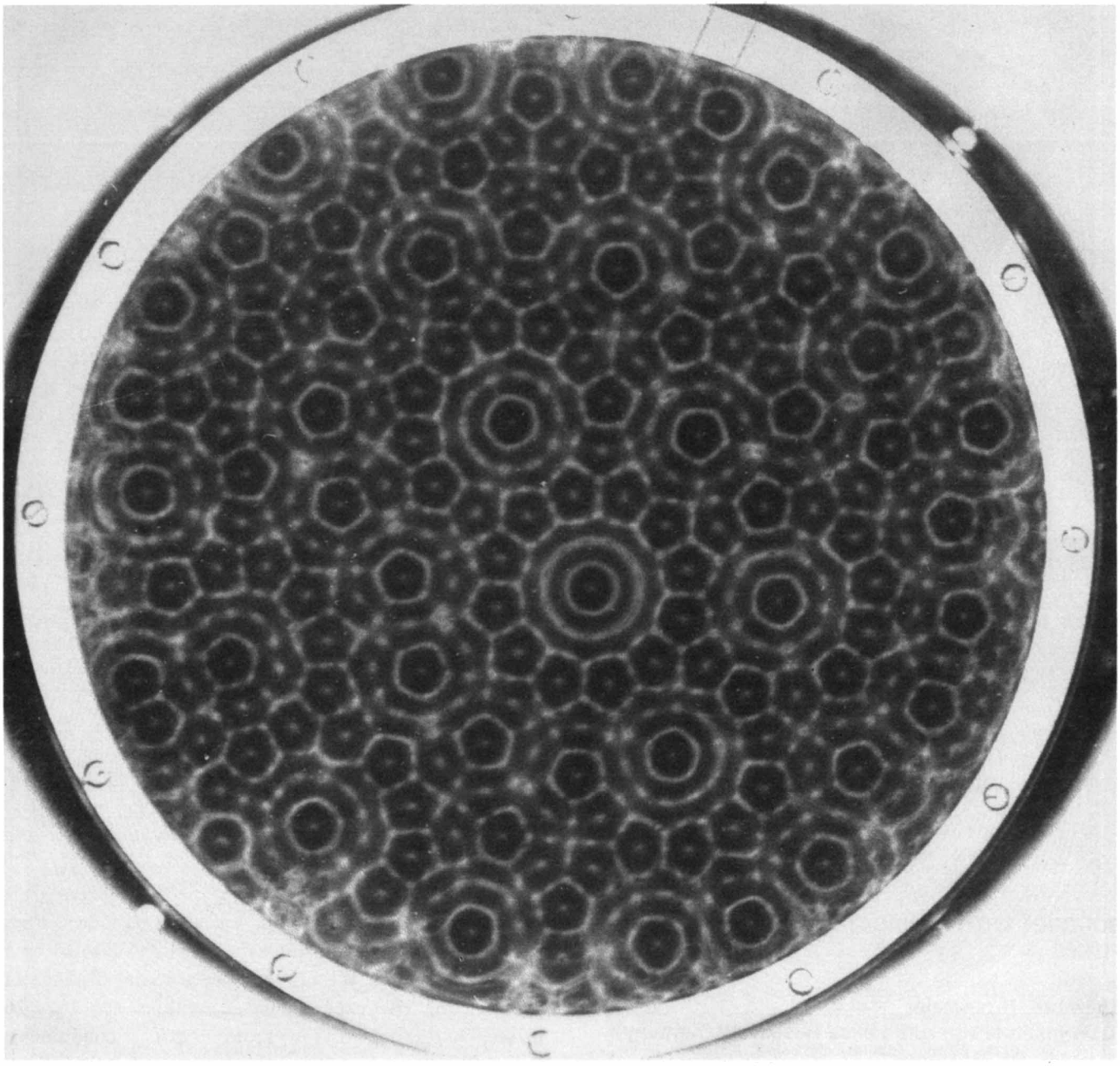

A QUASICRYSTALLINE SURFACE WAVE PATTERN

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This 12-fold quasicrystalline pattern of standing waves shows straight lines traversing the container in certain directions even though there is no discrete translational symmetry. (View the photograph from a glancing angle.) A 12 cm diam container, filled to a depth of 3 mm with a mixture of 88% glycerol and 12% water, is forced to oscillate vertically. The waves are viewed from directly above the center, looking down. Two forcing frequencies in the ratio 4/5 are used simultaneously, so that the vertical acceleration is of the form $a[\cos\chi\cos(4\omega t)+\sin\chi\cos(5\omega t+\phi)]$. Here, the frequencies are $4\omega/2\pi=120$ Hz and $5\omega/2\pi=140$ Hz, the amplitude mixing angle χ is 65°, and the relative phase ϕ is 75°. Containers of various side-wall shapes yield identical results; thus the pattern is not a finite-size or interference effect. It arises at the primary instability of the flat surface when a is increased through a critical value a_c, which is about 20 g.