Optical frequency combs based on modelocked lasers have revolutionized precision metrology by enabling measurements of optical frequencies, with implications both for basic scientific questions (“Are the fundamental constants really constant?”) and for a variety of applications that range from low-noise microwave generation to trace gas sensing. Recently, new schemes for frequency-comb generation that derive combs directly from continuous-wave lasers have emerged. Generally these new frequency combs come in platforms with smaller footprints and have higher repetition rates, which is convenient for many applications outside of the laboratory; the ultimate goal of these developments is to bring combs to new applications in a chip-integrated package. I will discuss two approaches for frequency comb generation: First, I will discuss comb generation via parametric frequency conversion in Kerr-nonlinear resonators, and I will describe recent developments in our understanding of the nonlinear dynamics involved in generating and stabilizing these combs. I will present a new, extremely reliable method for spontaneous generation of soliton pulses in Kerr resonators that makes use of a phase-modulated pump laser. This technique removes the dependence on initial conditions that was formerly a universal feature of these experiments, presenting a solution to a significant technical barrier to the practical application of these combs. Then I will describe observation and explanation of ‘soliton crystal’ states with highly structured ‘fingerprint’ optical spectra that correspond to ordered pulse trains exhibiting crystallographic defects. Second, I will introduce comb generation based on active electro-optic modulation of a continuous-wave laser, in which a train of chirped optical pulses is generated and subsequently spectrally broadened to span an octave. I will describe the first self-referencing of a frequency comb of this kind. Finally, I will conclude with a discussion of avenues for further research.