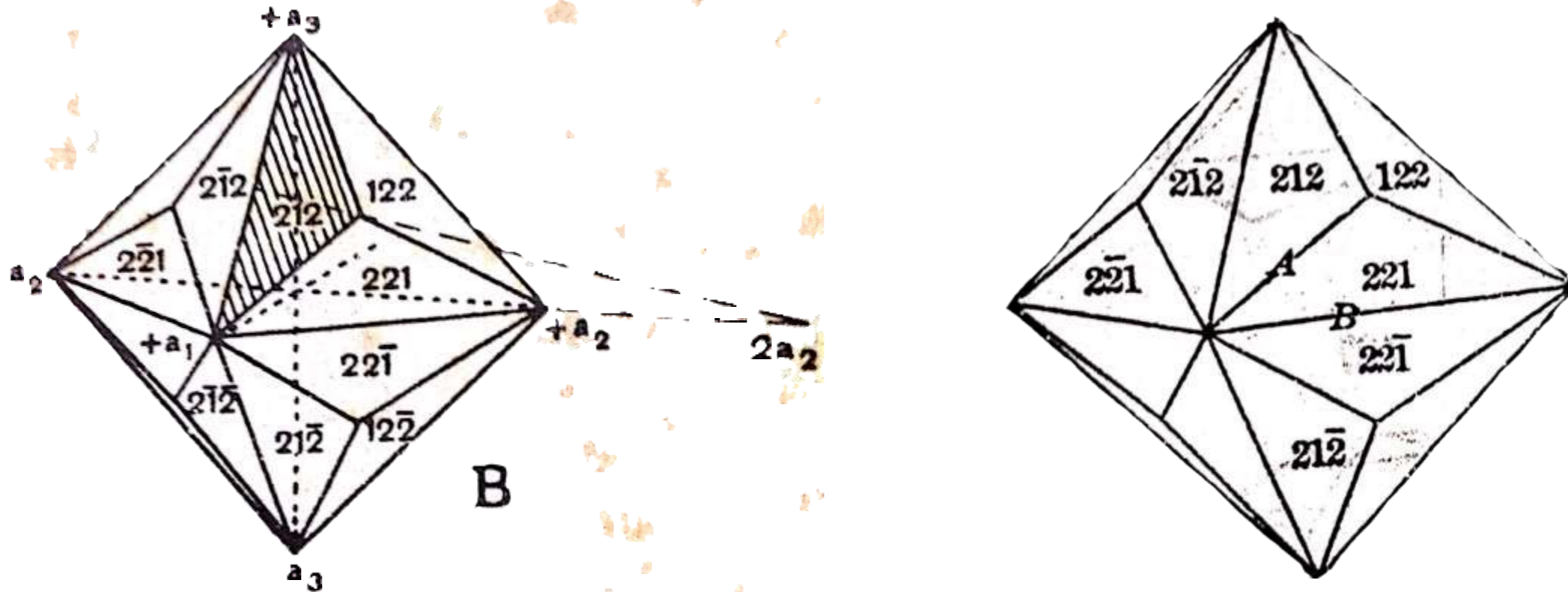
- 12 rhomb shape faces
- Each face intersects two axes at equal distance and parallel to the third axis.
- Symbol of the form is (110)
- Examples: magnetite, sodalite

Tetrahexahedron



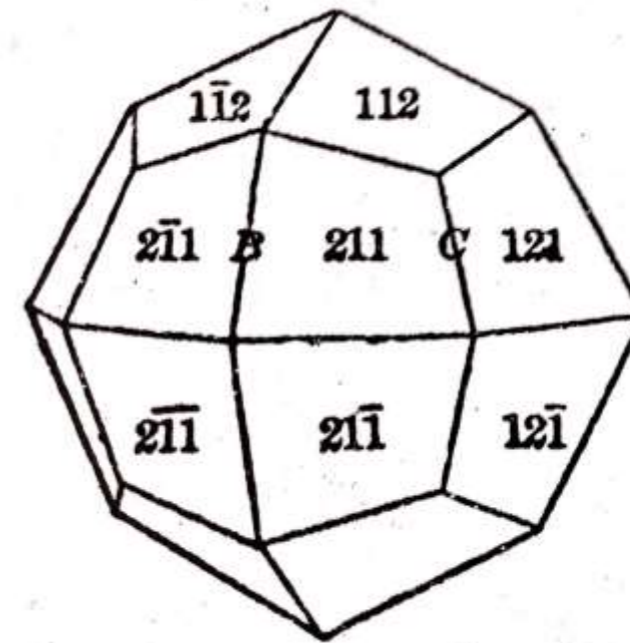
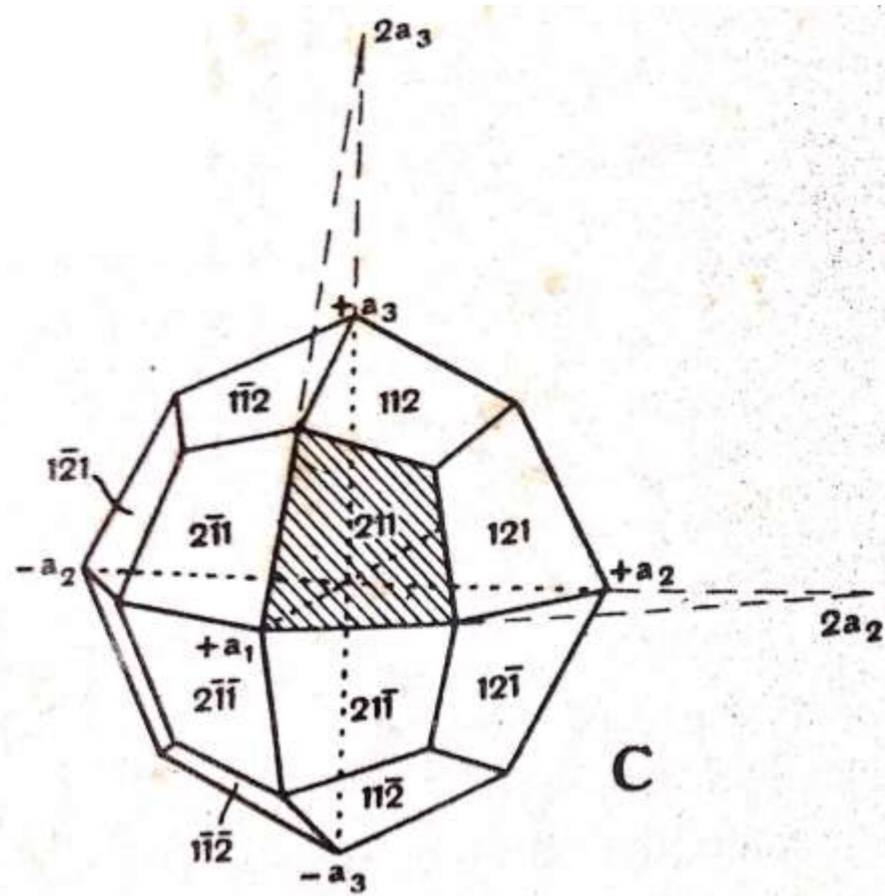
- 24 faces; isosceles triangle faces
- It can be imagined as a cube, in which each face has 4 equal sized triangles raised from the centre of the cube.
- Each face is parallel to one of the axes and intersects other two at unit distance and a multiple of unit, respectively.
- General symbol: $(hk0)$
- Examples: garnet

Trisoctahedron (aka Trigonal Octahedron)



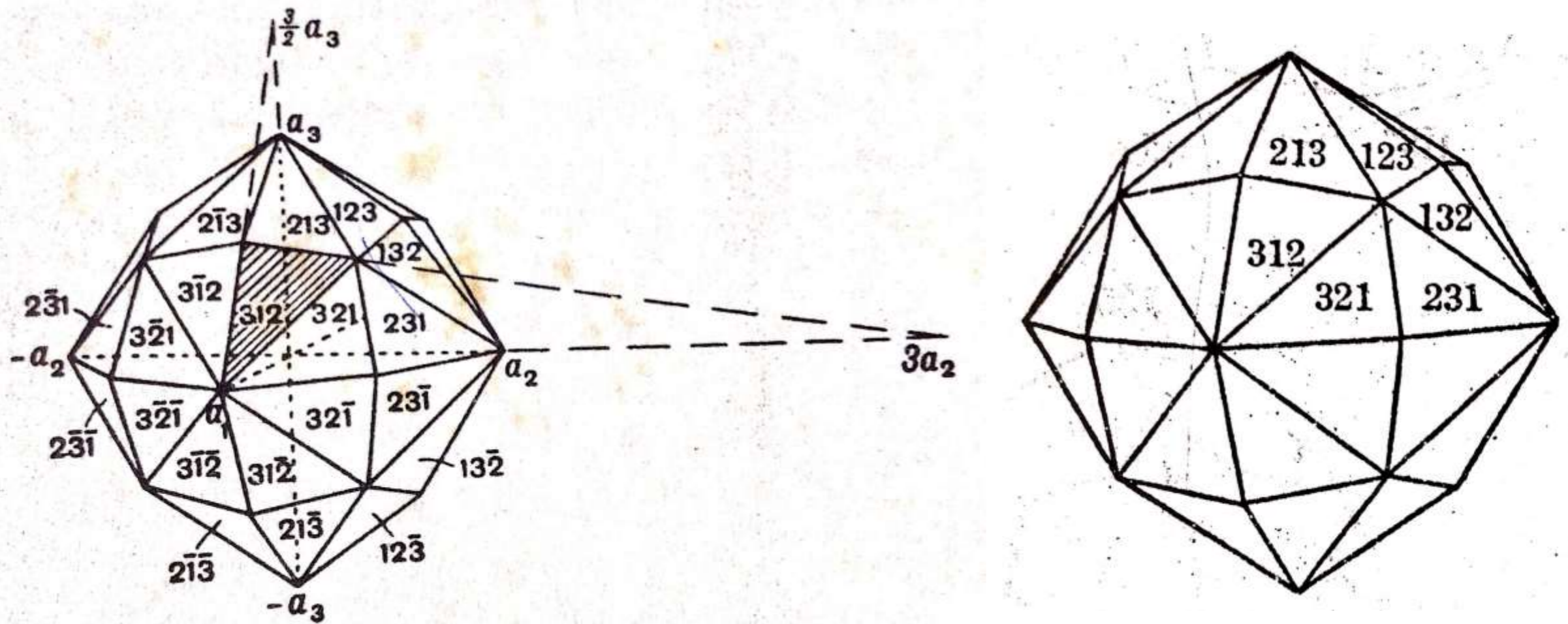
- 24 faces; isosceles triangle faces
- To more easily visualize what a trisoctahedron looks like, first think of an octahedron. Each octahedral face is divided into 3 isosceles triangles by drawing 3 lines, each originating at the center of the octahedral face and reaching the 3 corners of that face.
- Each face intersects two axes at unity, and third axis at some multiple of unity.
- General symbol: (hhl)
- Examples: diamond

Trapezohedron (aka Icositetrahedron)



- 24 similar faces; trapezium shaped faces
- Each face cuts two axes at equal length and the third one at smaller length.
- General symbol: (hll)
- Examples: leucite, analcime

Hexoctahedron



- 48 faces; scalene triangle faces
- Each face cuts the three axes at unequal lengths
- General symbol: (hkl)
- 6 faces appearing to be raised from each face of a simple octahedron. These may be envisioned by drawing a line from the center of each of the 3 edges of an octahedral face, through the face center to the opposite corner.
- Examples: garnet