PYRITE FROM TUCSON, ARIZONA

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At the Arizona-Tucson copper mine near Tucson, Arizona, pyrite crystals remarkably rich in faces have recently been found. Many of the individual crystals show representatives of all seven "fundamental" forms, and some show a total of ten forms. The crystals are rather small, averaging between an eighth and a quarter inch. However, since they are disseminated rather thickly in the calcite seams, and since the faces are very brilliant as well as numerous, good groups have the scintillating effect of a cluster of faceted gems.

The country rock at the mine is hard, dense, more or less laminated, and in places considerably brecciated. Cursorily examined, it would be named a silicified limestone. Thin sections, however, show it to be a much altered rhyolitic ash. In age it is middle or late Tertiary. Within this dense rock, as well as in its calcite seams, the pyrite occurs. When embedded in calcite, the side nearest the rock shows a rough surface with no suggestion of faces. The remaining three-quarters of the crystal is sharply developed.

Noteworthy is the presence of five distinct crystal habits. Two of them are within the rock itself. Number I is the cube striated by the pyritohedron (120) but otherwise unmodified. Number II is the pyritohedron (140) and the cube in oscillatory combination. Quite different from the crystals embedded in calcite, these two habits are simple, are dull in lustre, and are completely bounded by striated faces.

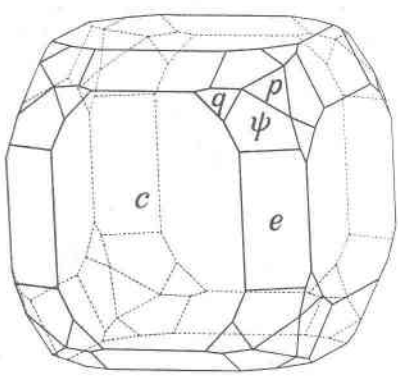
The simplest of the crystals in the calcite (habit number III) appear at first glance to be unmodified pyritohedrons (120); but examination under the binocular microscope invariably shows the presence of at least three other forms—(111), (112), and (124).

Habit IV is cubic, (100) being modified by the four faces (120), (124), (111), and (112). An idealized drawing is shown in Figure 1. The cube face is likely to be striated and terraced by the pyritohedron and diploid. Otherwise the faces are smooth and unstriated.

Habit V, shown in Figure 2, is the commonest of the five. The octahedron is the most prominent face, with six other "fundamental" forms usually determinable with the ordinary pocket lens. Ten crystals of this habit were measured on the Goldschmidt

goniometer and twenty more were examined under the binocular microscope. Twelve forms were positively identified. They are the cube (100); the pyritohedron (120); the dodecahedron (110); the trapezohedrons (112), (113), (114) and (334); the octahedron (111); the trisoctahedron (122); and the diploids (124), (123), and negative (345). The narrow trapezohedron belt between (112) and (001) is rounded and striated and shows traces of faces besides those mentioned. A similar trisoctahedron belt, (122) to (110) is likewise rounded and striated, but the commoner effect here is to eliminate (110) as a distinct face. The position of the positive diploids is sometimes occupied by a rounded corner which gives as a signal a triangular blur, ten degrees on a side. The octahedral faces may be terraced by the trapezohedron (112) and the trisoctahedron (122). In general, though, the faces are free from striations or etchings. The average number of forms per crystal is seven, with a minimum of five and a maximum of ten. (The two forms not always developed are the dodecahedron and the trisoctahedron.) The only distortion at all out of the ordinary is one in which three of the cube faces are suppressed, the symmetry then simulating that of the tourmaline class.

To put on record, then, Type V (the occurrence of the seven "fundamental" forms on one crystal) is the object of this short note.



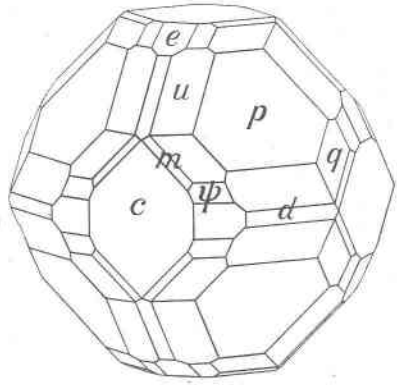


FIGURE 1. TYPE IV. Cube, *c*, (100); Pyritohedron, *e*, (120); Diploid, *ψ*, (124); Octahedron, *p*, (111); Trapezohedron, *q*, (112).

FIGURE 2. TYPE V. Cube, *c*, (100); Pyritohedron, *e*, (120); Diploid, *ψ*, (124); Octahedron, *p*, (111); Trapezohedrons, *q*, (112) and *m*, (113); Trisoctahedron, *u*, (122); and Dodecahedron, *d*, (110).