This newsletter is brought to you by Trader Joe's candy, ski slope shuffles, and way too many pushups. Enjoy!

Ironman World Champs

The Ironman World Championship was last weekend. Just in the last couple years has Ironman changed the setup such that the women and men race on different days and in different places. This was the women's race in Nice; the men's race is October 26th in Kona. I won't provide any commentary on what I think about this decision, as either way I'd like to celebrate the athletes that race on both of these tough courses.

An Ironman is a long-distance (some might say "ultra") triathlon: a 1.2 mile open-water swim, followed by a 112-mile bike ride, and then a 26.2-mile marathon run. The Nice course has a very hilly, almost mountainous, bike course. The Kona course is known for its wind and heat. The prior reigning World Champion Lucy Charles-Barclay decided not to participate this year for health reasons (I believe both sickness and potentially injury). She has a really good YouTube channel on which she explains in more detail and also has tons of great videos about training and racing as a pro triathlete.

Laura Philipp of Germany won the race this year (after third last year), Kat Matthews from Great Britain finished second (after a DNF (did not finish) last year), and Chelsea Sodaro, mom and athlete from the U.S. and 2022 champion, came in third. Watch the race highlights here and read more about all the triathletes here! It's really interesting and motivating to see how many times athletes DNF a race but keep coming back for more.

Coaching snapshot!

Pacing is such an important topic and people have lots of questions about it, so let's dive in! First, pacing is important to make sure you're doing easy training easy, moderate training moderate, and hard training hard. The different stresses help develop different physiological (and psychological!) systems that I've outlined before here.

I did a lot of threshold training (based on RPE and a cycling functional threshold power (FTP) test) before my biking Everest in 2021. I could do hill repeats for what felt like ever.

Question: "How do I pace myself if the workout says to do intervals at "threshold pace"?"

Threshold pace is pretty well-defined by lactate levels and power output and can be estimated by heart rate and rate of perceived exertion (RPE),

Threshold is usually referring to "anaerobic threshold" which is the power output at which lactate accumulation equals lactate clearance. This article in the *Canadian Journal of Applied Physiology* provides a nice overview of the different methods to estimate one's anaerobic threshold:

1. IAT is the individual anaerobic threshold. It is found using step-wise lactate testing. This is relatively easy to determine using lactate testing, but there are many methods for determining the exact point of IAT, so it could vary depending on the method used.
2. OBLA 4 is the onset of blood lactate accumulation and corresponds to power output at 4mM/L lactate. This is the easiest to determine (but still requires lactate testing).
3. MLSS is maximal lactate steady state, or the highest blood lactate concentration (and corresponding power) that can be sustained for 10-30 minutes without accumulating more than 1mmol/L of lactate. It is found using long duration, constant intensity testing that is repeated over the course of days, which makes it very time-intensive to determine. Many studies including this one in rowers and this one in cross-country skiers show that MLSS is generally a lower power than IAT or OBLA, but they are sometimes is in agreement (see this article on cyclists). Though lactate levels at anaerobic threshold measured by IAT and MLSS are typically between 3.0 and 4.0, this varies athlete to athlete and can be as low as 2.0.

Regardless, most of us don't have access to lactate testing. So how do we figure out what our threshold is? With cycling or rowing/erging, or any sport that has a power meter, I recommend a classic functional threshold power (FTP) test. Typically, this involves a warm-up, a 5-minute maximal effort, then a 20-minute maximal effort. The FTP (and therefore your threshold power) is 95% of the average power over the 20-minute test. With running or swimming, or any sport without a power meter, I generally recommend a 30-minute test, popularized by triathlon coach Joe Friel and backed by research. Rather than estimating a threshold power, we can use the average heart rate and/or pace over the last 20 minutes as an estimate for heart rate or pace at threshold power. All of these methods have flaws, however. *Threshold power and heart rate vary with fatigue levels, and pace varies with elevation gain/loss. Therefore (and I know it took a while to get here), I do believe that RPE is the best stat, especially for athletes who don't have access to lactate meters or (new and I have to read more about them) muscle oxygen sensors. An RPE of 7-8 out of 10 is gold.*

Finally, consider this question: "how do I pace myself if a workout says "5k pace"?". Does it take you the same time to do a 5k as the prescriber assumes? 15-minute pace (an elite 5k time) is vastly different physiologically than 25-minute or 35-minute pace. For this reason, I generally describe paces to athletes as efforts they feel they can sustain for a given amount of time, unless the athletes is doing very specific race-pace training. For threshold, that's 50-minute pace.

What questions do you have about training and racing? Reply to this newsletter or email me, and I'll answer one next week! Also, let your friends know that I'm taking more athletes! I'm looking to work with runners and triathletes and depend on you to help spread the word :) Send them to my website to submit an inquiry or just pass along my email.

Fueling plans

I love regular food but for training and racing my go-tos are really gels and drink mixes. Here is a peak at my nutrition plan for R2R2R this weekend. Though it looks very precise, in practice I never stick exactly to the plan. Instead, adaptability is the name of the game. Sweating more? Drink more salty water. Feeling nauseous? Lay off the intake for 30 minutes. Need a boost? Take some caffeine. Feeling sloshy? Have something solid. Etc.

That said, I do have a favorite pre- and post-race banana bread recipe!

Performance Banana Bread

Serena's Plan

Mile	Distance between places	Time	Place	Hydration (mL)	Sources	Carbs (g)	Caffeine (mg)	Sodium (mg)	Sources
0	0	5:00	South Rim	1000	Skratch (2 scoops)	60	20	860	Gu
5	5					80	0	30	2xSIS
10	5	7:00	Phantom Ranch	1000	Naak (1)	63	0	215	1xSIS
14	4					30	0	0	1x Precision mini
17	3	8:30	Cottonwood	2000	Skratch (3)	100	200	1215	1xSIS CAF
20	3					90	0	0	Precision BAG
22	2					12	0	100	1xVanilla Muir
24	2	12:00	North Kaibab	1000	Naak (1) + Skratch (1)	83	0	615	1xSIS
31	7	13:30	Cottonwood	1500	Skratch (1)	110	0	400	Precision BAG
34	3					40	200	15	1xSIS CAF
38	4	15:00	Phantom Ranch	2000	Naak (1) + Skratch (2)	93	0	1000	1x Precision mini
40	2					90	0	0	Precision BAG
43.5	3.5	16:30	Hava Supai	2000	Skratch (2)	60	20	860	Gu
45	1.5		3-mile House			100	20	90	2xSIS, Gu
48	3	18:30	South Rim			40	0	15	1xSIS
Total	48		13:30:00	10500		911	440	5310	
Total per hour			810	778		71	34	414	
						NaN		505.7142857	

Order pickup or delivery!

S.S. Endurance is done vending at the Harvard Farmers Market for 2024. Instead, I have a new pickup system! Order online 24 hours in advance for pickup. Remember, I also do delivery or pickup from spots determined by you! For updates, make sure to follow me on Instagram @coach_serena326. For questions, feel free to email me by responding to this email!