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The discriminant of a trinomial of the form $x^n \pm x^m \pm 1$ has the form $\pm n^n \pm (n-m)^{n-m} m^m$ if n and m are relatively prime. We investigate when these discriminants have nontrivial square factors. We explain various unlikely-seeming parametric families of square factors of these discriminant values: for example, when n is congruent to 2 (mod 6), we have that $((n^2 - n + 1)/3)^2$ always divides $n^n - (n-1)^{n-1}$. In addition, we discover many other square factors of these discriminants that do not fit into these parametric families. The set of primes whose squares can divide these sporadic values can be seen as a vast generalization of the Wieferich primes. We provide heuristics for the density of these “sporadic” primes and for the density of squarefree values of these discriminants. This is joint work with David Boyd and Mark Thom. (Received August 29, 2013)