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Jon Wilkening* (wilken@math.berkeley.edu), Department of Mathematics, University of California, Berkeley, CA 94720-3840. *Nearly time-periodic water waves.*

We develop a high-performance shooting algorithm to compute new families of time-periodic and quasi-periodic solutions of the free-surface Euler equations involving breathers, traveling-standing waves, and collisions of solitary waves of various types. The wave amplitudes are too large to be well-approximated by weakly nonlinear theory, yet we often observe behavior that resembles elastic collisions of solitons in integrable model equations. A Floquet analysis shows that many of the new solutions are stable to harmonic perturbations. Evolving such perturbations over tens of thousands of cycles suggests that the solutions remain nearly time-periodic forever. (Received February 17, 2013)