# TTT Diagrams

forward

Science

With **Time-Temperature-Transformation** (***TTT***) diagrams or their cousins: **Continous-Temperature-Transformation** (***CTT***) diagrams, serious steel science *and* serious steel making starts. Everything we did so far, was only a prolonged foreplay, so to speak. Fun - but not yet serious.
Like phase diagrams, TTT and CTT diagrams provide a kind of map that enables you to get oriented in the wilderness of steel alloys, structures, processes, and properties. Like phase diagrams once more, TTT or CCT diagrams are easy to read after you learned a few rules - but not so easy to calculate.
I'm going to devote several modules to this topic.

1. **The Basic Idea** or how to get there *without equations*.
   I will look at how fast some simple things happen at different temperatures. Then I will put the pieces together to deduce how fast a *phase transformation* happens at different temperatures. This produces a certain kind of diagram, and looking at that diagram kind of "from the side" will produce a TTT diagram. Then I look a bit at the differences between TTT and CCT diagrams.
2. **Theory** or doing TTT diagrams more *quantitatively*.
   I will give the derivation of the Johnson-Mehl-Avrami-Kolmogorov equation that is at the heart of TTT diagrams. Then I will reason why this many-syllable-equation is very useful but still a far cry from covering all there is about those diagrams.
3. **Applications**
   I will demonstrate that you actually can get a lot of mileage out of using questionable TTT diagrams in a fishy way. Then I will look at what it takes to do it right.
4. I will give you a basic idea of how to **construct TTT**, **CCT** and **phase diagrams** from *experimental* data.