Natural Ice Crystals of Uncommon Shape[1]

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During the summer months of 1965 The University of Chicago's Cloud Physics Project was engaged in basic cloud research in northern Minnesota. On 16 August 1965, in the course of this research, several ice crystals of unusual shape were collected in an anvilled-out cumulonimbus. The ice crystals were collected from the project aircraft with a continuous cloud particle replicator using high viscosity formvar solution.

The cloud at the penetration height of 17,000 ft MSL was found to contain solid hydrometeors with few supercooled cloud drops. The liquid-water content meter registered the highest value of 0.08 gm m^{-3} while the temperature in cloud was between -10 and -10.5C. The majority of the replicas of the solid hydrometeors were irregular and broken, possibly in part because of particle breakup on impaction as they were collected at a speed of 160 mph. The individual crystals were mostly hexagonal plates, sector crystals and dendritic forms. However, we were surprised to

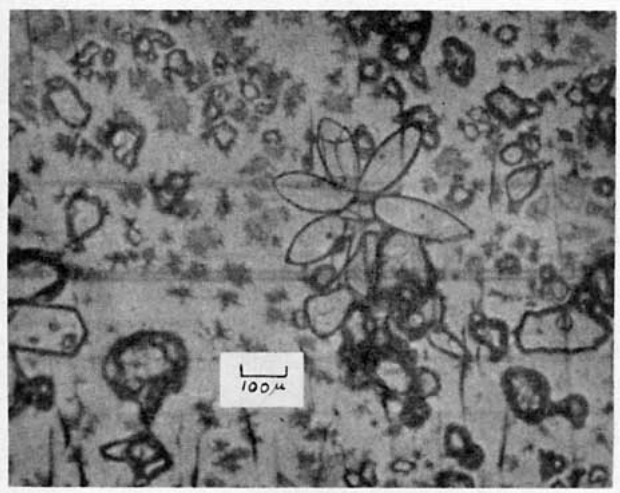

Fig. 1. "Daisy" dendrite with sharp pointed arms. Note cloud drops rimed to crystal surface.

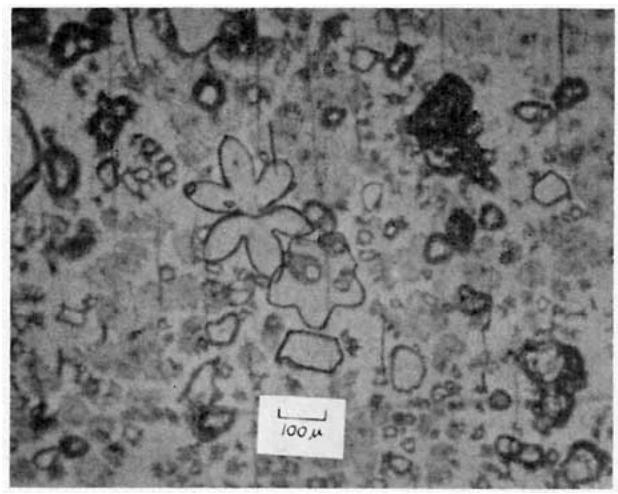

Fig. 2. Two "daisy" dendrites with rounded arms. Note broken hexagonal plate nearby.

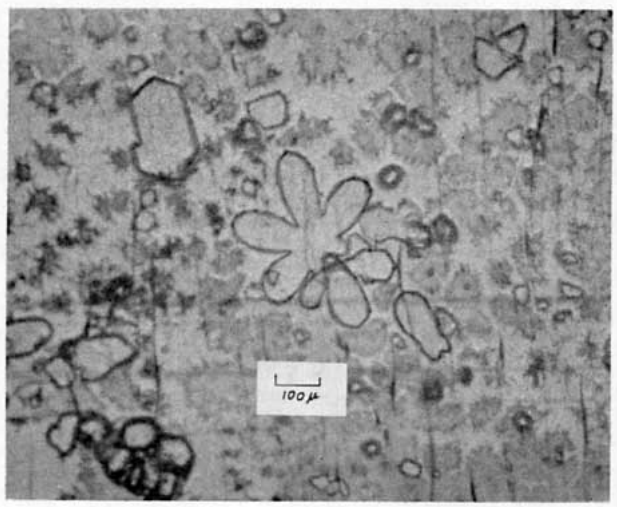

Fig. 3. Broken "daisy" dendrite and hexagonal plate.

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find several dendrities with unusual "daisy flower" shapes (Figs. 1, 2, 3).

Examination of the literature suggests that this crystal form has not previously been collected in natural clouds. We can only speculate as to their origin. The fact that hexagonal plates bearing sharp corners were collected simultaneously (Figs. 2, 3) is taken as evidence that the pointed tips did not result from partial melting or evaporation. In his studies of snow crystals Nakaya (1954) shows many examples of a similar structure at the center of large, well developed dendritites (p. 373, no. 229; p. 330, no. 65; p. 319, no. 25). He also gives a few examples which he calls "germ" crystals (p. 255, Fig. 455, nos. 1–2; p. 257, Fig. 457, nos. 1–2; p. 451, no. 851) growing in a slight vapor supersaturation, although the edges of the arms of his "germ" crystals are highly structured compared with our specimen.

The fact that the crystal form is seldom seen suggests that it represents a transitory form, which may serve as a "germ" for other crystal forms.

REFERENCE

Nakaya, U., 1954: *Snow Crystals*. Cambridge, Harvard University Press, 510 pp.