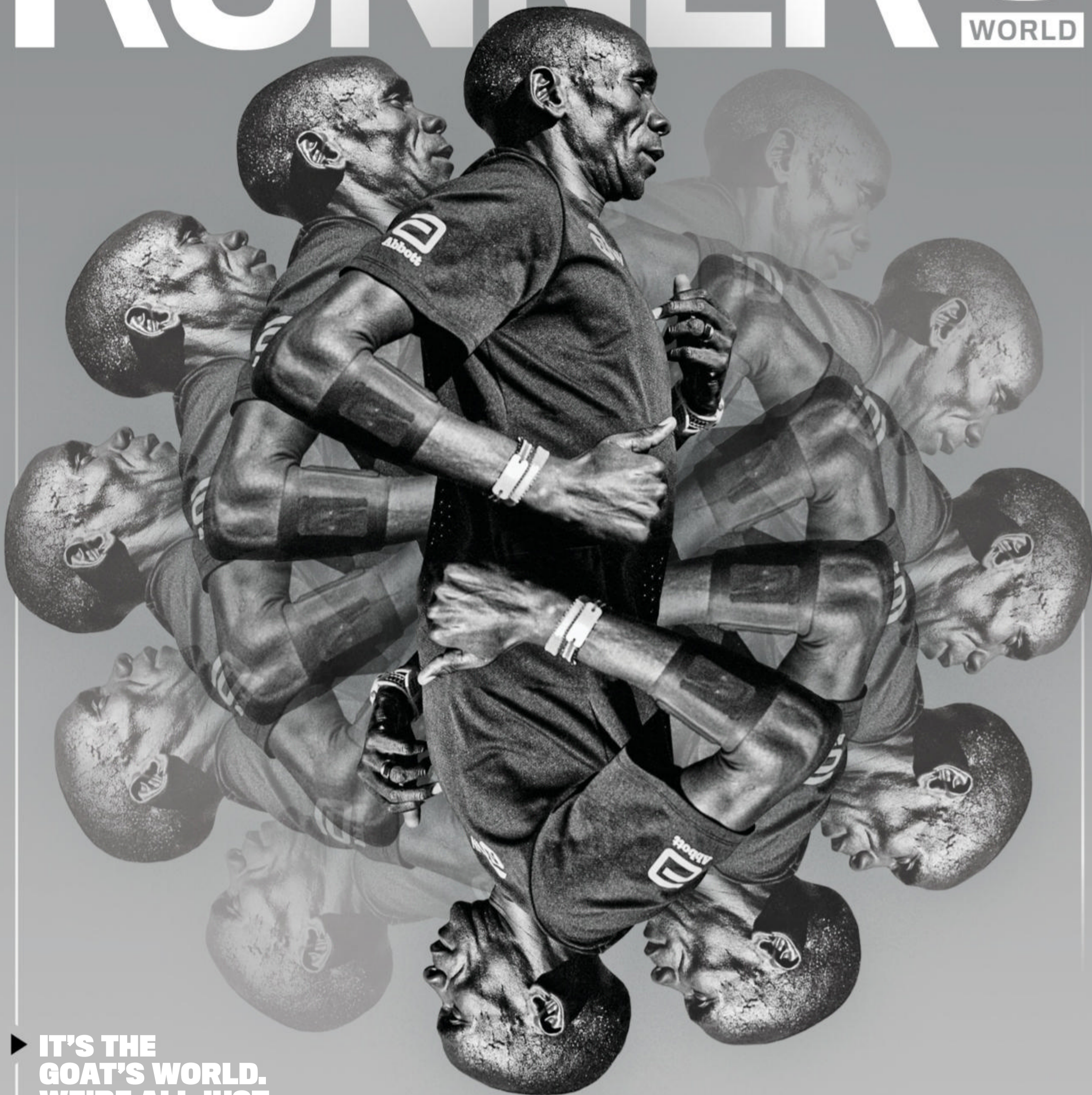


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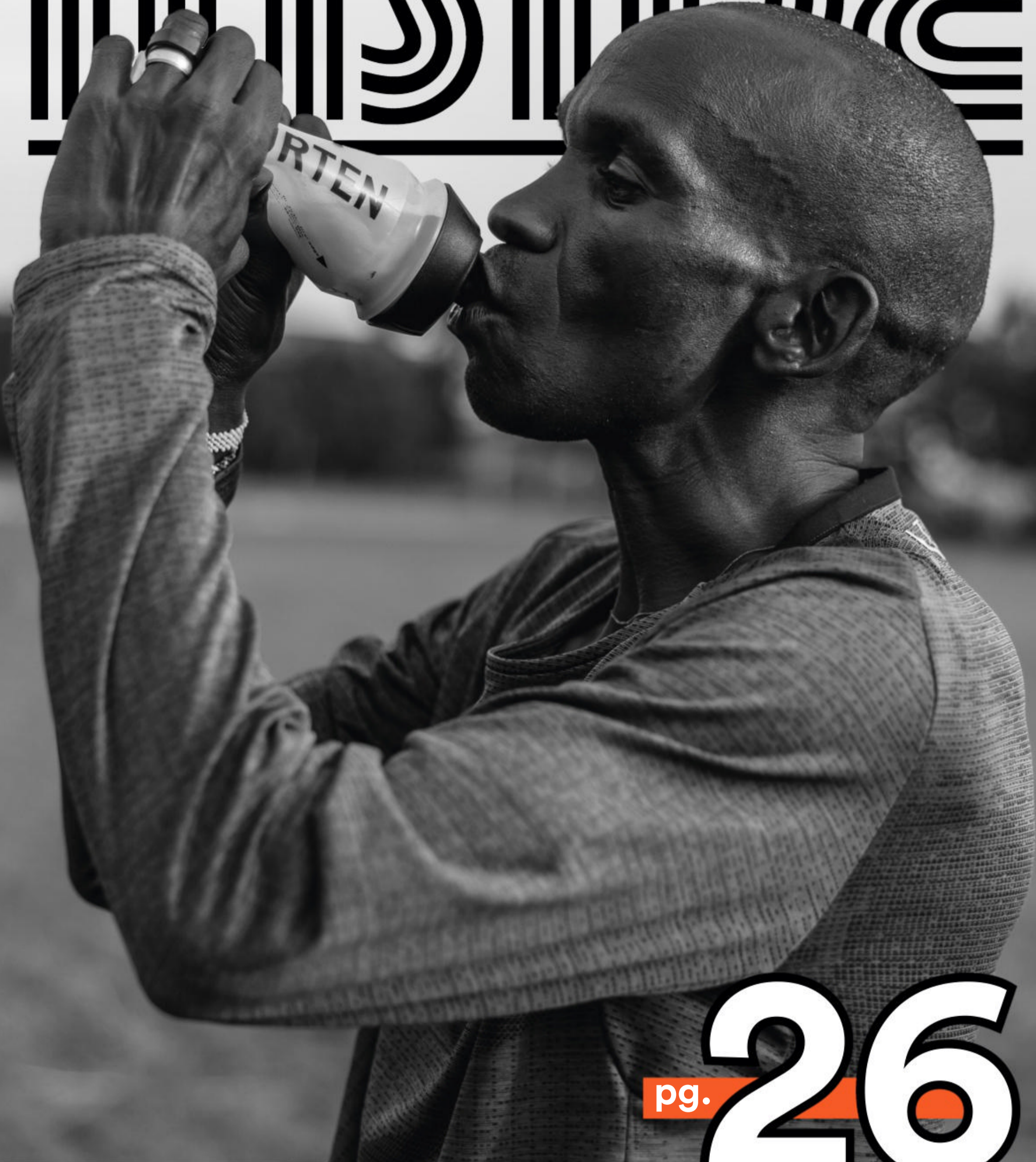
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SCAN ME

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Courtesy Jorrit Ooyen and Dan Vernon for NN Running Team

HELPFUL TIPS,
EXPERT ADVICE,
SMART TAKES,
& PROFOUND
(IF SLIGHTLY
OVER-OBSESSIVE)
RUNNING WISDOM

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THIS IS KIPCHOGE'S WORLD

Meb! Joanie! Bill Rodgers! Marathon legends on all the ways Eliud Kipchoge has changed the game. *By Dave Holmes*

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He's already done the impossible. Now he just wants to change the world. *By Dave Holmes*

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Evans Chebet spent years underperforming before winning the Boston and New York City marathons last year. Can he beat Kipchoge? *By Bill Donahue*

ON THE COVER:

PHOTO ILLUSTRATION BY RW DESIGN USING NN RUNNING TEAM COURTESY IMAGE

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GO BEHIND THE SCENES WITH *RUNNER'S WORLD* EDITORS AND CONTRIBUTORS



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“Evans Chebet’s mental strength is upper-level. He’s a modest and reflective man, but he’s also a street fighter. He believes strongly in himself, and he truly believes he will win.”

Toby Tanser in The Challenger



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GO BEHIND THE SCENES WITH THE PEOPLE WHO MAKE IT HAPPEN AND CONTRIBUTORS

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The Fastest Marathon Shoe Ever | For a new race shoe, our process typically starts with the filters of, what's mechanically the most efficient? And, what shows the most scientific promise? Then we might put something on the treadmill or have someone run around the Nike campus. Or we would use the research lab to validate that a prototype is both energetic and runnable. We have built plenty of things in the past that showed technical promise but that just weren't really sustainable for outdoor running or they just weren't comfortable. There are loads of ways you can make a shoe energetically efficient, but not really suitable for actual, realistic running. From there we would get to a couple of concepts. For the Alphafly, it took us at least six different build rounds.—*Carrie Dimoff, Director of Innovation at Nike*

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WHY YOU SHOULD WEAR TRAIL-

SPECIFIC RUNNING APPAREL

THIS OR THAT with Pat Heine-Holmberg, Senior Video Producer

Ascent	Descent (1)
Gravel	Singletrack (2)
Energy Bar	Snickers
Poles (3)	Hands on Knees
BOA	Laces
Phone	No Phone (4)
8 Hours	Insomniac
Hat	Visor
Music (5)	Podcasts
Loops	Point-to-Point

(1) Gravity is free speed! Even when you're tired, just lean forward. **(2)** Gravel is for roads, and I'm not a road runner. Let's get dirty. **(3)** In a muddy 100km race in 2015, I struggled to get traction on the uphill, grabbing trees while runners with poles click-clacked up the mountain with ease. Poles can also help offset the work your legs are doing on long climbs. The secret is in how you hold the strap. Pass your hand up through the strap from underneath, then grip the pole. You should be able to push down on the strap and get leverage without holding the grip, propelling yourself forward like a cross-country skier. **(4)** My best runs are totally unplugged. **(5)** When I do bring the phone, even the music I listen to doesn't have words.

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GO BEHIND THE SCENES WITH *RUNNER'S WORLD* EDITORS AND CONTRIBUTORS



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The Challenger | Evans Chebet won both the Boston and New York marathons last year, and when I traveled to Kenya to meet him, I hoped to identify his secret superpower. The mission was not easy, for Chebet does not brag. He's humble and soft-spoken, and because his first language is Keiyo, he and I spoke across a linguistic chasm, through an interpreter. Eventually, though, I learned more about his mother. Wanjiro Chebet, pictured here, became a widow when Evans was very young, and as she raised nine children in a small two-room house, she told the future champion, "There will be better days ahead."—*Bill Donahue, writer*



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GO BEHIND THE SCENES WITH *RUNNER'S WORLD* EDITOR



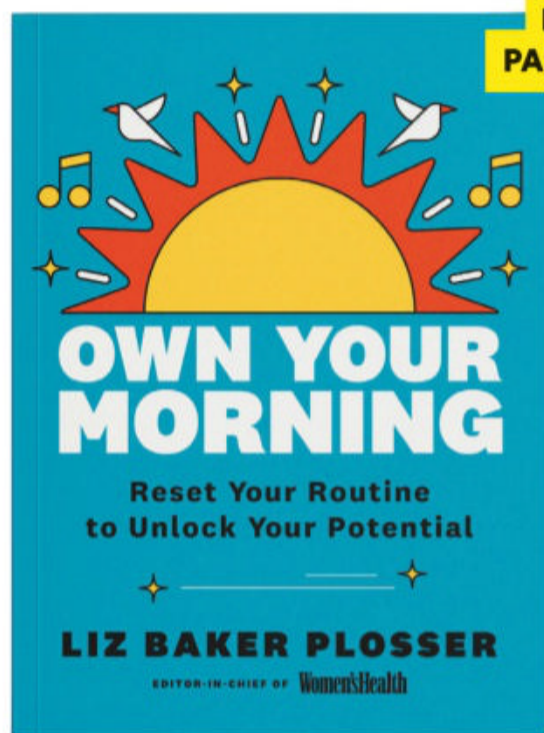
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Marathon Math | One of the first metrics I looked at when I started on this story was

BMI. I knew that BMI science is flawed, but when I plugged Kipchoge's height (5-foot-6) and weight (somewhere between 115 and 125 pounds) into a BMI calculator and it told me he was "average," I snorted and resolved to never worry about my BMI again. I also learned early on that, statistically at least, Kipchoge might not actually be an outlier among his peers. It kinda blew a big hole in my approach to the story. But, in retrospect, it's made me think about my own running and competing differently. While there's plenty of math and science behind his running, what makes Kipchoge great are these things that are not always measurable: his outlook, drive, even his commitment to smiling down the home stretch. You don't have to be a physiological super-specimen to bring these things to your racing, too.—A.C. Shilton, writer

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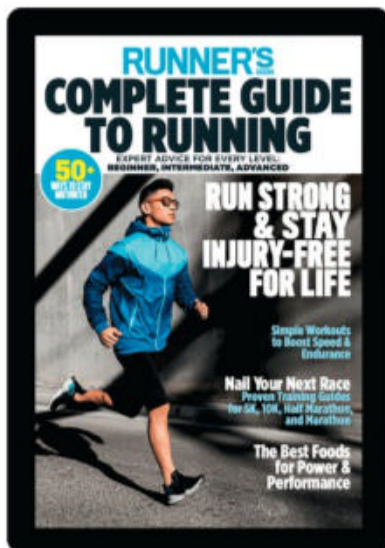
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Staff Meeting

IN WHICH WE CONVENE THE EDITORS TO SOLVE YOUR MOST PRESSING QUESTIONS, CONCERNS, AND EXISTENTIAL QUANDARIES



TIPS FOR NAILING YOUR FIRST MARATHON

Marathons take a lot of figuring out—from choosing the most comfortable clothing to making sure your shoes won't turn your toenails black to arriving properly fueled.

Truth be told, no matter how prepared you are, you'll only recognize some errors in hindsight. But you can put your best foot forward (pun fully intended) by learning from other marathon finishers. The following tips that *Runner's World* editors learned during their first marathons will give you more confidence and a relaxed mind going into your race.

TAKE CARE DURING TAPER

I wish I knew that you can get sick during the taper. I was enjoying the mandatory rest a week before my **Chicago Marathon** when I started to feel run down. I thought it was nerves, but no, I got sick. Really sick: sore throat, coughing, and serious congestion. Hallucinatory-level sick. Your body can get you through many things if you train properly—I was able to complete the marathon, but I wouldn't say I ran it. It was like some sort of literal fever dream, finishing at an embarrassingly terrible time (compared to what I had trained for). If I were to do it again, I'd have taken my taper time to hydrate, stay away from people, and boost my immune system. Next time!

AMY WOLFF // *Chicago Marathon 2018*

TAKE HYDRATION SERIOUSLY



When I ran my first marathon, I remember looking down at my hands midrace and having a mild freakout when I saw my fingers

resembling overstuffed sausages. My body needed not only more hydration but also salt. From then on, I've learned to sip Gatorade during the first couple of miles to settle my stomach and avoid another swollen sitch. If you don't want to stop during your race to slurp a quick drink, you can practice the "pinch and sip" method during your training. Either way, skipping aid stations isn't a good strategy. Trust me: You'll add less time stopping and hydrating than the time you would have accumulated bonking because you didn't stop and refuel.

AMANDA FURRER // *Disney Marathon 2012*

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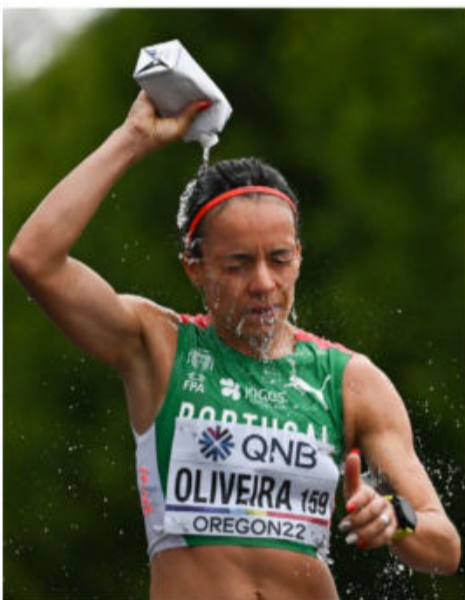


FIND AT FRONT OF STORE, NEAR CHECKOUT

Staff Meeting

Carefully Consider the Month of the Marathon

I signed up for my first marathon on a whim—for July, in Maine. I was teaching at the time and had the summer off. Blissfully unaware, I thought, how bad could July in Maine be? However, on race day, a heat wave encapsulated Bangor. The start time was pushed up an hour, but it was still 90-some degrees at the time of the finish. The humidity was so thick that the first hour on the course was covered in a blanket of fog and felt fittingly very Stephen King-esque (many runners dropping off added to the horrific mood). Surviving that gave me a good story to tell and made my next marathon a breeze—and it surely wasn't in July.



JENNIFER ACKER // *Paul Bunyan Marathon 2006, Bangor, Maine*



STRATEGIZE WITH YOUR SUPPORT SQUAD

Before my first marathon (New York City), I'd heard so much about the energy of the big-city crowds. I focused on this information while ignoring other less-encouraging intel. Specifically, I downplayed reports of wind and desolation on the Queensboro Bridge, along with its sneaky grade. First Avenue, while known for its raucous spectators, did nothing to reverse the effect of fighting a stiff breeze up an unrelenting incline in the eerie quiet. I looked to the packed sidewalks and saw a sea of homemade signs

for everyone but me. I wanted to cry. My squad was small—my husband and 10-year-old daughter—and they were unfamiliar with all of NYC's neighborhoods, so I'd told them just to meet me at the finish in Central Park. Getting there was a lonely slog. And I realized I'd bungled an important race strategy: Place your cheering squad at strategic points along the course where you expect to need support. It can make a big difference.

LEAH FLICKINGER
NYC Marathon 2009

DON'T CHEAT YOUR TRAINING



For shorter races like a half, sure, you can skip workouts and long runs (though don't do it on purpose) and not die on race day. But a full marathon will punish you for doing so. In the two months leading up to my first marathon, I did only two runs over 10 miles and was coasting along on 25 to 30 miles per week,

tops. On race day, my wheels fell off around mile 23 and it was a brutal slog to the finish line. I was young and dumb, not really serious about training after having raced shorter distances earlier in my life, but I learned my lesson. During my next marathon, five years later, I came in better prepared and ended up winning my age group.

JEFF DENGATE // *Disney Marathon 2004*

GIVE YOURSELF GRACE

Most first-time marathoners have said out loud or internally to themselves, "Never again," as they've clunkily made their way to the finish line. That was certainly in my head as I walked through each water station in the final five miles of the Philadelphia Marathon in 2011. Yes, it will hurt—even if you nail your training leading into it. But know that like all muscle soreness, it will

eventually go away. Give yourself the time to physically and mentally recover from your amazing effort. And if you're like most runners out there, you'll soon start to change your tune from "Never again" to "How can I do that better?"

BRIAN DALEK // *Philadelphia Marathon 2011*

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FEELING HEALTHY, FIT & STRONG

Keeping Fit With A Morning Shake

Being a health and nutrition correspondent means that companies frequently send me their products, and ask for my stamp of approval. Most of the time I dive into research, give the product a try, and send the company honest feedback about what they'll need to change before I'll recommend it. Plus my hectic job and my determination to stay fit means I'm always hunting for a quick and nutritious way to fill up on nutrients my body needs. So I can confidently say, "I've tried it all".

Last Tuesday work was especially hectic, but I'd booked with my \$200 an hour personal trainer, Tony, a triathlon winning, organic-to-the-bone fitness guy with a ten mile long track record of whipping the "who's who" into shape in record time, so I had to go. He noticed that my set count was down and playfully asked, "Feeling a little tired today?", as he handed me a bottle from his gym bag. After one sip I figured that there was no way this could be healthy because the creamy chocolate flavor was just too delicious. Still, he'd never risk his reputation.

With more than a healthy dose of scepticism I decided to investigate this shake he'd called INVIGOR8.

Turns out, it's a full meal replacement shake, which stunned me because virtually every other

shake I'd researched had tasted chalky, clumpy and packed with hidden "no-no's" like cheap protein, tons of artificial ingredients, not to mention harmful synthetic dyes, additives, sugars, preservatives, and hormones. And even though INVIGOR8's full meal replacement shake cost more than many of the shakes I've tried, it was about half the price of my favorite salad, and the nutrition profile looked second to none.

Wanting to know more, I reached out to a few of the people who were talking about it on trustworthy fitness forums. By the next morning three people got back to me saying,

"As a trainer I love Invigor8. It's definitely helped me to have more all-day energy, plus build the kind of lean sculpted muscle that burns more fat."

"Yes, I'll recommend it, it tastes great, and I really like how it keeps me feeling full for hours."

"I'm a marathon runner and a friend recommended it to me. Drinking it has become a part of my regular training routine, because my time has improved, my energy is up, and I'm thinking more clearly than ever before."

I decided to take my investigation one step further by researching the development of INVIGOR8. I was pleasantly surprised to find out

that the company went to great lengths to keep INVIGOR8 free of harmful ingredients.

The makers of INVIGOR8 were determined to make the first natural, non-GMO nutritional shake & green superfood. The result is a meal replacement shake that contains 100% grass-fed whey that has a superior nutrient profile to the grain-fed whey found in most shakes, metabolism boosting raw coconut oil, hormone free colostrum to promote a healthy immune system, Omega 3, 6, 9-rich chia and flaxseeds, superfood greens like kale, spinach, broccoli, alfalfa, and chlorella, and clinically tested cognitive enhancers for improved mood and brain function. The company even went a step further by including a balance of pre and probiotics for optimal digestive health, uptake, and regularity and digestive enzymes so your body absorbs the high-caliber nutrition you get from INVIGOR8.

As a whole-foods nutritionist with a thriving practice I understand the importance of filling my body with the best Mother Nature has to offer. I have always been reluctant to try new products because I was never sure of the impact they would have on my energy, and weight. INVIGOR8 is different, not only because it's delicious, but because it helps me to maintain the energy I need to run my busy practice, while helping me to stay fit and toned. Considering all of the shakes I've tried, I can honestly say that the results I've experienced from INVIGOR8 are nothing short of amazing.

Don't just take my word for it - try Invigor8 for yourself and experience the difference it can make in your running routine. A company spokesperson confirmed an exclusive offer for Runner's World's readers: if you order this month, you'll receive \$10 off your first order by using promo code **"RUN10"** at checkout. You can order INVIGOR8 today at Invigor8.com or by calling 1-800-958-3392.



BY LAUREL LEIGHT

The Best Reasons for Adding Track Workouts to Your Training



THE OVAL AT your nearest high school or college can serve up equal parts intimidation and welcomed challenge. Running on a track means you have a predictable and controlled environment to check off 400-, 800-, or 1600-meter repeats. But you also have that next curve or lap staring you in the face, hollering at you to run a little faster.

That's the beauty of workouts on the track, though: They help you increase your speed.

"Track workouts are absolutely something runners should have in their repertoire of workouts," says Alex Ostberg, a competitive middle-distance racer and running coach with RunnersConnect in Chapel Hill, North Carolina. "Whether you're training to race a mile competitively or gearing up to run a marathon, there's a time and a place for the track—and lots of benefits specific to it."

Here's exactly why it pays off to be a track star and everything you need to know to make your laps around the loop time well spent.

● The Benefits of Track Workouts

You'll get instant feedback / The quick assessment you get on a track is unlike what you can get on the road. Yes, your watch or phone should give you splits with accuracy, but it's not as foolproof as a clearly marked track. "You know exactly when you're hitting each 100- or 200-meter interval," says Ostberg. "There could be delays with GPS, or it might not be accurate in a wooded area out on the roads or trail."

Paces also feel different on a track because you have more spatial awareness, which can contribute to the feedback you get from your runs. "We've all had the experience of running on roads that seem to stretch infinitely into the distance," Ostberg says. "That can feel very daunting. Even if you are covering the same distance on a track, having a feel for where exactly you are and how quickly you are progressing through an interval can help adjust your effort and ease the mental burden."

You might develop a cue for your progress, like counting down laps, and that offers an advantage you can't get on the road.

You'll learn about pacing / Dialing into a specific rhythm for 400-meter repeats on the track isn't as simple as jumping on a treadmill and tapping the machine to hold the pace. But that's kind of the point. "When you're running a race, you're not going to have the treadmill screen to guide you," says Josh Honore, NASM-CPT, a certified trainer and coach with STRIDE Fitness in San Diego. "On a track, you can stay really accurate with the distances you're covering and, if you're keeping time for your laps or intervals, you will also get a much better feel for what specific paces feel like."

This can benefit new runners who want to get comfortable with pushing their pace a little, as well as more experienced racers who want to PR and test their limits. You learn what slight pace variations feel like, how to hold a pace, and how to stick to a certain speed on race day.

You'll learn more about technique / When you're on a track, you're separating yourself from the distractions on an open road (like cars, dogs, and potholes). Instead, you can focus all your energy on tapping into your form, like maintaining good posture, pumping your arms, driving your knees, and using your glutes to push off, says Honore.

In addition to limiting distractions, a track can also have a synthetic, rubbery surface that helps you dial in form. "It gives you a little bit of a spring

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TWO- OR THREE-MILE-REPEAT WORKOUTS ARE IMPORTANT FOR MARATHON TRAINING. WHILE YOU CAN DO THOSE ON A TRACK, SHORTER SPRINTS IMPROVE YOUR EFFICIENCY AND FORM. —ALEX OSTBERG

or pop that allows you to better perceive your foot strike—how your foot touches down, where in your gait you hit the ground, how much time your foot's in contact with the ground, and how it feels in your joints and muscles," Honore explains.

You might have a better time / Call it the wind-in-your-hair effect, but research suggests that running intervals on a track might make running harder for shorter bursts feel easier. Runners reported lower rates of perceived exertion while looping a track versus clocking the same distance and pace on a treadmill, according to a study published in 2021 in the *International Journal of Strength and Conditioning*. Researchers believe this may come from an unfavorable perception of the treadmill and that exercising in a preferred environment—like outside—makes it more enjoyable, so it feels less taxing.

Who Can Benefit from Track Workouts

In a word: everyone. If you're training for a mid-distance race on a track, of course training on the same surface offers advantages because of the rule of specificity, says Ostberg.

Even if you're gearing up for a longer race on the roads or trails, running intervals on a track, whether longer repeats or sprints, can boost your performance. After 10 weeks of 200-meter interval workouts on a track, runners not only improved their aerobic capacity, but also showed greater gains in VO₂ max and leg strength than those who performed moderately paced workouts, according to a 2018 study published in the *Journal of Strength and Conditioning Research*.

How to Boost Your Time on the Track

Schedule well / It's a good idea to sprinkle in some sessions on the track throughout your training season—but really focus on dialing in your distances and paces as you get close to race day, says Ostberg.

He recommends starting a training cycle with less-structured, effort-based sessions on the track, like a fartlek, in which you do free-form surges in pace, and then fine-tuning those intervals as race day approaches.

"Later in a season, once I've determined my goal race pace during the course of a training block, is the time when I'm doing the hardest workouts with the most control over my pace," Ostberg says.

Check in with yourself often / Know your goal pace for an interval and break it into chunks, suggests Ostberg. For example, if you're trying to finish 800-meter repeats in four minutes, check your watch every 200 meters; if you're very far off the 60 seconds it should have taken you to cover that distance, tweak your speed accordingly. The same goes for other pace-dependent intervals.

Turn around / Running the same loop, in the same direction, over and over can quickly make you feel like a hamster on a wheel. To bust the monotony, Ostberg recommends either flipping your direction every lap (if you're running intervals of one lap or shorter) or running in one of the outer lanes to avoid the sharp left turn. Also, check to see if your track has directional days to determine if you have to move clockwise or counterclockwise.

Add in some drills / Hitting the track doesn't mean you always have to sprint at top speed like you're trying to catch Allyson Felix. One of Honore's favorite ways to use the track is for running drills before a speed workout.

To try it: Jog a lap or two slowly, then finish your warmup with 100-meter repeats of drills like skips, high knees, and hurdle walks. "These drills are going to reinforce good form, and that translates beautifully to not only marathon training but any kind of running, no matter your goal," Honore says. 🏃



3 TRACK WORKOUTS TO TRY

Whatever your training goal... there's a track workout for that. Here are three, from run coach Alex Ostberg.

THE WORKOUT / Mile repeats (about four laps of the track)

TRY IT / If you're training for a 5K

HOW TO DO IT / Run a mile 10 to 15 seconds slower than your goal race pace. Walk for 3 minutes. Repeat for 3–4 total reps, aiming for your goal 5K pace for the last mile.

THE WORKOUT / 400s (one lap of the track)

TRY IT / If you're training for a 10K

HOW TO DO IT / Run 400 meters at your goal 10K pace, then jog slowly (or walk if you're new to track workouts) for 100 meters. Repeat for 8 total reps, building up to 16 reps.

THE WORKOUT / 100-meter strides (the straightaway of the track)

TRY IT / If you're training for a half marathon (or any race distance)

HOW TO DO IT / End an easy run at the track. Run 100 meters at a perceived exertion of 8 or 9 (out of 10), walk 100 meters to recover. Repeat 5 times.

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BY MATTHEW KADEY, MS, RD

A Quick and Easy Guide to Optimize Postrun Nutrition

» **WHEN YOU FINISH** a run, you might think that the important work is behind you. But your goal of becoming a stronger, faster runner has really just begun. “The concept I try to stress to athletes is that most of the benefits from a workout don’t occur until afterward, during the recovery process,” says board-certified sports dietitian and runner Lauren Antonucci, RDN, CSSD. “It’s here where we need to ask ourselves what our bodies need to repair and recover to better adapt to training and improve in a balanced and additive way.”

Postrun nutrition plays an important role in replenishing energy stores, repairing damaged muscle tissue, and promoting quicker recovery. But many runners neglect their meals and snacks after a run. “It’s time that more people think of their postworkout fueling as part of their overall training,” Antonucci says.

Figuring out what to eat after a workout can feel like a struggle. So, to help you fine-tune your nutrition to recharge your engines and optimize your recovery, follow these after-run fueling tips from sports dietitians.

● **Prioritize carbs**

If there was ever a nonnegotiable recovery aid, it would be carbs. In general, endurance exercise, like running, stresses the carbohydrate stores within muscle cells, known as glycogen. And it’s this glycogen that powers your hard efforts. “That makes eating carbs postworkout important for recovering stored glycogen in the muscles so you are prepared for the next training session,” says sports dietitian Katie Kissane, MS, RD, owner of Fuel 2 Run in Fort Collins, Colorado.

Research shows that eating enough carbs after a workout restocks glycogen and leads to better muscular performance. Carbohydrate consumption is also thought to be the most effective for lessening the increases of immune disturbances that occur during exercise recovery, which can leave you susceptible to certain illnesses, like a pesky cold.

After a workout, think of your body as a sponge ready to soak up recovery carbs. And tweak the amount you eat based on your workout, Kissane says. “For most athletes, I recommend between 0.5 and 2 grams of carbs per kilogram of bodyweight, with the lesser amount for shorter workouts lasting less than 60 minutes and [that are] not super intense. Aim for the upper end of this range for runs lasting two hours or longer with some intensity or 60 to 90 minutes of very high intensity.” A 150-pound runner who runs for 90 minutes and wants to get at least 80 grams of carbs in their recovery meal can do so by eating 2 cups of plain cooked spaghetti.

Newer research suggests that taking in a large dose of carbs at once after a workout does a better job of recovering muscle glycogen than consuming smaller amounts spread over a longer time. But you’ll still want to follow this up with more carbs in subsequent meals and snacks so that your muscle glycogen is fully restocked within 24 hours.

While recovery is everything that happens between two workouts, the timing of your carbs becomes more crucial if the window between your sessions is short. For example, say you finish a run in the late afternoon and are planning on going out again the next morning. “This is where you need to expedite your refueling so that your energy stores have a better chance of getting replenished and you feel better during your next run,” says Antonucci.

● **Don’t skimp on protein**

When you run, your muscles sustain micro-tears, making protein an essential nutrient in your recovery meal. “Postworkout protein is necessary for repairing and synthesizing muscle tissue,” says Kissane. In



FEELING REJUVENATED WITH CBD

Life really does fly by. Before I knew it, my 40ish had arrived, and with them came some new gifts from dear ol' Mother Nature— frequent knee pain, stress, low energy and sleeplessness. Now, I'm a realist about these things, I knew I wasn't going to be young and springy forever. But still, with "middle-age" nearly on my doorstep, I couldn't help but feel a little cheated. That is until I found my *own* secret weapon. *Another gift from Mother Nature.*

It began a few months back when I was complaining about my joints to my marathon-running niece, Jen. She casually mentioned how she uses CBD oil to help with her discomfort. She said that CBD gave her more focus and clarity throughout the day and that her lingering muscle and joint discomfort no longer bothered her. She even felt comfortable signing up for back-to-back marathons two weekends in a row this year.

That made even this self-proclaimed skeptic take notice. But I still had some concerns. According to one study in the Journal of the American Medical Association, 70% of CBD products didn't contain the amount of CBD stated on their labels. And, as a consumer, that's terrifying!

If I was going to do this, I needed to trust the source through and through. My two-fold research process naturally led me to Zebra CBD.

First, I did a quick online poll—and by that, I mean I posed the CBD question on my Facebook page. Call me old fashioned but I wanted to know

if there were people whom I trusted (more than anonymous testimonials) who've had success using CBD besides my niece. That is how I found out that Zebra CBD has a label accuracy guarantee which assures customers like me what is stated on the label is in the product.

Secondly, I wanted cold hard facts. Diving deep into the world of CBD research and clinical studies, I came across Emily Gray M.D., a physician at the University of California at San Diego (UCSD) Medical School and medical advisor for Zebra CBD who is researching the effects of CBD. Dr. Gray wrote "early results with CBD have been promising and we have a lot of research underway now. I've had several patients using CBD with good success. It's important that you know your source of CBD and how to use it properly."

After hearing it from the doctor's mouth, I returned to my online poll and was amazed by the number of close friends and family who were already on the CBD train. Apparently, I was the only one without a clue! And funny enough, a couple of friends who commented were using the same brand as my niece—Zebra CBD. There was no consensus as to why they were using CBD, but the top reasons given were for tension & stress, muscle & joint discomfort, mood support, sleep support, as well as supporting overall health & wellness.

Eventually, even the most skeptical of the bunch can be won over. With a trusted CBD source in

mind, I decided to give it a go.

When I viewed Zebra CBD's selection online, I was impressed by its array of products, including CBD oils called tinctures, topicals, chewable tablets, mints and gummies. After reading on their website that all their products are made with organically-grown hemp, I ordered... and it arrived within 2 days!

The first product I tried was the rub. Now this stuff was *strong*. Immediately after rubbing it on my knee, the soothing effects kicked in. It had that familiar menthol cooling effect, which I personally find very relieving. And the best part is, after two weeks of using it, my knee pain no longer affected my daily mobility.

The Zebra Sleep Gummies, on the other hand, had a different but equally positive effect on my body. To take it, the instructions suggest chewing thoroughly. This was simple enough, and the taste was, well, *lemony*. After about 15 minutes, a sense of calm came over my body. It's hard to describe exactly; it's definitely not a "high" feeling. It's more like an overall sense of relaxation—and then I was out. Needless to say, I slept great and woke up refreshed.

While it hasn't been a catch-all fix to every one of my health issues, it has eased the level and frequency of my aches. And it sure doesn't seem like a coincidence how much better I feel.

All-in-all, CBD is one of those things that you have to try for yourself. Although I was skeptical at first, I can safely say that I'm now a Zebra CBD fan and that I highly recommend their products.

Also, I managed to speak to a Zebra CBD representative and negotiate an exclusive offer. If you order this month, you'll receive \$10 off your first order by using promo code **"Run10"** at checkout. You can try it yourself and order Zebra CBD at ZebraCBD.com/Run or at 1-888-762-2699.

other words, eating protein helps pumps the brakes on muscle breakdown that results from a workout and kickstarts the process to make stronger muscles. Carbs alone can't do that. Research also shows protein and carbs consumed after a run can support bone health and help runners meet their overall protein goals, which will help maintain muscle mass.

Both Kissane and Antonucci recommend no less than 30 grams of protein in a postworkout meal for harder runs or weight-training sessions. Research shows this amount is sufficient to maximize muscle protein synthesis rates during recovery. You can likely get away with less protein following easy runs or low-impact activities, like yoga.

Postrun protein can come from meats, yogurt, cottage cheese, eggs, high-quality plant-based proteins like tofu and tempeh, and protein powders like whey or pea. Four ounces of chicken will net you about 30 grams of protein, as will a scoop of protein powder with a tablespoon of peanut butter and 8 ounces of regular milk.

Some evidence suggests that co-ingestion of carbohydrate and protein after exercise may stimulate greater glycogen synthesis during recovery compared with consuming only carbs. In fact, a review published in 2021 says the extra calories from protein allow for greater amounts of carbs to be taken up and stored as glycogen. Just remember you want both macros, so don't cut back on carbs in order to get more protein.

● **Some fat is okay**

Fat in food can slow down the rate of carbohydrate and protein absorption, and replacing the fat used

for energy during exercise is not imperative. Kissane and Antonucci agree that making high-fat foods a staple of your recovery is not necessary.

However, fat is more calorie-dense than carbs and protein, so adding some to your postrun nutrition plan can help you meet your daily caloric needs. Plus, by making a meal taste better, it can drive you to eat more, something that is important if your appetite wanes after a tough workout.

● **Don't always trust your appetite**

For some athletes, appetite wanes after intense exercise as body temperature remains elevated and the body experiences changes in hunger hormones. This can leave you with little desire to eat—even at the expense of optimal recovery. If tough workouts leave you with no hunger, Kissane recommends drinking your recovery fuel, such as a yogurt drink or a protein- and carb-packed smoothie. This can bridge the gap until your urge for solid food returns.

● **Drink up**

A big part of the recovery equation means addressing any shortfalls in fluid intake during a sweaty run. Some fluid also helps you better digest your midrun and postrun grub.


Getting enough water after exercise depends on the length and intensity of the workout, the environmental conditions, and your physiology. To determine your postworkout fluid needs, you'll need to jump on the scale. Start by weighing yourself before exercise and then again afterward. "Drink 16 to 24 ounces of fluid for every pound

you've lost," says Kissane. As a general guide, she recommends taking in at least 20 to 30 ounces of fluids after a run, and then continuing to drink to thirst. Liquid can come from various sources, including water, sports drinks, milk, juices, sparkling water, or smoothies. Use your urine to check hydration status—light yellow is the goal.

● **Consider grabbing salt**

Sodium consumption after working up a sweat can promote fluid retention and stimulate your thirst, which encourages better hydration. "Runners shouldn't shy away from salt in their post-training food," says Antonucci. Although not the only factor, "the longer your run and the more sweaty it was, the more salt you can have in your postworkout meals and snacks," says Antonucci. Adding salty foods like pickles or smoked fish to your after-run meal plan can also help you get your electrolyte levels back in balance.

● **Plan ahead**

For nutrition success, think ahead and decide what you'll eat after a workout before you start moving. A study led by researchers at the University of Nebraska–Lincoln found that when participants chose what they wanted to eat after an exercise session *before* the workout, they reached for the more nutritious option (in the study, an apple versus a brownie). It's best not to leave postworkout nutrition up to chance—planning ahead makes it less likely that fatigue will put your recovery fuel on the back burner. 

POSTRUN SNACKS

Certain situations justify having a recovery option before eating a substantial meal. Not sure what the ideal postworkout snacks should look like? Here are some quick eats full of the nutrition you need to bounce back faster.

Toasted bagel with cream cheese, smoked salmon, and sliced pickled beets → Studies show that higher intakes of the omega-3 fatty acids found in fish may translate into lower levels of delayed-onset muscle soreness and reduced inflammation after workouts. Bagels are more carb-dense than bread, making them more capable at restocking glycogen. The pickled beets supply a quick hit of sodium, plus nitrates that may improve bloodflow to working muscles.

A bowl of cereal with milk → One small study on triathletes found that subjects who consumed a bowl of whole-grain cereal with low-fat milk after endurance exercise experienced improvements in the synthesis of both muscle glycogen (the stored form of glucose) and muscle protein. The dynamic duo of carbs in cereal and protein in cow's milk can expedite recovery following exercise.

Two hard-boiled eggs with a glass of tomato juice → According to research, eating whole eggs does a better job of stimulating muscle-protein synthesis after a training session than egg whites. Other research found that thanks to its antioxidants, tomato juice can reduce inflammation more than water. The added salt in tomato juice also works to replenish sodium you may have lost in sweat.

For postrun meal recipes, head to runnersworld.com/recoveryrecipes.

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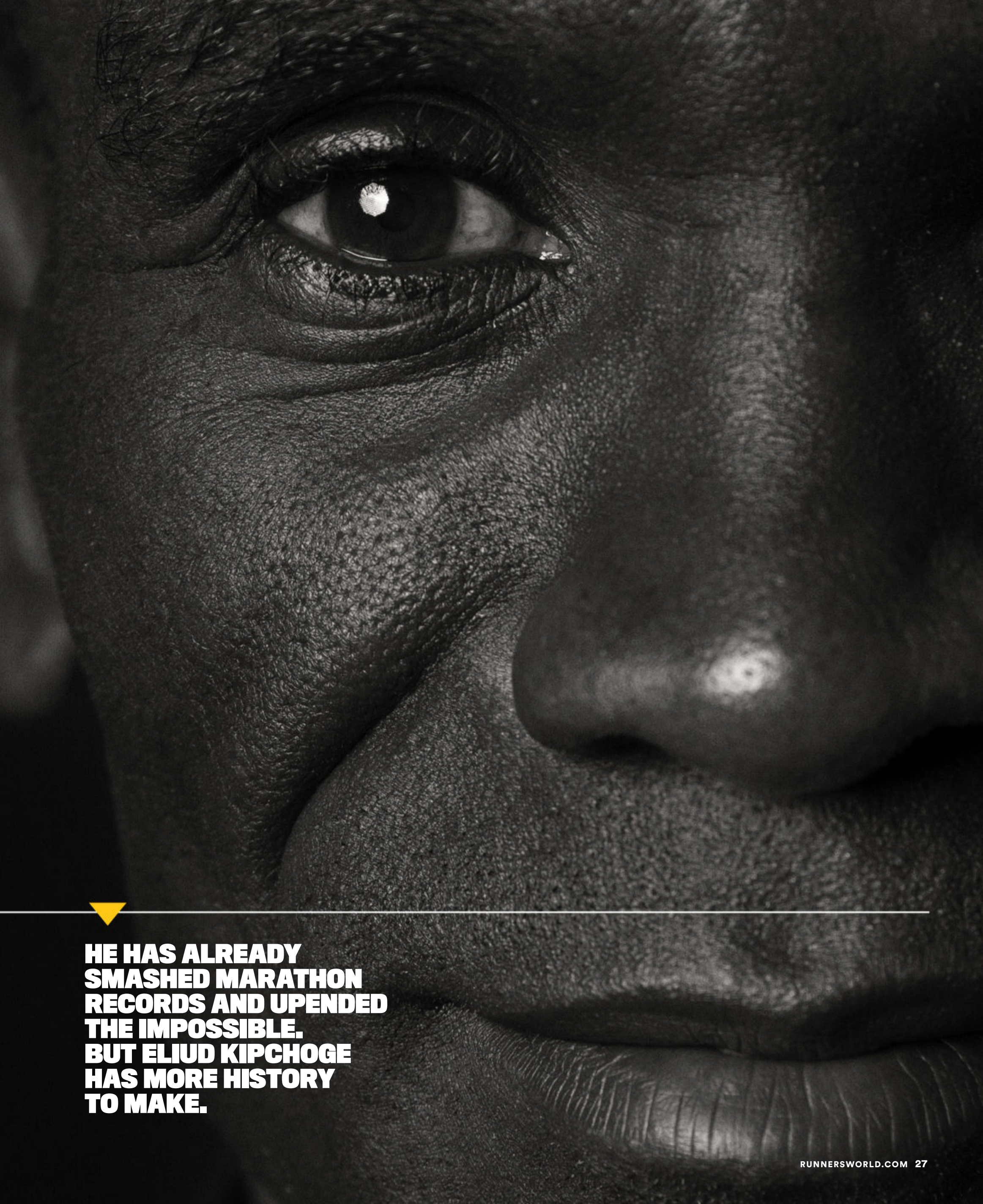
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**HE HAS ALREADY
SMASHED MARATHON
RECORDS AND UPENDED
THE IMPOSSIBLE.
BUT ELIUD KIPCHOGE
HAS MORE HISTORY
TO MAKE.**

UNOFFICIAL
01:59:40.2

BILL RODGERS

MEB KERFEZIGHI

JOAN BENOIT

RUNNER

RUNNER	FINISH TIME	PACE/MILE	LOCATION
Eliud Kipchoge (Kenya)	2:01:09	4:37.2	Berlin
Kenenisa Bekele (Ethiopia)	2:01:41	4:38.5	Berlin
Kelvin Kiptum (Kenya)	2:01:53	4:38.9	Valencia
Birhanu Legese (Ethiopia)	2:02:48	4:41.0	Berlin, 2019
Mosinet Geremew (Ethiopia)	2:02:55	4:41.3	Berlin, 2019
Dennis Kimetto (Kenya)	2:02:57	4:41.4	Berlin, 2014

Previous page: Courtesy NN Running Team; This page: Getty Images (Benoit, Rodgers, Kerfezighi, runners); Courtesy Nike (Alphafly); Courtesy NN

THIS IS KIPCHOGE'S WORLD

BY
DAVE
HOLMES

▶ PAST MARATHON LEGENDS SHOWED US WHAT WAS POSSIBLE. ELIUD KIPCHOGE MADE US BELIEVE IN THE IMPOSSIBLE.



EVERYTHING IS IMPOSSIBLE until somebody does it.

Think about how many very recently unthinkable things we encountered today alone: the electric car you saw this morning, the tablet I'm tapping this out on, Flamin' Hot Cool Ranch Doritos. They didn't exist, they *couldn't* exist, until they did.

Sometimes breakthroughs are the result of advanced technology. Sometimes they come from the exact right team of people with the exact right mix of skills. But sometimes the thing that brings it all together and makes it work is nothing more than pure will. Discipline. A defiant smile and a single step forward. And then, if this is a marathon we're talking about, several thousand more steps forward.

For decades, physiologists said a sub-two-hour marathon was impossible. Then, in 2019, Eliud Kipchoge broke the very recently unthinkable two-hour-marathon barrier, completing the INEOS 1:59 Challenge in Vienna, Austria, in 1:59:40. I'd call it a quantum leap if I didn't suspect that physicists had already started calling quantum leaps "Kipchoges."

He carried us into a new world. It is, in fact, Kipchoge's World, and we're just running in it. Much more slowly.

"Sub-two-hours? It doesn't seem real," says marathon legend Bill Rodgers. "I remember when the physiologists said a human being can't run [a marathon in] under two hours and two minutes."

A little more than a decade ago, "people started to wonder whether we would see a sub-two happen, and I said it would happen in our lifetime," says Meb Keflezighi, 2004 Olympic silver medalist in the marathon. "I just didn't imagine it would be this soon."

As the first Olympic women's marathon gold medalist, Joan Benoit Samuelson knows something about breaking barriers, but even she had her doubts. "I used to think I couldn't possibly be around when two hours was broken," she tells me. But then along came Kipchoge. Very quickly. "When he first attempted to break two," in Nike's 2017 Breaking2 event in Monza, Italy, "I was actually there with Allyson Felix to hold the break tape. That was the first time I saw him, and wow. He's just totally built for long-distance running."

He didn't make it that time—he finished with a time of 2:00:25

and had to settle for (unofficially) breaking a world record—but Benoit Samuelson ascribes exactly zero of that shortfall to Kipchoge himself. "It was a dark and lonely early morning when the race started, and if there had been as many people cheering in the first half as there were near the finish line, I think he'd have broken it there." Take it from another game changer in the world of long-distance running: Eliud Kipchoge was ready, the world was not.

Knox Robinson, a New York City-based running coach, was also in Monza, and he found himself watching with a combination of awe and concern. "He was willingly putting himself into a situation that no one had ever experienced before, and I had that parental impulse to, like, snatch a child's hand back from an open flame. There was a tension in the air." Robinson laughs and quickly clarifies: "For everyone else, that is. Before the race, he was napping. Everyone else was like, *We're about to go to the moon here*, and this guy's just taking a quick snooze. Kipchoge was the one in control."

As the man himself says in the 2021 documentary *Kipchoge: The Last Milestone*, "The way you think about pain is the way your life will be. At the apex of pain, that's where the success is." It's a little self-hypnosis, some mental jiu-jitsu, and it's part of a zen approach to running that is pure Kipchoge.

Keflezighi credits Kipchoge's greatness to his patience. "He's been on top of his game for a long time; he didn't just jump to the marathon. He naturally grew into it with a solid base of buildup, speed, and stamina."

"You know, there's the science of it, a runner's VO₂ max and all that," says professional runner Nico Montañez, "but I think his mind was there way before his body was." And just as Kipchoge's achievements have runners talking like scientists, they have PhDs talking like fans: "There is no doubt that Kipchoge is at the top of the world for his fitness, his VO₂ max, his lactate threshold, his mental stamina," says Alison Marie Helms, PhD, a certified personal trainer and running coach. "But what truly sets him apart is the efficiency of his stride. Just watching him run, the fluidity of it is mesmerizing. No energy is wasted."

"You don't see him being super aggressive in the race, or being the one to make moves early," professional marathoner and running coach Dakotah Lindwurm says. "He stays calm and collected and sticks to his race plan." She adds, "I actually took something from him, which is that you can smile through the pain. It's easier to push through the pain if you are tricking yourself into thinking you're enjoying it."

"We all do the same sort of training, we recover the same," Montañez says. "But mentality-wise, he's leaps and bounds above everyone else, and we're all trying to catch up."

There is also, unique among internationally famous athletes, genuine humility. "There's this photo that they published around Breaking2 where there was a list of the cleaning duties at his training camp," says Robinson, "and Eliud's name is on it." He stops to let it sink in, maybe for himself. "Like, the greatest runner of all time is on his hands and knees scrubbing the toilet. The guy who cleans the toilet is the guy who broke two hours."

That humility gives running coaches a new lesson for their athletes: "He could be living in a huge mansion and driving the nicest cars," says Wes Miller, recently named NJCAA Assistant Coach of the Year for his work with the South Plains College track-and-field team, "but he just stays in his own lane and continues to train." Kipchoge keeps it humble, even after achieving the superhuman, even as an actual museum is being built in his honor in Kenya.



Courtesy NN Running Team

Kipchoge and teammates Noah Kipkemboi and Geoffrey Kamworor on a 30K run in the Kaptagat Forest.

It's a lesson Miller could try to teach his runners, he says—but it's something only someone like Kipchoge could show them.

Kipchoge's energy transcends the elite field and reaches the amateurs. Brian Oates has run the Boston Marathon for 27 years now, and he measures Kipchoge's feat the way mortals—defined here as “still very good runners”—do: “The guy could run Hopkinton to Boston and back to the starting line before I've taken the right onto Heartbreak Hill.” Oates laughs, like the physical reality of it hits him as he's saying it. “I mean, the guy is one of one.”

Kipchoge's pace would be about a 13.1 mph on a gym treadmill, a speed that would blow most of us out the back wall of the gym if we tried it, which is why we're lucky most commercial treadmills won't even let us try. Kenny Santucci, who's run the New York City Marathon five times, owns the gym The Strength Club NYC and thinks about Kipchoge when he's training clients. “We'll do a lot of sprints on the treadmill, and when you feel what that speed feels like, the idea of holding it for longer than 30 or 40 seconds is unreal. And Eliud's out there living it for two hours.”

Rodgers set the first of his two American records in the marathon in 1975 at 2:09:55, just shortly after getting back into running

to shock his lungs into shape after quitting smoking. The man knows a little about what the human body can achieve against the odds. “Kipchoge is just a phenomenal athlete, in track and in the marathon. He's got fast-twitch *and* slow-twitch muscles, it seems.”

When the experts are proven wrong, often there is the sense of a dam breaking. “Nobody could do a sub-four mile until Roger Bannister did it,” Oates says. A month and a half after the barrier fell, Australian runner John Landy ran a mile in 3:58, and a year after that, three runners broke four in the same race at the British Games. After Bannister, Oates says, “then a whole bunch of people said, *Oh, I can do that now.*”

“Once the doors began to open for women in marathoning in the early '70s, the barrier to break was three hours,” says Benoit Samuelson, “and then pretty quickly it was 2:20.” She added, “I think when people break out like this, it's a positive influence on everyone.” He may not be able to share his VO₂ max with us, or his fast-twitch and slow-twitch muscles, or his tech, or his team. But we can all share his spirit.

Kipchoge has broken two hours, and there's no doubt he'll do it again on an officially sanctioned marathon course. Just like

when the sound barrier is broken, we hear a boom: “Now when you go to an airport bar in the Midwest, people are talking about Kipchoge,” Robinson says. After Breaking2, “anywhere you went, from a bagel shop to a pizzeria to a barbecue spot, that's what Americans were talking about.” Bill Rodgers agrees: “He's an international figure now, like a soccer star.” It's accomplishment enough to become a star in a sport as unflamboyant as long-distance running, but now his shine is lighting up the whole activity. “Kipchoge is someone Americans are talking about,” Robinson says. “And it's high-octane on the running boom.” Benoit Samuelson says it best: “How can you not love the guy?”

As you watch a human being run a marathon in under two hours, it is fair to wonder whether there is anything a person can't do. Keflezighi is contemplating that very thing. “We're all stronger, faster, and quicker than we ever think, and sometimes we surprise ourselves, but there is a world we cannot go to, right? For a marathon, you can't say one hour.” Keflezighi pauses, and so do I. Because *of course* you can't. *Can you?*

Maybe that pause is what Eliud Kipchoge has really given the world. That moment of uncertainty that creeps in after we say, emphatically, that something cannot be done.

In Kipchoge's world, we're all a little bit less certain that limits exist at all, that there is anything the human mind, will, body, and soul can't accomplish. The experts and the veterans said a sub-two-hour marathon couldn't be done. And they were right. Until Eliud Kipchoge did it.

What's your sub-two? What's the thing the voice in your head is insisting you cannot do?

I mean, that voice is right. For now.

Maybe tomorrow it won't be.

Take it from Eliud Kipchoge: You can't do it.

Until you can. 

↙
Kipchoge and his wife, Grace, embrace after the INEOS Challenge. It was the first time she'd seen him race.





In Kipchoge's world, we're all a little bit less certain that limits exist at all, that there is anything the human mind, will, body, and soul can't accomplish.



➤ Kipchoge crosses the finish line of the 2022 Berlin Marathon, breaking the world record.



Eliud Kipchoge wore the Nike Alphafly 2 for his 2022 Berlin Marathon win. His race there lowered the world record to 2:01:09.

THE FASTEST MARATHON SHOE EVER

THERE ARE FEW SECRETS SURROUNDING NIKE'S ALPHAFLY, YET SCIENTISTS STILL STRUGGLE TO EXPLAIN WHY THE SUPER SHOE IS SO SUPER.

BY JOHN TYLER ALLEN



WHEN THE PUBLIC first noticed Nike's new Alphafly, it didn't look like much: In August 2018 the French Instagram account @RUN'IX posted a photo of Eliud Kipchoge flanked by smiling runners. There, atop the red Kenyan soil, Kipchoge is wearing a nondescript black upper attached to a chunky slab of what looked like the Vaporfly's ZoomX foam. This was the first spark of speculation on how Nike planned to follow up on its world-beating Vaporfly, though Kipchoge had already been testing prototypes since January.

In the two years prior, Nike's new Vaporfly, unique for its thick, bouncy Pebax-based foam midsole and carbon-fiber plate, had upended the less-is-more maxim governing racing flats by winning—sometimes sweeping—nearly every major marathon it entered. And in the month after those first mysterious photos, Kipchoge, wearing Vaporflys, would claim his first marathon world record in 2:01:39 at the 2018 Berlin Marathon.

More photos of the new prototype, midsole seemingly (bewilderingly) thicker than the Vaporfly's, surfaced every few months until, in October 2019, in Vienna, Kipchoge wore a polished version of the still-unnamed shoe to clock the first sub-two-hour marathon (albeit not an official record) at the Ineos 1:59 Challenge. The following June, the Air Zoom Alphafly NEXT% was released—and, last year, was updated as the Alphafly 2. Meanwhile, Kipchoge has used Alphaflys to lower his official world record to 2:01:09 and claim his second Olympic gold medal in the marathon.

The Alphafly, with its air chambers, is an obvious evolution from the Vaporfly. And it retains the mechanically familiar block of responsive foam stabilized by a heel-to-toe carbon-fiber plate. That's no longer a mystery. But how, exactly, does that system translate physiologically to the fastest marathon ever run? Biomechanists are still figuring that out.

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THE PREMISE OF the Alphafly is simple, says Carrie Dimoff, a Nike director of innovation who leads the Alphafly development team: "If we can store more of your energy and return more of that energy, you can run more efficiently."

All of running is energy maintenance, from our shoes to our stride. "We are essentially giant springs as we run," says Geoffrey Burns, PhD, a sports physiologist at the U.S. Olympic and Paralympic Training Center. In the air, between footfalls, we're gathering potential energy both from the forward motion of our previous step and as gravity pulls us down. When our foot strikes the ground, our bodies begin

accepting and storing that now-realized potential energy, mostly in our muscles and tendons. Then, in dynamic concert, these muscles and tendons recycle that energy, adding a bit of effort to maintain our kinetic momentum, and push us forward off the ground and back into the air. Researchers quantify how much energy we each require to run—our "running economy"—by measuring the amount of oxygen our muscles demand during an effort that we can sustain for hours.

In 2017, researchers from the University of Colorado and Nike published a study in *Sports Medicine* showing that runners averaged a 4 percent improvement in running economy wearing a Vaporfly prototype compared to running in Nike's racing flat, the Zoom Streak 6, or the 2016 Boston Marathon-winning Adidas Adizero Adios Boost 2, also a flat. Months later, Nike tied its shoes to this improved running economy when it launched the Zoom Vaporfly 4%.

The highly cushioned Vaporfly was a paradigm shift, sending shoe developers, footwear researchers, and runners on a quest for shoes promising biomechanical efficiency. "We'd been saying forever that minimal was better," Dimoff says. "We needed these specific study numbers to explain why people should trust, suddenly, this very tall shoe."

The idea that a shoe with those attributes could be fast had been a revelation at Nike, too, and in June 2016, almost a year prior to Kipchoge's first sub-two marathon attempt wearing Vaporflys, a development team was already working to see how far they could push this cushioned propulsion in a new model. "We weren't looking to invent a companion shoe to the Vaporfly," Dimoff says. Instead, they were asking how they could make the system more energy-efficient.

"We started thinking about the Nike Zoom Air technology," Dimoff says, referencing Nike's trademark air-filled-rubber cushioning, which debuted in the Air Tailwind running shoe at the 1978 Honolulu Marathon. As a component, they believed these air units could return more energy to the runner than Nike's springiest foam. "We thought we could make the system more efficient by swapping out some foam for air," she said.

To find out, Nike researchers started conducting mechanical tests on individual components—air units, foam, plates—to answer some initial questions: How much energy was stored? What shape is the deformation curve? Which returns the most energy?

They designed and built the air units first, and then began cobbling prototypes around them. Systems of components came next, with partial builds going through further mechanical testing. By late 2016, wear-testers were already putting the first of hundreds of prototypes through paces





“Everybody at the time made a huge deal about this carbon-fiber plate, but that foam is the magic, that’s the game changer.”

on treadmills and across Nike’s campus. Throughout the process, Dimoff says, they were looking for “the right balance between what the science told us was performing the best and what the runners told us was the most comfortable; the ones they had the most confidence in.”

Finally, in January 2018, Dimoff and team took the first of at least five rounds of prototypes for Kipchoge to test at his training camp in Kaptagat, Kenya. “We think we have something even better,” the design team had told him. Kipchoge was game to try it. “He just put them straight on and ran,” Dimoff says. “There was no hesitation. He just saw innovation.”

THE HEART OF the Alphafly—and its Vaporfly cousins—is not the much-discussed carbon-fiber plate, but the ZoomX foam. ZoomX is Nike’s custom formulation of Pebax, a proprietary polyether block amide (PEBA) thermoplastic elastomer (flexible plastic). A PEBA’s chemical structure can be precisely ordered to exhibit a staggering range of properties: hard enough to form the top layer on skis, soft enough to be a waterproof jacket layer, or, as with ZoomX, puffed into a foam. Nike has been deploying it as the hard outsole on the bottom of its cleats since the 1990s and, in 2000, as a plate, in the Shox R4 running shoe.

This capacity for precision tuning is also what allows PEBA foams to be made softer or firmer, bouncier or more rigid. Nike refused to discuss the development of its Pebax foam, but did say it manufactures ZoomX to “produce different benefits” for different shoe models. “In the Alphafly and Vaporfly, we’re manufacturing

[ZoomX] to produce the most energy return,” says Nike Running footwear senior product manager Elliot Heath. “Whereas, in the Invincible [trainer], we manufacture the material a little differently to produce cushion for everyday runs.”

Critically, for the Alphafly and Vaporfly, PEBA foam could be optimized to produce properties previously thought contradictory: tall but lightweight, plush yet springy. In a shoe midsole, all foam acts as a spring: It absorbs and stores potential energy when compressed by the foot (known as compliance) and returns a portion of that energy as the foot rolls onto its toes and pushes off, when the foam rebounds to its original shape (known as resilience).

Midsole foams—EVA, TPU, and PEBA—vary in their capacity for compliance and resilience. And none give back as much energy as they get. At its best, the standard EVA foam used in most shoes returns around 65 percent of the energy put into it, Burns says. The Adidas Boost 2’s fairly unique TPU foam, measured in the original Vaporfly 4% study, returns a laudable 76 percent. And in that same study, the Vaporfly’s ZoomX foam returns an unprecedented 87 percent.

“Everybody at the time made a huge deal about this carbon-fiber plate, but that foam is the magic, that’s the game changer,” Burns says about the study.

But the amount of energy that midsole foams return is only half the equation, Burns says. There’s also how much energy is stored. Consider the thin rubber soles on minimalist shoes, he says. They return nearly all the energy put into them. But because they can hardly be compressed, they store virtually no energy and return little.

The energy returned by the three foams in the Vaporfly 4% study—65, 76, and 87 percent—was a percentage of the total energy those foams were able to store to begin with. And when the researchers measured this storage capacity, they found the Vaporfly prototype’s ZoomX, when compressed, stored nearly twice the energy of the other shoes. When this energy storage capacity was compounded by the foam’s superior energy return, overall, the Vaporfly returned more than twice the amount of energy per step. The authors credit “its substantially greater compliance rather than the greater percent resilience.”

The foam’s weight, or lack thereof, is what makes all this possible. “For a very resilient spring, the longer it is—the stack height of a shoe—the more energy you can store,” Burns says. But increasing the stack comes with a weight penalty. Studies have quantified this “cost of cushioning.” Every 3.5 ounces (100g) of added weight per shoe reduces running economy by roughly 1 percent. The Adidas Boost 2’s TPU improved on traditional EVA, but that racing flat weighs roughly the same as the Alphafly 2, which stacks its lightweight ZoomX foam twice as high.

“So,” Burns says, “a super shoe is not just a high-energy-return foam, it’s not just a compliant foam, it’s not just a lightweight foam. A super shoe needs all three of those things.”

And what about that carbon-fiber plate? When the Vaporfly debuted, the running world seized on this and armchair biomechanists labeled it a spring that propelled the runner forward (akin to the carbon-fiber blades that South African sprinter Oscar Pistorius raced on at the 2012 Olympic Games).

Cries of technological doping rang out—at least until Nike’s competition produced their own super shoes. A 2022 study in which Wouter Hoogkamer, who led the original Vaporfly study and now conducts research at University of Massachusetts Integrative Locomotion Lab, took a table saw to the forefoot of a pair of Vaporflys, making six lateral cuts through the bottom of the



Courtesy NN Running Team



Eliud Kipchoge
wins the 2022 Berlin
Marathon with
a time of 2:01:09, a
new world record.

shoe and the plate, and then compared subjects' performance in them versus wearing an intact Vaporfly. While the study tracked only 13 participants, the sliced plates worsened subjects' running economy by only 0.5 percent. And, lining up with previous studies on carbon-fiber plates, the intact Vaporflies produced longer ground-contact time and a noticeable forward shift in ground reaction forces, suggesting that the plate, instead of acting as a spring, is guiding forces into the forefoot, acting like a stiff lever, and increasing the stance's propelling phase.

This fits with Dimoff's description of the plate's purpose. "It stiffens the shoe to reduce joint work and allow your stride to be more efficient," she says. Highly pliant cushioning inherently lacks not only stability, but also coordinated forces. The plate brings the center of pressure to where we need it under the foot, says Iain Hunter, PhD, an exercise science professor specializing in running biomechanics at Brigham Young University. In 2019, Hunter published a study in the *Journal of Sports Sciences* validating the original Vaporfly study. During our foot strike, "the force under the foot drifts forward, builds, and peaks around the middle of the time we're on the ground," he says. The foam compresses, storing energy, and then the plate, because of its rigidity, positions the foam to "give that energy back close to the time the person needs it."

The plate's sculpted shape, with a spoon-like dip in the forefoot, makes this choreography possible. "We want your foot to roll efficiently," Dimoff says. "A flat plate would be a slappy experience. That would actually add work."

The Alphafly uses the same plate, tweaked to distribute force across the dual Zoom Air chambers. The energy return of the units tests upwards of 90 percent, Dimoff says. The puck-like pods include tensile nylon fibers, tethering the bottom of each chamber to its top to create a flat floor and ceiling that loads and returns forces vertically.

In October 2020, Dimoff's team began Alphafly 2 prototyping with a new goal: Improve the shoe while making its advantages accessible to more runners, those training to break three, four, and five hours in the marathon. The Alphafly 2's base was slightly widened, the air chambers now sit on a sliver of foam, the heel drop was bumped from 4mm to 8mm, and padding was added to wrap the heel and top of the foot in a closer, softer hug. This overall tune-up increases lateral stability and smooths the tran-



sition into the forefoot.

The shoe's foam, plate, and air units remain the same, running just as efficient as the generation before it. Not that anyone but Nike knows exactly how or why any Alphafly always tests out on top. When I began reporting this article, I wanted to identify the technological linchpin responsible for the Alphafly's ability to improve running economy. PEBA foams and carbon-fiber plates are no longer unique to Nike, after all. But I learned, and was reminded, in every conversation and each study I read, that the mechanics of this shoe (and other super shoes) are a product of an intricate and interdependent architecture. Dimoff spelled this out for me: "There are lots of really high-performing materials and components to the shoe," she says. "But what makes them special is the way they come together in a system."

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THE ALPHAFLY'S EMINENCE is, broadly, easy to explain: It's simply a better system and a better spring. Even so, when the world's top running biomechanists and kinesiologists have taken the shoe, or the Vaporfly, into a lab to define why it's superior to the competition that's emerged, the results are inconclusive. They've admitted as much: "The better running economy...cannot be currently explained from a biomechanical standpoint," a group of researchers from the University of Lausanne Institute of Sport Sciences and the Volodalen Swiss Sport Lab wrote in a 2022 *Footwear Science* paper.

There are theories, all with evidence, on how these shoes improve running economy. In both the original Vaporfly study and Hunter's follow-up, subjects wearing Vaporflies showed slightly longer stride lengths compared to the same control shoe, the Nike Zoom Streak. Hunter's study also found those wearing Vaporflies ran with



“He just put them straight on and ran. There was no hesitation. He just saw innovation.”



relative to a traditional shoe, but less so, with subjects averaging a 1.4 percent improvement and 0.9 percent improvement, respectively.

To Joubert, the studies converge. In Alphaflys and Vaporflys, larger ground reaction force—stronger, faster, bouncier running—seems to generate greater improvements in running economy. “You can only get back what you put in,” Joubert says. He thinks a runner’s weight, too, could factor, especially in the bigger Alphafly. “If you’re really lightweight and barely getting off the ground, how are you benefitting from these 40 millimeters of stacked foam?”

The hypothesis gaining the most traction comes from Nike researchers’ 2019 *Footwear Science* abstract showing that a group of Portland Marathon finishers wearing the Vaporfly 4% exhibited lower blood markers for postrace muscle damage. Anecdotal evidence for this is strong, as well: On big runs in the Alphafly or Vaporfly, your legs seem to last longer, they’re not so taxed at the end, and they’re less sore the next day. “Exercise physiology is coming to accept that muscle cramping late in the race has a lot more to do with muscle damage than hydration or electrolyte imbalances,” Joubert said. “From personal experience, the last marathon I ran, in the Alphafly, I was at mile 22 thinking, ‘I’m not supposed to feel this good. When are things going to fall apart?’”

But, as Joubert and others told me, none of this is evidence that the Alphafly is the superior shoe, or that any super shoe will be super for everyone. Across studies, at all speeds, individual responses to these shoes range from 3 percent detriment in running economy to something like a 6 percent gain.

“We [each] have a unique interaction with the ground,” Burns says. And this extends to shoes, too. “The way you move through the foot strike and load that foam, and move over that plate, is going to differ for every single person.” He sees the leading hypotheses proposing why the shoes are beneficial—the foam is returning more energy to the runner, the plate is guiding contact forces—and why some see improved running economy and others don’t, and he says they’re plausible. “But nothing is clear yet.”

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IT’S ALREADY HAPPENING again. This time the first hints of the next Nike super shoe popped up at the December 2022 California International Marathon—six months since the Alphafly 2’s release—where a racer was seen wearing a prototype with a more angular chunk of white ZoomX under another plain black upper. At this January’s Houston Half Marathon, Conner Mantz was spotted in similar shoes en route to his 6th place finish. Both pairs appeared to have white tape concealing the air units. In March, wearing a polished version, painted with a swoosh, air units visible, Tsehay Gemechu took 2nd place and Suguru Osako placed 9th among the women and men, respectively, at the Tokyo Marathon.

Nike remains tight-lipped; a spokesperson declined to call it an Alphafly, referring to it as the company’s “latest marathon innovation.” But the familiar air units and similar foam contours are compelling evidence for a system update. Compared to the Alphafly 2, the prototypes appear to add foam midfoot. This could improve the shoe’s transition from heel to toe-off, says *Runner’s World* testing director Jeff Dengate. “There’s also less rubber used in the back half of the shoe. Nike probably didn’t see much wear there, so the little patch there may save weight.”

Nike did share one detail, and perhaps it’s the only one that matters: The fastest marathoner of all time is currently training in these shoes. 🏃

greater vertical oscillation, more bounce in their step, while Hoogkamer’s study, in an adjacent data point, found they ran with greater ground reaction force. Hoogkamer’s study showed that heel-strikers saw slightly greater improvement in running economy than midfoot-strikers. Are they utilizing more of the foam? Studies adding carbon-fiber plates to traditional midsole foams have shown the same benefits for heel strikers. Maybe these runners are simply leveraging the full potential of the plate.

A 2022 *Footwear Science* study by Dustin Joubert, PhD, assistant professor of kinesiology at St. Edward’s University in Austin, Texas, presented results from the only head-to-head research I could find that measured the Alphafly against other super shoes (the Hoka Rocket X, Saucony Endorphin Pro, Asics Metaspeed Sky, New Balance RC Elite, Brooks Hyperion Elite 2, and the Vaporfly Next% 2). On average, the 12 subjects showed the greatest improvement in running economy in the Alphafly (3 percent), with statistically similar results for the Vaporfly and Metaspeed Sky (at 2.7 and 2.5 percent, respectively). Joubert doesn’t know exactly why.

He found correlations hinting at how the shoes are working and who is benefitting, though with only 12 participants, none of the explanations “popped out” as much as he would have liked. Similar to Vaporfly studies, Joubert’s study found that the Alphaflys produced the longest stride length, and that the shoe’s lowest responders, those who saw the smallest gains in running economy, ran with slightly lower vertical oscillation than the other runners.


In a follow-up study, published this year in the *International Journal of Sports Physiology and Performance*, Joubert, with Burns, measured the running economy gains in subjects wearing Vaporflys while running 8:00- and 9:30-minute/mile pace, in contrast to the 6:00- to 7:00-minute/mile paces typically employed in these studies. The results showed that the Vaporflys, at slower speeds, still improved running economy

Eliud Kipchoge
takes a quiet
moment at home
in Elodoret, Kenya,
to read a book.

ELIUD KIPCHOGE'S HIGHER PURPOSE

▶ HIS BIG DREAMS AND SERIOUS AMBITIONS
GO FAR BEYOND RUNNING.

BY DAVE HOLMES



WHEN YOU ASK the greatest marathoner of all time what he'd be doing with his life if he'd never picked up running, you're going to get a quizzical look. When I pose the question, Eliud Kipchoge's brow furrows a bit and stays furrowed. Not angry, not annoyed, more like I'd just started speaking Esperanto.

It's the end of a Monday at his training camp in Kaptagat, Kenya, where he arrived this morning after spending most of the weekend with his wife, Grace Sugut, and their three children at home 20 miles away, and where he'll stay until he goes back on Saturday, as he does each week. The work of Monday is done (a long-ish run in the morning and an easy hour in the afternoon), and dinner awaits.

So far in our talk, Kipchoge has been affable and polite. In conversation, as on the course, he presents himself as the epitome of clean living, clean training, and clean thinking. He is a devout Catholic. He's had the same coach—1992 Olympic steeplechase silver medalist Patrick Sang—for more than 20 years. He eats well, runs hard, reads those inspirational books you see in airport bookstores (his all-time favorite: the motivational fable *Who Moved My Cheese?*). If not for the wife and kids, we'd call him monastic. His answers rarely stray far from the subjects of a positive mindset and dedication to peak performance, and when they do, like a patient coach, he leads them gently back. But right now, Kipchoge is not unaffable or impolite, he's just...still. And I feel like I've offended him.

Whatever it is that makes him pause, it gives me a moment to think about the man. Here in America, where our athletes are as media-coached as our movie stars, our habit is to dismiss Kipchoge's style of relentless positivity as phony or disingenuous. But what if it's not? Eliud Kipchoge has done the impossible by running the first sub-two-hour marathon, and the merely improbable by becoming a globally famous long-distance runner. He's set the world record and seems poised to break it. He's a few weeks away from his first Boston Marathon, where he'll face a deep field that includes Evans Chebet, Gabriel Geay, Benson Kipruto, Lelisa Desisa, and, of course, Heartbreak Hill. (This issue went to press several weeks before the race was scheduled to take place on April 17.)

Life is running for Eliud Kipchoge. Life has to be running. None of this is possible any other way. It's why the thoughts have to be positive, the stomach has to be full, the wife and kids have to be just far enough away. This life is a good life, and it is the result of singular focus, and positive thinking, and singular focus on positive thinking. Every thought has to be locked in on the here, and the now, and the good.

Let the merely great waste their mental energy on thoughts like where else they might have been. To be the best, the very best who ever was, you need to be all the way where you are now, and where you want to go.

He holds that quizzical look for a long time, and then I realize that he isn't blinking or breathing, and then I realize he's been staring at me in furrowed-brow silence because his screen is frozen. Even the best who ever was has to deal with janky WiFi.

I ask the question again: Where would you be if you hadn't started running?

He says he doesn't really think about it.

This interview has been edited for length and clarity.

Runner's World: So Boston is about a month away. How are you feeling about it?

Eliud Kipchoge: I'm really excited. I'm really looking forward to putting my foot again on American soil, and I expect a good race.

RW: Who will your toughest competition be?

EK: I think everybody's a tough competitor, and I give them total respect. If they have prepared and planned enough, they can take the day. And if I have prepared enough and planned enough, I'll take the day.

RW: You've said that you think Boston is going to be the hardest race of your life. Can you elaborate on that?

EK: It'll be a different experience, especially in America. It's been a long time since I raced in Chicago. And now it's Boston, my first one. It's a tough course, all around. And yeah, the stories of being uphill and uphill...it will be a tough day.

RW: Have you decided what your autumn marathon will be?

EK: Not yet. I have to put all my energy into Boston. After Boston, I will put everything on the table.

RW: Okay, so we're totally focused on Boston, and everything else will wait. This far out, what does a typical day at training camp look like for you?

EK: Monday, I have a long run for an hour twenty, and then an hour in the evening. Tuesday, I will have a track session, totaling 15 kilometers. And later that day, I will have easy runs for an hour. Wednesday will be like Monday. Thursday I will have a long run, 30 or 40 kilometers. Friday will be like Wednesday and Monday. Saturday is a big day with the fartleks, and an easy run in the evening. And Sunday is a long run day, it's an easy 30 kilometers or 25 kilometers. So that's how my week will be.

RW: What does your nutrition look like throughout the day?

EK: I eat normal food, normal Kenyan food. I eat beef and ugali (a traditional porridge made from maize or cornmeal) in the evening. Lunchtime, I just take beans and potatoes and rice, and I'll take bread and tea in the morning. So it's simple, but a well-balanced meal.

RW: You are totally focused on Boston right now, and the training is your life. I'm doing New York in 35 weeks, and I have just a few hours a week to get in shape. What's your advice for amateurs like me?

EK: For the social runners I coach, they have a limited time because of their work, because of their responsibilities. They should try to devote



Posing with a fan after winning the 2022 Berlin Marathon and setting a new world record.



I will embark on mentoring the next generation, educating young people on many issues: on investment, on general life, on discipline, on what's required as a human being.

an hour every single day to train, if their schedule allows. If not, then make sure to run three or four days a week. But make sure to end a week, like on Sunday or Saturday, with a very easy long run, an easy two hours to make the body rejuvenate and get ready for another new week.

RW: Is there a piece of advice you've gotten from your coach, Patrick Sang, that really sticks with you?

EK: One thing that he gave me, 20 years ago, is that he told me, "You should treat yourself as the best one." That's what I'm doing. I respect my training, I respect everything. But when I'm in a starting line, I treat myself as the best one, the best trained, the best planned, and the one who has done more training than anybody else. That's what I'm carrying for the last 20 years.

RW: How do you instill your work ethic into your kids? I imagine their upbringing is slightly different than yours was.

EK: Their upbringing actually is totally different. But I have tried to explain to my kids that I'm away from Monday afternoon to Saturday morning because I want to train hard and compete in higher races, break the world records, and all of us will enjoy life. So my children understand that their daddy is working hard all the time in order for them to get food on the table, to go to a good school, to be happy and live in a good way.

I want them to understand that if you work hard, you can achieve it. And if you work hard, you can set a standard and get something. Because they know that if I won a race, they're happy, and they'll go places, they'll go to school, they'll be comfortable. So they're also working hard knowing that it's a responsibility.

RW: What if one of them decided to become a marathoner? Would that make you happy? Would you be concerned?

EK: It'll make me happy. Yeah. But if one of them actually decided to be a tennis player or a footballer, I'll give them support. I give them autonomy to choose. Sometimes they run, they bike, they go for football. But I think as the time goes, they'll choose the type of sport that they like.

RW: Have you had days that didn't go as well as you had hoped?

EK: Absolutely. I have had days that my body cannot respond well. But those are the challenges in running. Because all the days are not equal. Today, you have a lot of energy. Tomorrow, it's halfway, the next day is okay. When the day is not promising, then I try to do what I can. I try to push, and then I call it a day.

RW: In that whole process, is it just you talking to yourself?

EK: I normally talk to myself. I normally audit what

has been happening for the last year, see what's going on. And knowing that this is just temporary. So I talk with myself. And the next day, when I wake up, I'm energetic again.

RW: So each day is a blank slate.

EK: Absolutely, yes.

RW: You're the most famous marathoner, probably ever. Is that something that you let yourself think about, or is it something you keep out of your mind?

EK: I do think about it, but I don't get answers with my thoughts. But the beautiful part is that I'm instilling inspiration to many people in this world. I really feel happy, yes.

RW: What's the most challenging part of being famous the way that you are?

EK: All the responsibility that is on my shoulders, from the race organizers, sponsors, all my fans, physical fans and also on social media channels. So it's a lot going on in my life, but I need to move on and show them that together we can make this world a running world.

RW: You've said that religion is extremely important to you, and that it's kept you from doing things that would take you off the path of training. What did you mean by that?

EK: Just being disciplined. It brings me from outside the course and puts me inside the course so that I'll enjoy my life actually by going to sleep, rather than going to the club.

RW: You do a lot of philanthropic work. Is there one project that you are most proud of?

EK: I'm most proud of the library that's been constructed in my home area. It's a huge library, and I want to build libraries like it across the whole country. Another thing is I adopted a huge forest here in my training area. We have plans to plant 2,000 trees in May, and I am proud of the conservation and education, and I think one day it will spill to the whole country and even East Africa.

RW: So what do you want your legacy to be? How do you want to be remembered?

EK: I want to be remembered by people knowing that no human is limited. Above all, I want to make this world a running world. I'll be a happy man if all citizens can run.

RW: I have to ask about doping. It still happens despite all the controls. What do you think has to change so that athletes don't feel they need to cheat?

EK: I need people to know that sport is a career. And it's a career that builds logically, that grows

slowly until you get where you want to be.

If you go to the gym, you cannot get a lot of muscles if you train for 10 hours. But you can get a lot of muscles when you go for six consecutive months and maintain discipline. What I mean is this: People should train and wait for the money to come slowly. They should not rush for financial gain. What makes people dope is financial. What makes people dope is pushing them about the performance.

It's unfortunate that people are not learning. It's unfortunate that doping is around us, that people are still doing it for financial gains. If all of us can get the knowledge and treat sport as a real profession and treat the sport as a career that you need to build slowly and the only way to build is to train in a clean way...you'll get a lot of people interested in you.

If all of us can [recognize] that what we are doing is for our lives and for our next generation, doping will go away. But we need a lot of time to teach the young generation and tell them, "Hey, let's treat ourselves in a positive way, and treat the sport in a positive way, by making it a real profession and building it as a career."

RW: Aside from winning Boston and whatever the autumn marathon will be, what's left on your list of things you want to accomplish in life?


EK: A lot. I've never run New York. New York's still there. I'll be running other big city marathons in the future, visiting all the countries, even running in Iceland. Running in the Caribbean and, hopefully, one day running across Haiti.

RW: Have you thought about what your life might look like after you leave running behind?

EK: I will embark on mentoring the next generation, educating young people on many issues: on investment, on general life, on discipline, on what's required as a human being. We are all human, but you need to be a real human being whereby we respect each other.

I'll also put my energy on my foundation, the Eliud Kipchoge Foundation, which deals with education, conservation, and health. And above all this, I want to spread the word of positivity and running. I want to have more followers, a billion followers actually, on social media channels, to help me push the idea of running. I always tell people health is our wealth, so I want to make people healthy through running.

RW: Speaking of health, what's for dinner tonight?

EK: Tonight I will have veggies and beef, and ugali. And then I'll have a glass of milk and go to sleep. 



Kipchoge (center) and some of his NN Running teammates during a Thursday 30K long run in the forest in Kaptagat.

2022



5'6"
HEIGHT

0.16
second
APPROXIMATE GROUND
CONTACT TIME

115-125
pounds
APPROXIMATE
WEIGHT



➤ Kipchoge in 2022 on his way to a world record in the streets of Berlin with a team of three pacers.



1:59:40

THE NUMBERS
THAT PROVE
KIPCHOGGE IS
THE UNDISPUTED
GREATEST.

BY A.C. SHILTON

MARATHON MATH



IF YOU'VE EVER watched Eliud Kipchoge run on TV, it is possible that your brain has thought, you know, he actually doesn't look like he's going all that fast.

Your brain is wrong. If you cheer at his next marathon, he will seem to blow by. If he passed you on a running path, he'd be gone faster than your dignity after eating a pre-group-run burrito. But because the motorbike-mounted camera is keeping that same incredible 13mph pace, our gray matter fails us. Our visual perception of motion relies on our brain's ability to compute how fast something is moving relative to objects around it. So if you've never witnessed Kipchoge in person, rest assured, he is going very, very fast.

At his marathon pace, he could literally run around the world in—wait for it—just under 80 days. He could run to the moon in 18,233 hours and 12 minutes. And he could kick it down Route 66 in just over a week.

It's not like Kipchoge is the only fast marathoner on the planet. In a Kipchoge-less world (perish the thought), we could be writing here about the world's second fastest marathoner ever, Kenenisa Bekele. His 2:01:41 from Berlin 2019 is not quite 0.4 percent slower—just 32 seconds—than Kipchoge's official 2:01:09 world record. But it's in that sliver of seconds where Kipchoge becomes a legend. It's why he was chosen to break the two-hour barrier—and why he pulled it off.

Slapping GOAT on every athlete having a moment isn't particularly scientific—or accurate. Superlatives unanchored by context tend to just float toward hyperbole. The greatest show on earth? Says who? The country's best yogurt? Using what metric? We wanted to understand that line between great and greatness—both what defines it statistically and creates it physically.

WHEN YOU LOOK at Kipchoge's race times, what really emerges, says Melissa Kovacs, PhD, a statistician and runner, is his consistency. Take all of Kipchoge's marathon finish times over the past nine years: The mean—or average—finish time (2:04:25:18) is almost exactly the same as the median—or middle—finish time (2:04:10:99). That's one clue that all the numbers are clustered together. Then there's just how often he lands on the podium. He's only once finished a marathon off the podium, and in all but two of his attempts, he's come out on top.

Another indication of his consistency is his standard deviation, meaning how much each value varies from the mean finish time. Kovacs, who describes herself as a data-obsessed recreational runner on a quest to qualify for Boston, wanted to see how Kipchoge's consistency stacked up to hers. She crunched the numbers for the 28 half marathons she's run over the past 19 years. Even at a shorter distance—which should mean there's less variation—her mean and median finish times varied by three minutes. Her standard deviation was over eight minutes. She also looked at another elite, Bekele, whose standard deviation for all of his marathon finishing times is three minutes and 14 seconds.

Kipchoge's comes in at just over two minutes.

These numbers are complicated a bit by the fact that marathons happen outdoors in cities where elevation varies and weather sometimes doesn't cooperate. When you just look at Berlin—a course Kipchoge has run five times—his consistency both over time and during the race is remarkable.

Between all five Berlin attempts, he's run the first 5K with a standard deviation of just nine seconds. Even at the half marathon, where he's jockeyed with other racers for 13.1 miles and taken the occasional outside tangent, his standard deviation is only 47 seconds. Looking at his 5K splits from his 2022 Berlin race, his pacing from start to finish is metronome-like. At the tail end of the race, when anyone else's exhaustion might have set in, Kipchoge takes just 29 seconds longer to cover the five kilometers between 35 and 40 kilometers than he took to cover the first 5K of the race. His standard deviations for all the 5K segments is just 11.24 seconds.


WHEN IT COMES to the very top of our sport, the differences between athletes become minuscule. Many runners try to duck just under the world record, hoping for the second or two they need.

In 2003, Paula Radcliffe snatched the record from Susan Chepkemei by a mere 4 seconds. And when Kelvin Kiptum ran the Valencia Marathon in 2022, he fell short of Bekele's record-setting Berlin time (2:01:41) by just 12 seconds, or a percentage change of 0.16.

In Kipchoge's second attempt to run the marathon in under two hours, he shaved 45 seconds off his time, from 2:00:25 to 1:59:40. That was a 0.6 percent change—a huge improvement in a sport where gains of 0.4 percent differentiate a world record holder from just another great runner.

WHEN NIKE BEGAN its Breaking2 Project, Kipchoge was one of 17 athletes under consideration to attempt to run a marathon in under two hours. A team of physiologists studied a host of factors about the runners, from calf girth to body-fat percentage. I talked to Andy Jones, PhD, a member of that team, about how Kipchoge can do what he does. "When it came to the actual marathon performance," especially over time, Jones says, "he is head and shoulders above everybody."

One of the most important metrics for elite runners is VO_2 max, which is essentially the amount of oxygen your body can consume during exercise, according to Aaron Parmar, an exercise physiologist who studies VO_2 max at Northumbria University in the U.K. While we don't know Kipchoge's exact VO_2 max—or any of his biometric



He's only once finished a marathon off the podium, and in all but two of his attempts, he's come out on top.

RUNNING SUB-2 ▶ BY THE NUMBERS

1.37
SECONDS

The **theoretical time penalty** Kipchoge paid for running on the streets of Vienna for the 2019 INEOS 1:59 Challenge versus running a perfectly flat, straight marathon.

10

The **number of pacers** who ran with Kipchoge in a reverse-V formation, with seven runners in front of Kipchoge and three behind—35 pacers rotated every 5K.

5.00
5.00

THE NUMBER OF METERS KIPCHOGE COVERED EVERY SECOND FOR ALL 42,194.988 METERS OF THE RACE.

46.4
SECONDS

The **advantage** the Vienna course had over the 2017 Monza Breaking2 course, due to its elevation and lack of turns.

85
PERCENT

The amount of drag that the reverse-V formation reduced.

2 CENTIMETERS

The **possible extra distance** Kipchoge covered beyond 26.2 miles, thanks to the rigorous process course designers used.

480–500
GRAMS

The **total amount of carbohydrates** Kipchoge is estimated to have burned at an intake rate of 20 to 30 grams of carbs per hour. He also burned 73.3 calories of fat and 983 calories of carbs per hour.

2.78
PERCENT

The **amount by which smiling** reduced the oxygen cost of vigorous running, per a 2017 study—which may be why Kipchoge is more often seen grinning than grimacing.

2 HOURS

The **time-zone difference** between Vienna and Kaptagat, Kenya, where Kipchoge trains. This minimal disruption to his schedule let him race at almost the exact same time that he would've at home.

120,000 (ish)

The **number of spectators** that lined the course to watch Kipchoge.



Kipchoge after winning the 2022 Berlin Marathon—and breaking the world record—with a time of 2:01:09.

data, as he has never released it publicly, and his press team denied my request to peep at it for this story—we do know the mean VO_2 max in Jones's elite group of 17 was 71.0 ± 5.7 milliliters per kilogram per minute.

You might be thinking, *How exceptional can elite runners' lungs really be? We're all human, after all.* But a 2020 study published in *Sports* looked at the physiology of 15 mid-pack marathoners as they geared up for the Athens Marathon. Eight were considered “moderate” athletes, finishing the marathon in under four hours. The other seven, finishing over four hours, were considered “low-level” athletes. (This four-hour marathoner would like a word.) The VO_2 max for moderate athletes was 27.7 percent lower than the elites in Jones's study. Low-level athletes, meanwhile, had VO_2 max numbers that were 45.2 percent lower than Kipchoge and his friends.

To run a marathon like an elite, you have to be able to sit and suffer at a slightly lower intensity than what you might choose for a few-minute sprint. That makes lactate threshold another crucial measurement for distance runners, which is the percentage of your VO_2 max you can hold before your body starts creating lactate—that substance that makes your muscles feel like they're burning. The faster you can run—or the higher the percentage of your VO_2 max that you can sit under—without creating a ton of lactate, the more successful of a runner you're going to be.

Kipchoge, assuming he runs around the middle of the 17 participants in Jones's study, would be able to run 62.9 percent faster than the moderate finishers in the Athens Marathon, and 105 percent faster than the four-plus-hour finishers, without reaching his lactate threshold.

The third big physiological measure that sports scientists look at when measuring elite distance runners is running economy, or the amount of oxygen their bodies consume to cover a distance, says Kyle Barnes, PhD, an associate professor of exercise science at Grand Valley State University. We don't know Kipchoge's exact running-economy numbers, but, Barnes says, “he's got to be incredibly efficient at these crazy paces that he's running,” adding that running economy is a mix of being biomechanically expedient, having the physiology to distribute oxygen to muscles, and having a robust army of mitochondria in your cells that convert fuel into energy.

“When we selected the three runners for the original Breaking2 Project, we were looking for somebody who had the right combination of those three numbers, and Eliud was certainly one,” says Jones, adding that, while he can't share Kipchoge's numbers, he's the rare athlete that seems to be strong in all the ways that count.

IN THAT COCKTAIL of things that make a runner excellent, there may be other factors, like bodyweight and power-to-weight ratios—i.e., how much power a runner's legs generate relative to how much their bodies weigh. Kipchoge is 5-foot-6 and weighs between 115 and 125 pounds. Jones's study found the average body-fat percentage of his 17 elites to be just 7.9 percent, which is far below the 16.3 percent that a 2013 study found to be the average for recreational male marathoners.

Likewise, Hannah Margaret Rice, PhD, an associate professor at the Norwegian School of Sports Sciences, took force and stride-length measurements as part of the study of these 17 elites. Rice says that using a forceplate, which captured the runner's force as their feet hit the ground, actually shows that elites running at race pace use less force than you or I would if we were trying—just for a few minutes—to hold 13.1 miles per hour.

However, compared to us plebian runners, elites are moving their feet much faster. Rice looked at ground-contact time, or how long these 17 elites had one foot on the ground before pushing off for another stride. They averaged just 0.16 second.

Shorter contact times tend to correlate with better running economy, Rice says, as you're essentially spending less time with your foot in the breakover phase, when it's stationary on the ground.

TAKEN TOGETHER, ALL these numbers show a man who perhaps has an edge over his competitors here and there through biomechanics and physiology—though, of course, they're always nipping at his heels. But Kipchoge, like all athletes, is more than just consistent split times and impressive lactate threshold values.

It is Jones's job to look objectively at data. And yet, his just-the-facts approach gets fuzzy around the edges when he starts to talk about what makes Kipchoge so great. “He's just a very special person,” he says, adding, “and he just exudes class, and calm, and he's just so intelligent, and he's just...there's just something zen-like about him.”

Rice is similarly mesmerized—and a little stumped—by exactly how Kipchoge is just so good. For her, the ease with which Kipchoge seems to run blazing-fast mile after blazing-fast mile is mind-bending. “I don't think the scientific community has put their finger on why and how this happens,” she says about the fact that Kipchoge seems to run almost as effortlessly at the end of a race as he does at the beginning. “He is a little bit of a mystery and a wonder.”

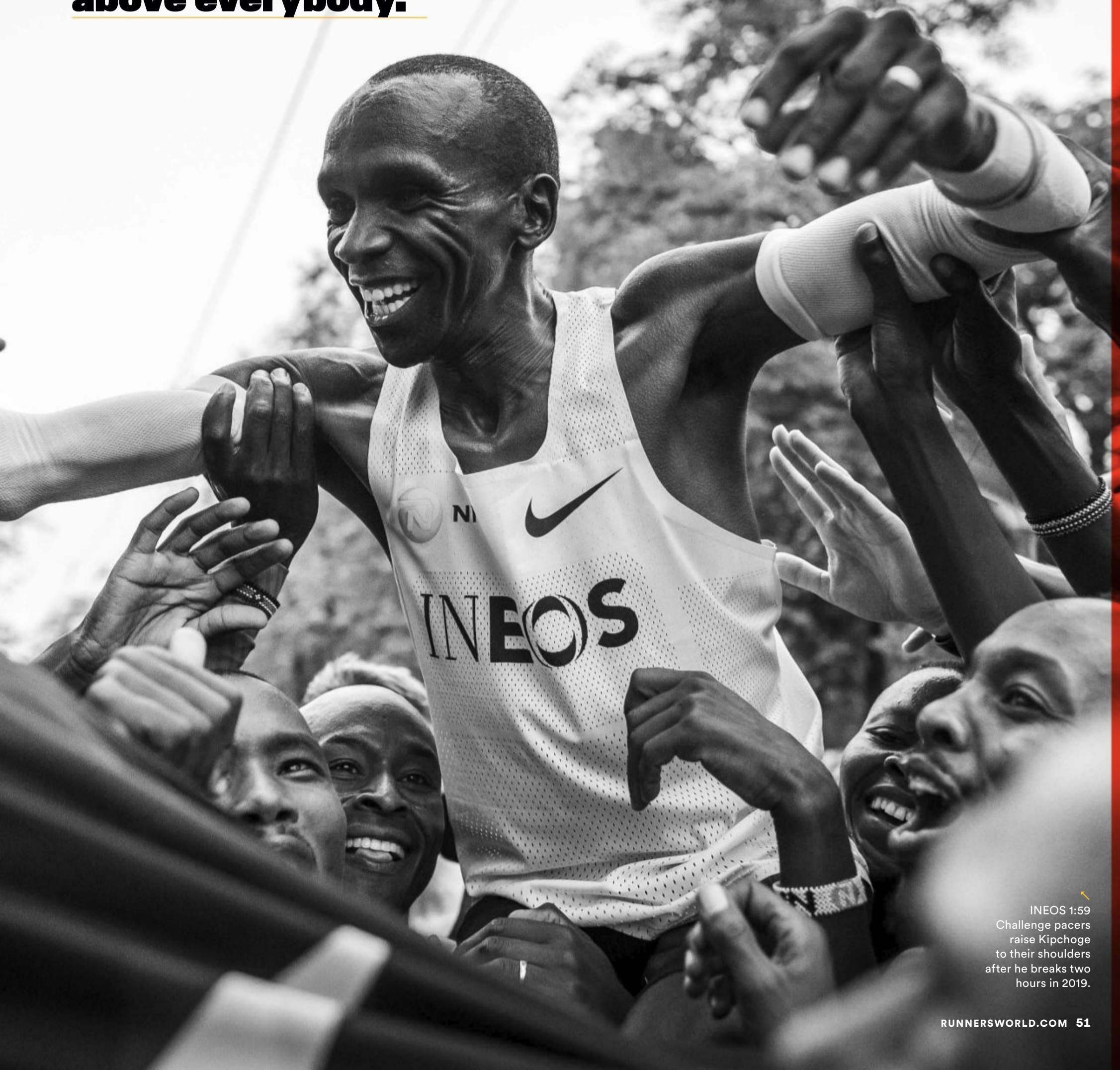
But these, of course, are qualitative descriptions, not quantitative data points. Which is why Jones has his own favorite, nonstatistical term for describing Kipchoge: He isn't so much of an outlier as he is a trailblazer.

What makes Kipchoge's racing exceptional, Jones says, is that Kipchoge is one of the rare runners who doesn't seem to be constrained by numbers.

Limits seem to only be suggestions to Kipchoge. 



“When it came to the actual marathon performance,” especially over time, Jones says, “he is head and shoulders above everybody.”



INEOS 1:59
Challenge pacers
raise Kipchoge
to their shoulders
after he breaks two
hours in 2019.

A black and white photograph of Eliud Kipchoge running on a dirt road. He is wearing a dark Nike jacket with 'FDJ' and 'N NM' logos, and 'INEOS' leggings. In the background, two people with backpacks are walking on the same road. The word 'TRAIN' is overlaid in large white letters on the right side of the image.

TRAIN

↗
Eliud Kipchoge
takes an easy
morning run
through Eldoret,
Kenya.



LIKE KIPCHOGE

LEVEL UP
YOUR
RUNNING
WITH
THESE FIVE
LESSONS
FROM THE
MARATHON
GOAT
AND
HIS TEAM.

BY SARAH GEARHART

THE MOST REMARKABLE aspect of the fastest marathoner in history is how unremarkable—and how accessible—his training is. Eliud Kipchoge has the best resources in the world at his disposal, but rather than relying on treadmills that cost more than a Lexus or recovery devices worthy of NASA missions, he follows simple training tenets that maximize how he recovers, what he eats, his mindset, and the conditioning he does after his runs. We talked to Kipchoge and the team at his Global Sports Communication training camp in Kaptagat, Kenya, as well as outside experts, to find out how anyone can apply his strategies. →



1

SLEEP
LIKE
YOUR
RUN
DEPENDS
ON IT

➤ Above: No napping yet, Kipchoge performs a core strength routine. Right: Taking a dip in his camp's ice bath.



2

REVIVE SORE MUSCLES WITH AN ICE BATH

TWICE A WEEK, Kipchoge takes a 10-minute plunge in his camp's ice baths to aid his postrun recovery. It may not be pleasant, but studies find that cold water immersion (CWI) therapy like Kipchoge's ice bath is effective. "Most research shows that over 48 hours, athletes have reported an improvement in DOMS [delayed onset muscle soreness] and sometimes corresponding improvements in strength and/or flexibility," says Rebecca Stearns, PhD, a professor of kinesiology at the University of Connecticut.

Cold water reduces the body's temperature, which narrows the blood vessels. This flushes metabolic waste from inflammation out of muscles to speed recovery, says Stearns. Water temperature between 50 and 59 degrees Fahrenheit for 10 to 15 minutes is cold enough to produce results, she adds.

You can set up an ice bath at home by filling a tub halfway with cold water. Then, depending on your tap temperature, add one to three 5-pound bags of ice. Stearns suggests trying CWI once or twice a week and checking with your physician to make sure you don't have any contraindications for doing ice baths.

"It's very intense. It's not for everybody," Kipchoge says. "You need to learn to relax and learn to absorb pain."

ELIUD KIPCHOGE SLEEPS up to 9 hours at night, often also taking an hour-long midday nap. Most of us don't have the time or the 120-mile weekly workload to clock that much shut-eye, but we can still benefit from Kipchoge's sleep hygiene cues.

At least 30 minutes before bed, he turns off or puts down all electronics. The habit reduces his exposure to blue light, known to delay the release of melatonin, leading to a decrease in sleepiness, says Kannan Ramar, MD, past president of the

American Academy of Sleep Medicine. Then, instead of scrolling through social media (he prefers Facebook), Kipchoge winds down by reading at least two chapters of a book.

"If I have enough sleep, my body and my mind are free of stress and ready to go with the programs," says Kipchoge.

While you're asleep, your body is doing more than resting. Crucially, your pituitary gland releases growth hormone, which helps your

muscles repair and grow, says Ramar.

Most runners don't need a nap if they consistently get the recommended 7 to 9 hours, Ramar says. But when you don't hit that target, naps can help counter short-term sleep loss and provide an energy boost for a late-day run, Ramar adds. He suggests a 20-minute doze between noon and 3 p.m. to relieve fatigue. Napping longer than 20 minutes can leave you feeling groggy due to entering a deep-sleep state, Ramar says.

3

UPGRADE YOUR DIET WITH PROTEIN

KIPCHOGE HAS ALWAYS maintained a high-carb diet, but after running 2:00:25 in Nike's 2017 Breaking2 project, he began working with exercise biochemist Armand Bettonviel to improve his nutrition and further push his performance. Bettonviel, who develops nutrition plans for elite athletes, sought to up Kipchoge's protein intake to aid his recovery as well as help to build and maintain his lean muscle.

"I've noticed a difference since I started to be serious about nutrition," Kipchoge says. "Recovery is very fast, I have a lot of energy."

While Kipchoge's exact protein intake is confidential, Bettonviel suggests runners aim for 1.5 to 2 grams of protein per kilogram of bodyweight. For a 150-pound runner, that's 102 to 136 grams.

Kipchoge's meals feature Kenyan staples like ugali (a cornmeal porridge), potatoes, rice, chapati (a wheat flatbread), managu (an iron-rich leafy green), beans, whole-fat milk, eggs, chicken, and beef. Meat is only served about half the week, so to hit his protein goal Kipchoge drinks mala, a local sour milk, says Bettonviel. Every 6 ounces has about 7 grams of protein, making it comparable to kefir found in most stateside dairy aisles.

Bettonviel also introduced a high-protein porridge to the camp menu (Kipchoge eats it with fruit after training) made with whey protein and teff, an ancient grain that offers 10 grams of protein per cooked cup. You can DIY by mixing a half scoop of protein powder with whole-grain teff—stocked at many grocery stores and sold on Amazon—and cook it similarly to oatmeal. Alternatively, Kodiak Cakes makes oatmeal with whey protein and 12 grams of protein per serving.



4

MEDITATE TO BUILD MENTAL STRENGTH

KIPCHOGE IS AN especially mindful runner, says his coach Patrick Sang. While training and racing, he focuses on his breath and his movements, and aims to minimize outside distractions. It's a skill that helps him embrace the pain and challenges of a marathon.

Mindfulness—a practice of focusing your awareness on the moment, with a kind and curious attention in a nonjudgmental attitude—can benefit any runner, says Corrie Falcon, director of mindfulness-based training for athletes at the University of San Diego Center for Mindfulness. Resting your attention on elements of a present moment, like your breath, heartbeat, or even a drip of sweat, can prevent you from getting caught in an inner dialogue mid-training or competition that may unravel your focus.

"In moments of high stress before or during a race, mindfulness has been shown to reduce the production of stress hormones, reduce blood pressure and heart rate, improve emotional regulation, and promote relaxation in the body," says Tara Zinnamon, PhD, a neuroscientist and meditation teacher.

Kipchoge credits his focused, spartan lifestyle for developing mindfulness, but it can also be cultivated through a consistent mindfulness routine. Even just 12 minutes of guided meditation five days a week for one month can be effective, says Amishi Jha, PhD, a professor of psychology at the University of Miami.

If guided meditation seems outside your comfort zone, Falcon recommends a strategy you can try while running. She describes it as a "sense practice." Run in silence. For two minutes, focus on what you see, then focus on sound, followed by what sensations you feel, and then smell. "And when you have a thought, label it 'thought' or 'thinking' and return to the present moment experience through the senses," says Falcon.




5

BUILD BONUS ENDURANCE ON A BIKE

TO BOOST HIS training volume without increasing his risk of a running injury, Kipchoge rides a stationary bike for an hour twice a week after his runs.

Cycling is a concentric (shortening) muscle-contraction activity, which is easier for muscles to recover from, says Colorado-based coach Bobby McGee, who has worked with runners and triathletes (including Olympic gold medalist Gwen Jorgensen) for more than three decades. In running, the primary loading is eccentric (lengthening), which is more demanding and damaging.

“A one-hour endurance run is limited by leg fatigue, not heart and lung fatigue. A two-hour ride doubles the cardio conditioning but has minimal leg-muscle damage,” says McGee.

Kipchoge spins at an easy pace, which he says also helps reduce muscle soreness. “Cycling is a far more effective recovery modality than an easy run, especially for bigger runners with a slower cadence,” says McGee. He recommends cycling no more than twice weekly and for less than 20 percent of your overall training time. 

Above: Kipchoge trains with his NN Running teammates. Left: Relaxing with a book at his home in Eldoret.

Evans Chebet after a morning run outside Kapsabet, Kenya, on February 20, 2023.



THE CHALLENGER

▶ **AFTER YEARS AS A RUNNER-UP ON THE WORLD MARATHON STAGE, EVANS CHEBET HAS BEEN ON A WINNING STREAK. CAN HE UNSEAT HIS HERO?**

BY BILL DONAHUE // PHOTOGRAPHY BY KHADIJA FARAH



BEFORE HE WON the Boston Marathon, before he won New York, and long before he built his mother a new home, Evans Chebet rented a small one-room house for \$12 a month about 45 miles south of Kondabilet, the tiny mountain village in Kenya where he grew up. The home was sparsely furnished with a stool and an old table. Chebet cooked outdoors—usually sukuma wiki (similar to collard greens) and ugali, a traditional cornmeal porridge—and in the long hours between training sessions, he sat outside and stared at the red dirt and the evergreen forest of the Kenyan highlands, reflecting on his luck.

It was 2007. Chebet was a 19-year-old aspiring distance runner, and he'd come to seek his fortune. He was living outside Kaptagat, a town of about 2,500 people, hoping to work his way into Kenya's talent pipeline. Many Kenyans who race internationally, including marathon world record holder Eliud Kipchoge, live in spartan high-altitude training camps in Kenya's Great Rift Valley, sleeping in tiny unadorned rooms and sharing housekeeping chores and communal meals. Chebet was trying to gain entry to a camp run by Rosa & Associates, an Italian sports management company.

Although he grew up with few financial resources, he was now—thanks to an uncle's largesse—rubbing shoulders with running's greats. "I was so happy to be there," he says.

Chebet was hardly a shining prospect. He'd never raced on the track. Indeed, he'd scarcely raced at all, and he was resigned to waiting outside the Rosa camp, and tagging along on the athletes' brisk morning workouts. "I'd start out with the front runners, trying to show my talent," he says. "But I'd get dropped."

While Kenya has flourished economically over the last decade, more than 36 percent of the population lives below the poverty rate, according to World Bank data. There were—and still are—hundreds of impoverished young men and women who haunt the locked gates of Kenya's elite training camps, harboring a ragged dream of stardom and wealth. Few succeed or even get a chance, but in 2008, a young Italian coach with Rosa named Claudio Berardelli saw something in Chebet and invited him in. "He was young and not very strong," Berardelli says, "but I'd seen some improvement."

That scrawny kid at the gate is now 34. He won both the Boston and New York City marathons in 2022, and he'll face a stacked field this year when he lines up to defend his Boston title. On April 17th, in its 127th running, the Beantown classic will play host to a sort of holy visitation. The esteemed 38-year-old Kipchoge—the two-time Olympic champion, the only human ever to go sub-2:00 for the marathon—will be making his first-ever appearance at the starting line in Hopkinton. Kipchoge has been characteristically succinct about his race strategy, telling reporters, "I see myself winning."

The field will include a total of seven sub-2:05 Kip-

choge challengers. Is Chebet the quickest of all these would-be spoilers? "If you are betting on a man to mess things up for the impeccable grandmaster, it could be Evans who delivers," says Toby Tanser, author of *More Fire: How to Run the Kenyan Way*. Tanser lives in Kenya and is friendly with Chebet and other top harriers.

Chebet won last year's Boston Marathon with shrewdness and authority. Early on, he tucked into the lead pack of about 15 runners. At mile 20, he climbed with this group up Heartbreak Hill. Then—still looking fresh, with just six mostly downhill miles left—he threw down the hammer and wheeled through the 22nd mile in 4:27. His next two splits were 4:26. No one could touch him. In the end, he beat runner-up Lawrence Cherono, also Kenyan, by a full half-minute, clocking a time of 2:06:51.

Seven months later, Chebet held a nagging Achilles injury at bay and hung on to win the New York City Marathon in 2:08:41 on a weirdly sweltering November day. And the victory was no fluke. The man has run 27 marathons, 10 more than Kipchoge, and he's won five of the last six he's entered.

But it's unlikely that the name Evans Chebet rings a bell with many runners. Even though Kenyans have won 23 of the 31 Boston Marathons held since 1990, most American fans don't make the effort to distinguish one Kenyan from the next. We know Kipchoge, sure, but beyond that it's just "the Kenyans" and facile chatter about how fleetness is "in their genes."

And while many Kenyan winners speak English, Chebet's facility with the language is limited. At the press conference after he won New York, he answered questions in Swahili. The marathon did not have an interpreter on hand, and when officials crowdsourced for translation, Chebet's words were rendered so vaguely, so roughly, that the winner remained behind a sort of curtain. So when I found myself in Kenya for work last December, I saw an opportunity to unlock the enigma surrounding Chebet and humanize the man who might just topple a legend.

.....
ELIUD KIPCHOGE IS so widely celebrated in Kenya (and the world) that he can make other runners seem invisible. Just minutes after



Chebet's mother Wanjiro (left) with an employee outside the restaurant she runs in Kondabilet, Kenya.



Evans Chebet (here and at right) and teammates train in the Nandi Hills outside Kapsabet, Kenya, on February 20, 2023.



I land in Eldoret, where many of the country's top athletes live, I encounter a huge billboard just outside the airport with a larger-than-life picture of Kipchoge and the words "Welcome To The City of Champions." Soon my driver, Cornelius Lagat, is telling me Kipchoge "is more protected than the president of Kenya."

Evans Chebet is, in contrast, quite the opposite. A couple of hours after I call his publicist to ask for an interview, a guard is ushering me into Chebet's training camp in Kapsabet, a city of more than 80,000 about an hour southwest of Eldoret, where Chebet and 19 other athletes live in small parallel bedrooms.

At 5-foot-7 and 132 pounds, Chebet is a slight man, with bright brown eyes and a shaved head. He rolls into the interview a few minutes late, wearing a yellow camo hoodie and an easy grin, even though his Achilles is still sore after New York. With his marathon winnings, he just financed, two days ago, a huge wedding to the love of his life—the mother of his three children, 26-year-old Benedicta Serem. A thousand guests had been on hand for the nuptials. Chebet's family had helped feed the crowd by slaughtering two cows, three goats, and 10 chickens.

We sit on a couple of worn couches and then, smiling, bemused by my curiosity, Chebet spends two hours talking to me through an interpreter, his voice soft, his tone almost unrelentingly positive. "I never dreamed I'd be racing against Eliud Kipchoge in the Boston Marathon," he says.

Chebet is the eighth of nine children. As a kid in his mountain village, he spent hours trotting along poking a stick at a worn tire beside him to make it roll smoothly over the rubbly road. The family owned one bicycle, a singlespeed black Hero Jet that for many years was too big for him; he crashed and cried as he learned to ride it. Now, he laughs at the memory. When he was about 8, he took to running a hilly loop of about nine miles whenever he felt like it. "I loved running so much," he says.

Chebet's father, Kipyasang, had been a distance runner, a 5,000- and 10,000-meter man, and had won many trophies. Only after I pressed him did Chebet note that his father died of cancer when he was a young boy. A photo of Kipyasang hung by the

door of the family's two-room house. Evans has no memory of him, but the financial struggles that followed his father's death remain vivid. "We had enough to eat just two meals a day," he says, "and dinner wasn't much—just a little githeri [a mixture of corn and beans]. I always felt like I had to support my family."

When Chebet was about 10, he began working as a day laborer, harvesting corn on nearby farms. Sometimes he burned wood, to make charcoal to sell. Sometimes, too, he herded the seven cows his family owned. Sometimes, when the cattle strayed and got lost, his older brothers, being older brothers, hit him with sticks.

He dropped out of school at 14, unable to pay the tuition, and began working full-time. He pedaled his village on the Hero Jet, gathering maize from farmers until he had enough to take three or four 90-pound sacks of grain to Eldoret. He traveled there a couple times a week in a communal van, lashing the grain to the roof and paying 80 cents for his ride.

Lifting the giant sacks left his body in pain but also built his muscles. In his spare time, he kept running. A neighbor gifted him a pair of trainers, and he would work out with his older brother John. His mother, Wanjiro, beheld Evans's easy, flowing stride and would point to Kipyasang's photo and tell him, "Run like your father. He left the talent to you."

In 2011, Berardelli took Chebet to his first major race, the Gargnano Ten Miler, in Italy, where he finished second in 50:53. It was a promising start, but even as Chebet spent the next few years getting faster, he never seemed able to win. In 2014, he finished second at two lucrative marathons, in Prague and in Seoul. Over the following three years, he finished second in three

more marathons—in Valencia, Spain, and again in both Prague and Seoul. “He was always the number two guy,” says Berardelli. “Subconsciously, I think he’d accepted being a very good athlete rather than a real champion.”

Meanwhile, Berardelli was facing a crisis. His most prominent athlete, Rita Jeptoo, a three-time Boston Marathon winner, tested positive for EPO, a banned substance, in 2014. In 2015, after two other athletes coached by Berardelli—marathoner Mathew Kisorio and 800-meter runner Agatha Jeruto—were caught doping, his contract with Rosa & Associates was terminated. At the time, the company’s director, Federico Rosa, told reporters that while he didn’t believe Berardelli was involved in the cheating, he felt he “was not able to pay enough attention to his own athletes.”

The Kenyan government felt differently, though, and in 2016 charged Berardelli and two others for administering drugs to Jeptoo and conspiring to destroy her career. They were eventually acquitted, but the media coverage of Jeptoo’s fall was nonstop.

There has never been any widespread speculation about whether Chebet himself has used banned substances, nor any actions against him by an anti-doping body, but Berardelli’s travails caused a shift. In 2016, exiled from Rosa, Berardelli opened a new camp in Kapsabet where Chebet now lives.

But the relationship between athlete and coach had always been a bit strained; Berardelli spoke only limited Swahili, which made communication difficult. And there may have been a difference in perspective. “When Claudio was setting the camp up,” Chebet says, “he was a little strict, like sometimes he wouldn’t let us go home, except on the weekends. I wasn’t used to that.”

Berardelli concedes that he is demanding. “I want athletes to have the right attitude, the right behavior,” he says.

In late 2018, Chebet parted ways with his longtime mentor. Without a coach, he began crafting his own training plans and would informally head out with elite training groups. Now that he had proved himself, he received a warm welcome—and he held his position at the front.

As I sat at the training camp with Chebet, observing his chill bonhomie, I knew I wasn’t seeing the whole of him. No one wins the Boston Marathon without harboring a little fire in his belly. Tanser told me, “Evans’s mental strength is upper-level. He’s a modest and reflective man, but he’s also a street fighter. He believes strongly in himself, and he truly believes he will win. You’ll never find him needing a sports psychologist.”

Where does this unbreakable spirit come from? “Whenever I’m in a big race, I remember what I went through as a kid,” Chebet says. “I had to fight to survive.” He tells me that, to understand his fortitude, I need to visit his childhood village.

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KONDABILET SITS HIGH in the Cherangani Hills, which are regarded as a source of storms in Kenya. Its name means “eye of the thunder” in Kalenjin, a local dialect. I travel out there one morning with a tour guide, Amos Kimutai, who speculates on the Kipchoge-Chebet showdown in Boston. “Everyone is waiting for this race between Eliud and Evans,” says Kimutai, who’s run a 2:19 marathon himself. “But Boston is

hard to predict. When it’s rainy and cold and windy, American runners do very well. If it’s sunny—well, the Kenyans will take it,” he says. “Evans is more tactical than Eliud. If it comes down to a sprint, Evans is going to take Kipchoge.”

Our driver, Cornelius Lagat, rejects this take, arguing that Kipchoge, who is older than Chebet, harbors superior wisdom and therefore the upper hand. “Kipchoge has the experience,” he says. “He will win.”

We turn off the highway onto a dirt road that twists steeply upward. In the center of Kondabilet, we pass Poa Place, a tiny restaurant run by Chebet’s mother, Wanjiro, age 71. Soon after that, we encounter a man driving a team of donkeys up from the Silanga river, each animal bearing two battered 20-liter plastic jugs filled with drinking water; there are still no pipes in Kondabilet.

The Chebets’ home is a mile uphill from the river. Evans is away at the camp, but Wanjiro is there to meet me. Wearing a tiered blouse and a pleated skirt in shades of pink and brown, she is accompanied by six family members. We sit in the large, airy house her son had built on his family’s land with his marathon profits. (Just in winning Boston and New York last year, he garnered \$250,000 in prize money.) There is almost no furniture outside the living room, and the walls are unadorned, save for a few small holes sprouting electrical cords. (Parts of the village have electricity, but there are still no power lines where the Chebets live.)

“No *mzungu* has ever visited here,” Wanjiro says through an interpreter, using a Swahili word for white person, “except for missionaries and aid workers.”

Wanjiro says she’s never been interviewed by a reporter, and now what is there to say? Still, she wastes no time before launching into a proud retelling of her son’s life and achievements. Evans had his own vegetable garden when he was small. He was highly skilled at guiding oxen to plow the fields. And he always loved to run. “When Evans was young, he was running all the time—up and down through the hills,” she says. “And every time he came home, he was stretching.” She mimics Evans stretching, twisting her torso as she sits on the couch, bicycling her legs for a second. “Oh, your children!” she says, laughing with delight, “they bring you blessings!”

I look around the room. There is a sizable crowd watching our exchange, and they all hang reverently on the matriarch’s every word. She is the mother of nine children, and there is something solid and deeply stabilizing about her presence. I



Chebet (right) and teammate Barselius Kipyego have a breakfast of tea and bread at camp after their morning run on February 20, 2023.

reflect now on something Evans had told me: “After my father’s death, it was my mother who felt the challenge. She struggled to provide for the entire family, but she always told us, ‘There will be better days ahead.’”

Even though her son was unproven, Wanjiro believed he could become a champion. She took Evans to the church services held each Sunday in Kondabilet’s mud-walled schoolhouse, and there he prayed that his family would be well-off like his neighbors. (“They owned a tractor,” he explained.)

Now, sitting in the living room, I feel the same force of hope at work. Wanjiro is strong. She’s kept Evans afloat, and all the while she has been buoyed by the people in that room. Evans, too, depends on them. The guy carries a fire within him, sure, but it is the love of those he knows best that sustains and propels him.

Wanjiro explains that most locals will watch the Boston Marathon via livestream on their phones. “We will be watching right in this room,” she says. “We will be praying. If Evans can beat Kipchoge, we will be very happy.”

Eventually, we wander outside into the yard, passing the two-room house Evans grew up in. Wanjiro still sleeps there—her entire wardrobe hangs from a clothesline by her bed. “It is better for old people to be in an old building,” her son William explains as we get ready to leave. “The walls hold the heat better.”

Wanjiro nods, listening, and then looks at me warmly as I climb into the car. “Next time you come,” she says, “we will slaughter a sheep for you.”

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CHEBET’S TIME AWAY from Berardelli was defined by a certain solitude. He rented an apartment of his own. He moved about independently, training wherever he liked, and even as he battled injuries, he ran well. In 2019, uncoached, he won the Buenos Aires Marathon in 2:05:00. Still, he was accustomed to living among others—that’s how he’d always thrived. “I was used to being part of a program,” he says. “I’d had a coach since I started running, and now I was not connected.” Late in 2019, he visited Berardelli at his Kenyan home.

During the separation, Berardelli had improved his Swahili and had also done some reflecting. “I realized I needed to step back a little bit,” he says. “I needed to be a bit less demanding on some things.” Reconciliation did not take long. “In about five minutes,” the coach told me, “Evans and I decided to put the past behind us.”

When Chebet returned to his old training group, he found a new synergy at work. Two of his longtime cohorts, Benson Kipruto and Amos Kipruto—not brothers but members of the same Nandi ethnic group—were pushing one another so much that in time they’d win major marathons in, respectively, Boston and London.

“Evans didn’t want to be left behind,” Berardelli says. “He found a new motivation.”

He also found in the Kiprutos the kind of support that sustains him, that he has always gotten from his family. “We are like brothers living in the same house,” Benson Kipruto says, speaking of Evans and Amos. “We live together, and we understand each other.”

“When we have a problem, they encourage you,” Chebet says. “We are there for each other.”

At the 2020 Valencia Marathon, with under 200 meters to go, Chebet was trailing his countryman, Lawrence Cherono, and seemed bound for yet another runner-up performance. But then suddenly he located another gear. He churned into the lead, and

on the last straightaway he buried Cherono, winning by a full four seconds as he lowered his PR to 2:03:00.


When I was visiting Kenya just a month after Chebet’s victory in New York, Berardelli was worried that maybe he’d never witness such magic again, for Chebet had spent weeks away from camp, planning his wedding. The Achilles injury was scuttling his training. Berardelli wondered if his athlete was still motivated. “Financially, he’s stable,” Berardelli says. “He has what he needs. Is it over?”

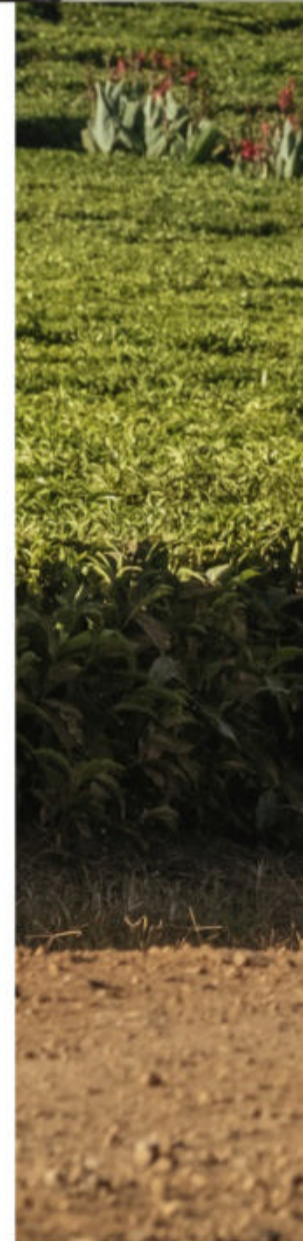
When I talked with Chebet over Zoom in March, though, he said he was pain-free. With Benson Kipruto, who will also run Boston, he’d just done a workout designed to prepare them for Heartbreak Hill and what follows. They’d knocked out 10 repeats over a one-mile stretch of road that featured a hard climb flowing into a steep descent. Chebet told me that he was ready—and that he has a crucial prerace ritual that he has never once skipped.

“A week before I leave Kenya,” he explained, “I go home to Kondabilet. My family gives me their blessings. We pray. And then I meet with my mother, and always she tells me, ‘You need to go and get your best because you know where you’ve come from.’”

As we were wrapping up this conversation, I asked Chebet if he had any questions for me.

His response was almost automatic. “I want to know about your family,” he said. I began telling my story, and as I spoke, Chebet canted his head a notch closer to the camera. He listened, intent, it seemed, on locating some truth in my gestures, in the tone of my voice.

When I was done, the interpreter swiveled his laptop so that Chebet could address me directly. I watched him speak. The moment seemed peaceful and underlain by the most earnest goodwill. “He is saying,” the interpreter said, “that he is very grateful that you took the time to visit his family and to know his mother.” 





**His mother beheld
Evans's easy,
flowing stride and
would tell him,
“Run like your
father. He left
the talent to you.”**



From left: Barselius Kipyego, Abednego Cheruiyot, Chebet, and Shadrack Kurgat outside Kapsabet, February 20, 2023.

GEAR

Notes, Opinions,
Useful Tips, and the
Coolest Gear From
Inside the World's
Most Rigorous Shoe
and Gear Testing Lab




Hoka Clifton 9



The rocker sole curves just behind the metatarsal heads, helping you roll more quickly from heel to toe.

HOKA CLIFTON 9

PRICE: \$145 | TYPE: Road | WEIGHT: 8.5 oz (M), 7.5 oz (W) | DROP: 5 mm

MY RELATIONSHIP WITH the Clifton is like a missed-connection story in the classifieds. I've tested and fallen head over heels for the Hoka Mach and experienced the memory-foam feel of the brand's max-cushioned Bondi. But, somehow, past Cliftons missed the mark. Their soft midsoles felt too spongy—I wasn't getting any rebound. I wanted the Clifton ride other testers experienced, one where I didn't have to choose between an easy run and a hard tempo. The versatile Clifton I've been waiting for has finally arrived in version 9.

First, let's talk specs. The Clifton 9 weighs 0.14 ounce less than the previous version.

That's the weight of a nickel or four raisins. Not much unless you're a runner who wants the best of both worlds: a lightweight daily trainer that's also abundantly plush. The 9 also performs a magic trick by shedding weight while increasing its stack height by 3mm (the shoe still has the same heel-toe offset as the Clifton 8). This is made possible with new compression-molded EVA foam in the midsole and a stripped-down jacquard knit mesh upper that's free of overlays. Also not sacrificed: surrounding comfort. The shoe has a more structured heel collar and thicker tongue. For weight savings, the tongue is

gusseted on only the medial side.

Running in the Clifton takes some easing into at first. In the beginning, it felt like previous Cliftons I had tested: like literally running on marshmallows—melting, sticky marshmallows. But my pace picked up midrun, and I got in a couple 7:15 miles on my usual route. That first Clifton 9 run was a reminder that the best things—like base-building—take time.

“Great ride! I get a natural spring, and the more I bring into each step, the better the return. I felt as good ending my runs as I did starting,” said a tester who ran the heck out of the Clifton 7 and designated the 8 as his casual

shoe due to abrasion on the heel area of the sole after only a couple of runs.

Another tester praised the cushioning but desired a more energized ride. “The shoes are a little clunky, which is why I would say I don't love the ride,” he said. “I feel a little sluggish in them. It's frustrating when I'm trying to do faster-paced stuff.”

One runner's marathon-training shoe can be another runner's recovery-day trainer. The Clifton 9 caters to both crowds, with both raving about its comfy feel.—*Amanda Furrer*





The outsole, made from silica, has a grippy arrow-point tread.

BROOKS REVEL 6

PRICE: \$100 | TYPE: Road | WEIGHT: 8.8 oz (M), 7.4 oz (W) | DROP: 10 mm

TODAY, THE \$100 running shoe—the good kind—has become as mythic as the Boston Marathon’s unicorn. Such shoes do exist, however. Saucony’s Axon 3, for example, wowed us with its rocker-soled propulsion and high rebound. Known for the Ghost, its everyday trainer, Brooks also offers a bargain-buy shoe: the Revel 6.

The Revel is a part of Brooks’s “Energize” family of shoes, categorized for their high energy return and springy ride. The 6 does its fam proud, providing high rebound with a locked-in fit. Compared to the Revel 5, this iter-

ation has an even sleeker knit upper, yet Brooks has kept the standard cushioned tongue and collar for max comfort in its lightweight shoe.

“The step-in feel is fantastic,” said a tester who previously ran in Altra’s super shoe, the Vanish Carbon, and the Altra Rivera (a shoe similar to Brooks’s Revel in terms of weight and ride). “The upper feels as good as—if not better than—some of my \$150 running shoes.”

Brooks upped the stack height in the heel with an extra 2mm of DNA foam. This makes for a more responsive ride. My runs felt fast and had some pop, reminiscent of earlier versions of the brand’s Launch, and even comparable to Brooks’s Hyperion Tempo, a racing shoe pumped up with nitrogen-infused DNA Flash foam.

Past the six-mile mark, I noticed some soreness in my forefoot, which I attribute to the thinner foam in that area. Another tester, who’s also a midfoot-striker, had the same experience.

“The heel cushioning is great for running on roads,” she said, “but it is a little lacking in the mid- and forefoot. This is okay for shorter runs and feels very responsive, but it’s not enough cushioning for longer runs.”

With this to consider, the Revel is best suited for speedwork and middle-distance racing. One more small perk: ample room in the toebox.

Said a tester, “The Revel has a comfortable upper with a wide toebox. This is always a must-have for me and something I really enjoy with Altras and Topos (brands known for their wide toeboxes).”—A.F.



Scarpa
Ribelle Run

Scarpa
Ribelle Run
GTX

Testers called the ankle collar "better than gaiters" for keeping out trail debris.

SCARPA RIBELLE RUN

PRICE: \$159 | TYPE: Trail | WEIGHT: 10.6 oz (M),
9.2 oz (W) | DROP: 4 mm

SCARPA RIBELLE RUN GTX

PRICE: \$199 | TYPE: Trail | WEIGHT: 11.3 oz (M),
9.6 oz (W) | DROP: 4 mm

SHOEMAKER LUIGI PARISOTTO purchased the Società Calzaturiera Asolana Riunita Pedemontana Anonima, or Scarpa, in 1956. Today, his descendants are at the helm and still crafting alpine boots and climbing footwear, with the addition of a few trail-running shoes. One such model is the Ribelle Run, a durable trainer billed for the types of rocky terrain you'd find in the Italian foothills where the company got its start. The terrain in Eastern Pennsylvania offers a similar rugged playground for our testers in the shoe.

“Traction was excellent on the sandstone of the Appalachian Trail, on slippery clay-like mud around local lakes, and through deeper water crossings,” said one tester, who found the 4mm lugs gripped well despite being shorter than those of her favorite Salomon Speedcross. The outsole still gave her enough traction on the trails of French Creek State Park’s Endurance Fest after several rain-soaked days in early spring. We owe a portion of that to Scarpa’s expertise as a climbing brand, capable of formulating its own impressive mix of rubber compounds.

We found it durable like a mountaineering sole, but on par with, if not slightly tackier than, Vibram’s MegaGrip on wet surfaces. It’s a dense and firm material that one tester, who frequently breaks the studs off his shoes, couldn’t crack even after more than 60 miles on the rockiest terrain he could find.

Part of Scarpa’s “they don’t make ’em like they used to” quality comes from the fact that, well, many brands literally don’t. The midsole uses a pretty outdated EVA material that’s responsive enough, but unexciting as most companies upgrade to bouncier Pebax, TPU, or plush super foams. It’s a protective and seriously stiff ride with enough impact absorption—and some extra softness from an Ortholite insole. But testers told us its responsiveness drops as the miles increase or the mercury plummets.

“I am a die-hard Speedgoat trail runner, and the Ribelle Run gave Hoka a run for its money,” said one tester, who wore the shoe for his annual April Foolish 50K race. “Not

so much for the cushioning, but because the narrower platform makes the Ribelle Run feel more nimble.”

Also waning in the current shoe-scape are heavy overlays. While the GTX model uses a waterproof membrane, both versions still have a thermally welded TPU film that’s further reinforced by ripstop polyester. Those layers meet a hard rubber toe rand, inspired by the brand’s climbing shoes, and a stabilizing TPU frame that halos the entire heel and arch. As you’d expect, it makes for an insanely sturdy exoskeleton—testers told us it’s impenetrable by pointy rocks and sharp trail debris. (Make a fist and give it a tap. It’ll sound like someone

is knocking at your door.) But, the construction adds weight and limits the upper’s stretch on a shoe that’s already lower-volume in fit and tight in the toebox.

Clearly, that snug fit didn’t constrain our ultra-savvy testers, mentioned earlier. They told us that’s due in part to the sock-like upper, which tightens on a cinched pulley system. One tester told us it was easy to adjust for more wiggle room when her feet swelled after five hours on the trail. Still, if you really hate the long quicklaces, dig around in the tissue paper of your shoebox. Scarpa’s got a pair of traditional laces in there for you to swap in.—*Morgan Petruny*



Varied lug shapes help you dig into the uphill and brake on the downhill.

PUMA FOREVERRUN NITRO

PRICE: \$150 | TYPE: Road | WEIGHT: 9.7 oz (M),
7.9 oz (W) | DROP: 10 mm

WITHIN THE PAST couple of years, Puma has performed a major revamp on its approach to running footwear. I witnessed this evolution since my start at *RW*, when the very first Puma shoe I reviewed was the Hybrid Runner. It had high rebound, but its weight worked against it. The midsole was also something to reckon

with, resembling fat salt grains on a county-fair pretzel. Fast-forward five years, and we now know the panther can produce a super shoe worthy of helping Molly Seidel win a bronze medal in the 2020 Olympic Marathon. We also now know Puma can create a steadfast everyday trainer after we logged hundreds of miles in the Velocity Nitro. The brand's next step is cracking the stability category, which Puma does with the ForeverRun Nitro.

We got our first look at the ForeverRun Nitro

last fall, when the Puma team hashed out its intention with the shoe: to lower injury rates caused by erratic pronation. It's a little déjà vu; we heard a similar spiel from Brooks back in 2019 when the brand introduced its guide rails. Puma's support is called RunGuide, but similarities end here. Unlike Brooks's guide rails—which act like “bumpers” on the lateral and medial side of the heel and midfoot—Puma's RunGuide reduces pronation velocity while TPU wrapped along the outside of the heel provides additional support.

The ForeverRun has the same midsole foam as the Deviate and Velocity—why else would their names all contain “Nitro”? But the Nitro in the ForeverRun is surrounded by a firmer rim of foam, resulting in a dual-density midsole that feels softer and provides more responsiveness and stability. The second key ingredient is the sockliner, which was engineered by Kaiser Sport & Ortopædi, a Denmark-based clinic and retailer that specializes in running and walking. The high-cushioned sockliner has a molded heel cup and metatarsal pad. Besides providing arch support, the insole's other aim is to promote proprioception (the self's sense of movement and body position).

It all sounds so holistic, much like Brooks's guide rails system. One tester even mentioned how the ForeverRun feels like the Glycerin GTS, a Brooks stability shoe. Pushing aside what to some may sound like mumbo-jumbo, the proof is in the run.

The shoe fits a little loose, which requires some extra lace tightening, but its ride checks all the boxes. The dual-density midsole buffers impact and provides plenty of cushion.

“I loved the overall ride and comfort with each step,” said a tester. “No matter what type of weather I ran in or how long I ran, these shoes were sturdy and provided the amount of comfort I need as a heel-striker. In addition, the cushion and stability combination in the heel and forefoot are unlike any shoe I have tried. It allowed for a solid and firm yet comfortable surface to push off of when trying to speed up my pace or when running downhill.”

Testers showered the ForeverRun with other stellar comments. High praise was given to the shoe's flexibility, light weight, and—reflecting on that holistic system—stability.

“This shoe was snug in the arch and allowed me to feel safe and secure with each step,” said a tester. “Around curves on gravel, I remember thinking how the shoe handled it so well and how supportive it felt.”—A.F.



A wider forefoot platform and heel provide even more support.



New looped eyelets save weight.

SAUCONY KINVARA 14

PRICE: \$120 | TYPE: Road | WEIGHT: 6.8 oz (M),
6.0 oz (W) | DROP: 4 mm

THE SAUCONY KINVARA was that special shoe for many of our editors and testers. The first version saw Jeff Dengate break three hours in the marathon for the second time. One tester, who calls himself a “Saucony junkie,” still hoards two pairs of his favorite model, the 8. I also have fond memories of past Kinvaras. The v4 was the first shoe that made me feel fast enough to hang with the front of the pack during my college track workouts. For that reason, it holds a sweet place in our hearts. And for many, the 14 only continues to improve. The Saucony junkie told us the 8 will be hard to go back to for him.

But it’s not for everybody. Elements of this update to the Kinvara were hotly debated

between both our staff and test team and, of course, more than a few Kinvara keyboard warriors in the comments sections of running blogs. The main struggles most had were the 14’s narrow fit and lack of stability.

Based on our testers’ feedback, women runners most noticed the lack of stability. Amanda Furrer and several Division I runners on the local college track team felt wobbly in the shoe, and one female tester actually withdrew from testing due to a rolled ankle. While the guys on our test team also said that the shoe didn’t lend much stability, they most noticed the shoe’s smooth snappiness and natural feel.

“This shoe is very well-balanced for an everyday comfortable ride with the ability to push into it for some faster efforts. It’s flexible enough for a smooth ride but has

enough stiffness to respond if you want to drop those last miles of your long run with a little bit of extra spice,” said one tester who supinates. “The work is on you to keep this shoe upright and get your foot on the ground in an efficient way. If you need extra support and guidance, look elsewhere.”

So, what changed from 13 to now? A lot. Saucony designed the 14 to be more of a do-it-all shoe that could run the gamut as a lightweight daily trainer and even a budget racer. For that reason, it borrowed key pieces from its hallmark neutral daily trainer (the Ride) and top-tier speedy model (the Endorphin Pro).

Now with an additional 3mm of stack height, the Kinvara 14 midsole has the same setup as the Ride 16. The bulk of the midsole is EVA-based Pwrrun with an extra thick Pwrrun-sockliner, made from fused TPU beads. Saucony broadened the Kinvara’s platform and raised the midsole sidewalls to stabilize the additional cushioning—though according to our testers, they’re perhaps still not quite wide or tall enough in the women’s version.

Given the similar foam construction, it’s not surprising that the Kinvara 14 feels like a stripped-down version of the Ride 16. The experience is nimbler and firmer underfoot—one that’s fun because it’s lean and fast and snappy, not bouncy and squishy. Runners who’ve grown up in the super-shoe era (or who have become accustomed to plush super foams, like myself) found it quite firm by comparison, and might avoid it for longer efforts when there are more max-cush offerings out there. One tester, who knows the Kinvara’s heritage, didn’t mistake the ride as low-energy return or overly harsh.

“I used to wear the Kinvara for 20-milers and longer tempos, but now I prefer it for shorter tempos and workouts,” she said, wanting more cushion as a mid-to-forefoot-striker. “My feet got a little achy beyond eight miles in the shoe, but overall it did feel responsive underfoot.

If you recognize the upper, that’s because Saucony used the same material as in its featherlight Endorphin Pro 3 to get the Kinvara down to its lowest weight yet. The fishnet-like mesh feels airy and breathable but isn’t game for rain and puddles—or wide feet. “The narrowness made me constantly think about the pressure on the outer edge of my midfoot,” said one tester, whose average-width feet rarely feel cramped by standard toeboxes. “The fit and hug of the upper was secure but not comfortable.” Another runner, who tells us she has long and narrow feet, said the Kinvara 14 was “made perfectly for [her] foot shape.”—M.P.

Asics Gel-Nimbus 25

PRICE: \$160 | WEIGHT: 10.5 OZ (M), 8.4 OZ (W)

DROP: 8 MM | TYPE: CUSHIONED ROAD

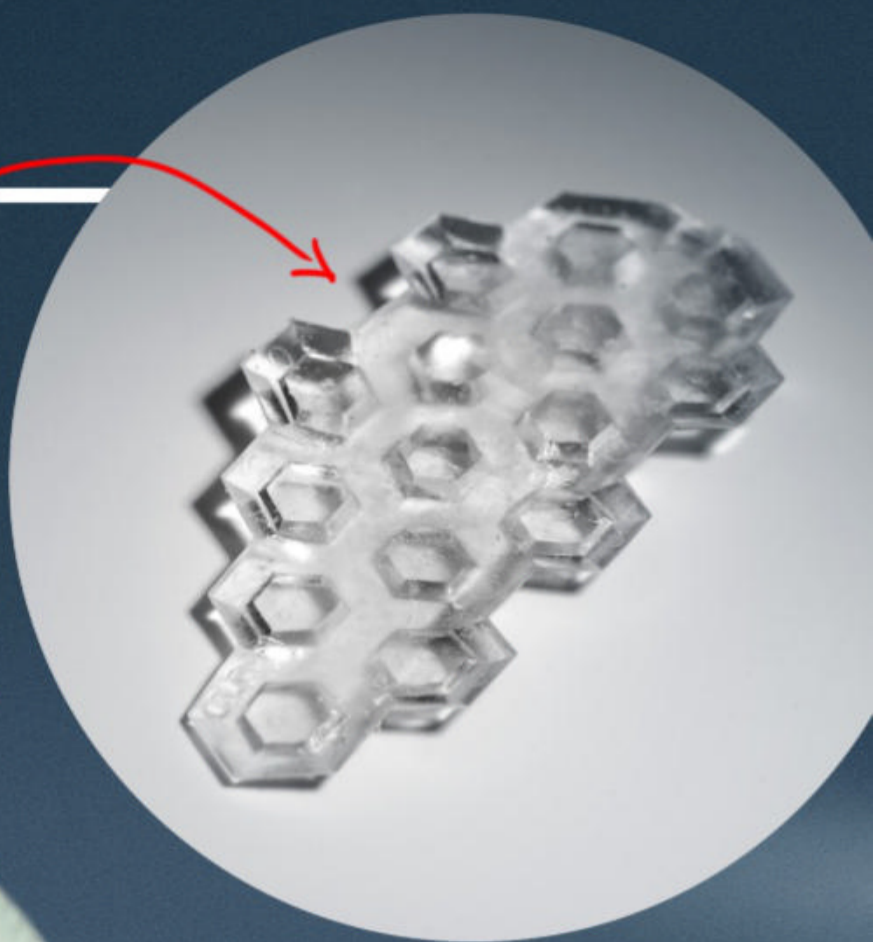
THIS KING OF cush received a major overhaul, which is a rare move for a shoe that's been around so long. After all, the thinking goes, if it isn't broken, don't mess with it. But, the running world has changed from where the Nimbus was traditionally positioned—the softest shoes got softer, lighter, and smoother. So, too, has the Nimbus. We cut the shoe open to see how Asics did it.

This is the first time the Nimbus has a knit upper.

A one-piece foam midsole boosts comfort (previous versions had two layers stacked). This single layer is FlyteFoam Blast Plus Eco, a lightweight, squishy foam that uses 23 percent bio-based materials.

There's no gel in the forefoot.

The forefoot rubber is softer and runs more smoothly, but, Asics claims, it's as durable as the harder compounds used previously. We have not experienced any durability issues in testing.



The gel pad is not glued into the cavity right below the Strobel board, which is good because adding glue makes the materials stiffer and harder.

The lighter foam allowed Asics to make the midsole thicker. In fact, we measured the heel to be 5.1mm thicker than the previous version, and the fore-foot went up 7.6mm.

Both the men's and women's versions feature an 8mm heel-to-toe drop. Previously, the men's shoe was at 10mm and the women's had an extra 3mm lift (by design, as Asics said the taller heel was intended to reduce Achilles strain).

When we cut the Nimbus in half with a band saw, the gel pad got ripped out through the bottom of the shoe. So, we peeled away the layers of the midsole from above to show how it is positioned under your foot.

The gel used to be visible from the outside—really for no reason other than to show consumers it's there and to demonstrate its value.

Illegal: We measured the heel stack height to be 41.4mm (Asics specs say 41.5mm), making this Nimbus thicker than the World Athletics allowable midsole limit (40mm). But that's not an issue, because nobody is seriously racing in a 10.5oz shoe.



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Why You Should Wear Trail-Specific Running Apparel

AMANDA FURRER WITH
PAT HEINE-HOLMBERG

HOURS INTO A trail run, the temperature suddenly drops 10 degrees and the windchill makes it feel another 5 degrees colder. You have a jacket on, but its mesh panels let those gusts go right through you. Your stomach is growling but you ate your lone gel an hour ago (it was the only one you could store in that slit of a shorts pocket). To make matters worse, it's beginning to rain. Did we mention that nothing you're wearing is water-repellent?

This nightmarish scenario emphasizes the need to wear clothing that's specially made for trail running. Don't worry—we're at your rescue. We spoke with Brooks senior product line manager Julianne Ruckman, who told us all about the brand's new High Point apparel collection and how each garment is designed for the trail. We also consulted our senior video producer, Pat Heine-Holmberg—*Runner's World* resident ultrarunner—for his guidelines in choosing ultra clothing and what he's currently wearing.

MEETING TRAIL RUNNERS' NEEDS

Brooks's High Point Trail Collection is built for experienced trail runners who need apparel that matches the requirements of their sport. It also caters to beginners who are new to navigating activewear that's suitable for the rigors of running off-road.

Whatever elements await you on the trail, you don't want to be incorrectly dressed hours into a run. For trail athletes, especially ultrarunners, "short runs" can be two hours out in dense wilderness, said Julianne Ruckman. On a video call with *Runner's World*, Ruckman described nonnegotiable product features her team applies to each piece before it's trail-ready.

PROTECTION → You shouldn't be underprepared running in a rapidly changing climate in the middle of nowhere. Lightweight, packable layers, like the **High Point Waterproof Jacket**, provide breathability as well as coverage. The jacket has front and back panels that ventilate the runner without permitting water to seep in.

A jacket that meets 10K/10K (waterproof/breathability rating) is crucial if you're entering a competition that has mandatory gear requirements that must be met before you're allowed to race.

"It's such an interesting process because [the race is] all about survival," said Ruckman. "[The race committee] needs to ensure that the pieces meet the needs of various elements that runners are going to face."

The High Point jacket's rating is 14K/14K. This means it's able to withstand up to 14,000mm of water pressing on one square inch of the material from the outside before leakage occurs. Additionally, 14,000 grams of water vapor per square meter can pass through the inside of the jacket to the outside, which promotes breathability.

DURABILITY → Besides being at the mercy of unpredictable weather, physical elements come into play as well. Having a leg sleeve snag on a branch and tear can be a small misfortune or turn into a dangerous risk for exposure. The path of most resistance: ripstop.

The **High Point 2-in-1 Short**'s exterior layer—made of recycled ripstop polyester—has a perforated grid pattern to stop any punctures or snags caught within the grid.

UPF (ultraviolet protection factor) material and a water-repellent treatment are also features to consider when choosing trail apparel. Brooks's shorts have well-rounded weather protection: a front panel with a DWR (durable water-repellent) coating to repel water and guard against high winds, and UPF 30+ fabric to act as a secondary shield against the sun.

STORAGE → Depending on the duration of your run, you'll either wear a pack or a race belt to store hydration and other long-run essentials or you'll rely on clothing pockets to carry some personal items and fuel.

"Once you're out on the trail, you're remote," said Ruckman. "Every must-have must be on you and with you."

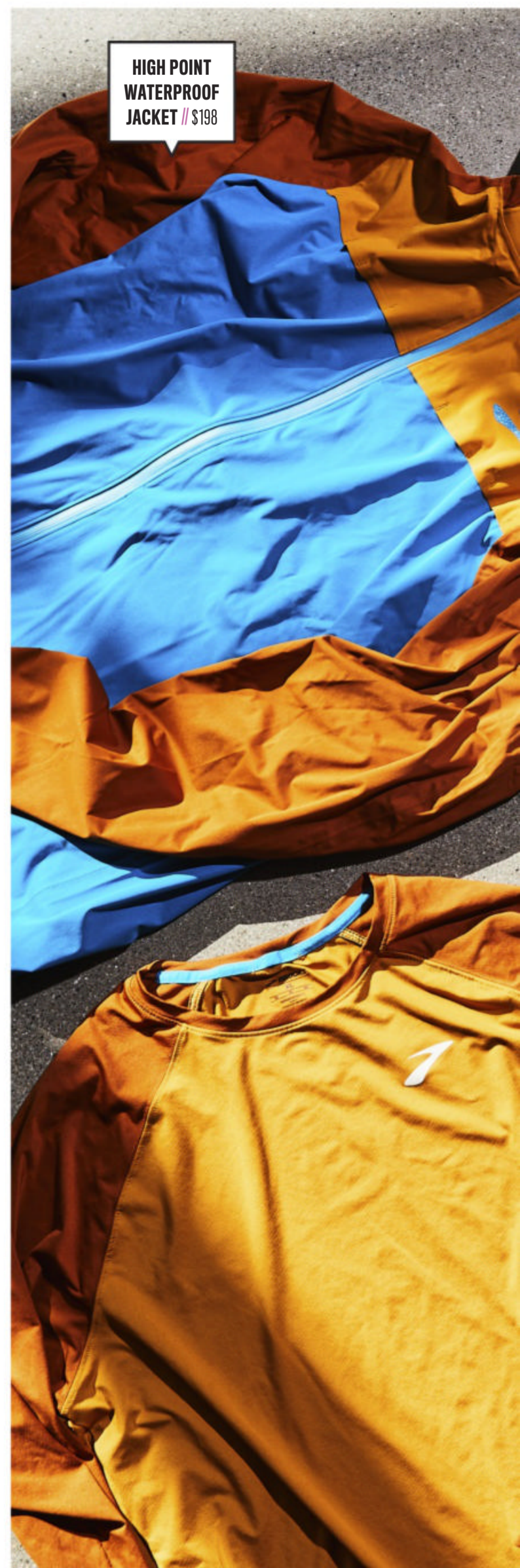
The **2-in-1 Short** has a built-in race belt with four drop-in hip pockets for easy access to gels or gummies, and a zippered back pocket. Though the back pocket can fit a medium-sized smartphone—external drawstrings tighten the waistband to keep it from bouncing—it's mostly intended for storing trash. Ruckman said their athletes specifically requested a back compartment for this reason.

COMFORT → Freedom of movement and chafing prevention are other factors to consider when developing trailwear. Ruckman explained, "We think through how a trail runner's movement is different [from a road runner's] in terms of their stride, the angle at which they're running, and also some of the accessories they wear."

The waterproof jacket, for example, is semi-fitted so runners can layer it over a hydration pack. Other garments, like a T-shirt, may seem pretty straightforward to make, but there are certain issues that trail runners are more likely to face compared to road runners.

"If there's a seam anywhere on a top," said Ruckman, "it's going to dig in over time, especially when you're wearing a hydration pack. It can feel uncomfortable and it could cause chafing."

Underarm side panels on the men's **Atmosphere 2.0** and women's **Sprint Free 2.0 long- and short-sleeves** stop the shirts from riding up. A flimsy top that you constantly need to adjust or retuck isn't ideal when you're wearing a race belt or reaching for trekking poles from your pack.

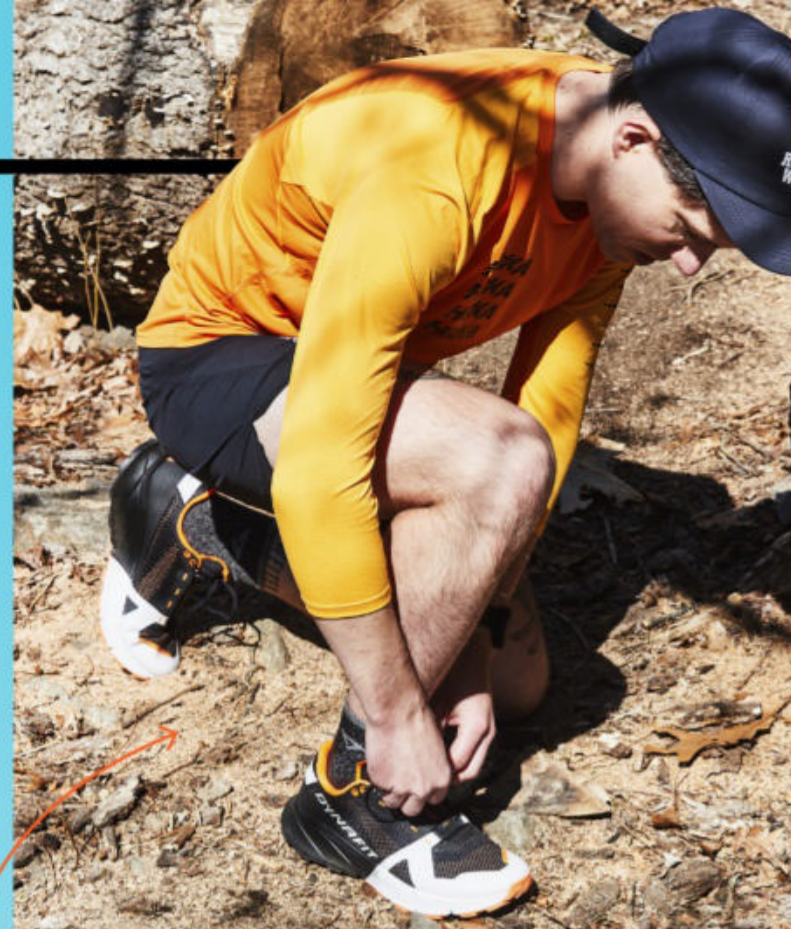




**SPRINT FREE
2.0 LONG-
SLEEVE // \$52**

**ATMOSPHERE
2.0 LONG-
SLEEVE // \$52**

**HIGH POINT
2-IN-1 SHORT
// \$78**



AN ULTRARUNNER'S WARDROBE

Pat Heine-Holmberg is a two-time UTMB finisher and set a 327-mile FKT on the Pennsylvania Mid-State Trail. You could say he knows a thing or two about what to wear running hundreds of miles—at a time. Here's what he looks for when choosing apparel to train and race in.

SOCKS

Many trail runners will wear thicker socks on the trail than on the road. Protection is the name of the game, and some added padding inside the shoe can save your feet from rocks and trail debris that like to poke into your shoe. Drymax socks have a moisture-repelling interior and moisture-attracting outer layer. I like their **Trail Run 1/4 Crew (\$16)** for being essentially two socks in one, which allows the two layers to rub against themselves, reducing friction directly against your feet.

SHORTS

I usually reach

for longer-cut shorts than the ones I wear for the road. As summer goes on, the forest grows in and trails get narrower—that means you're likely going to be brushing up against sticks, thorns, and leaves on singletrack. Shorts and tights can act as a brush guard, protecting you from scratches and things like poison ivy or ticks. The trails will send you farther away from civilization, so you need to carry more; having shorts or tights with great pockets is key. I reach for **Salomon's Sense Aero (\$70)** for the front pocket. It feels like an integrated

waist belt with minimal bounce.

SHIRT

Pack chafe is real. I got so chafed while wearing a tank top in my first 100-miler that now I never wear tank tops with a pack. Some people lube up their shoulders, but wearing a sleeved shirt did the trick for me. Generally, when you're wearing a pack, I think it helps to go with a lighter-weight top than you normally would wear. After all, a pack is another layer—it will trap heat to an extent. My current go-to is the **Hoka Glide 3/4 Sleeve (\$58)** for its light weight, breathability, and versatility.

TESTER NOTES

INSIGHT, EVALUATIONS, AND HELPFUL TIPS STRAIGHT FROM THE NOTEBOOKS OF OUR STAFF, MEMBERS, AND 280-RUNNER-STRONG WEAR-TESTING TEAM



Splurge or Steal: We Compared Three Aviators for Running

► You've likely heard of Goodr and Tifosi, two popular brands that make some of the best bargain shades for runners and cyclists. Method Seven also makes sunglasses, but calls itself a "specialty optics" company—which is tough to argue. The brand designs specs for pilots and weed growers, two professions with demanding visual standards for shades. While we runners aren't inspecting herbage under harsh UV lights or checking a dashboard through sun glare at 10,000 feet, we still need to block rays on our runs. We wanted to see if we could spot big differences between the most and least affordable options out there.

SPLURGE: M7 HUNTRESS TRAIL26

PRICE: \$275
WEIGHT: 18 grams
FRAME: Ultralight titanium
LENS: Polarized, anti-fog, anti-scratch, hydrophobic polycarbonate; UV400
VLT: 26%
BEST FITS: Small heads

STEAL: TIFOSI SHWAE

PRICE: \$35
WEIGHT: 25 grams
FRAME: Stainless steel
LENS: Polarized, shatter-proof, scratch-resistant polycarbonate; UV400
VLT: 11%–17%
BEST FITS: Small to medium heads

STEAL: GOODR MACH G

PRICE: \$35
WEIGHT: 17 grams
FRAME: Plastic
LENS: Polarized, scratch-resistant triacetate cellulose (TAC); UV400
VLT: 8%–40%
BEST FITS: Medium to large heads

THE VERDICT // It's not essential for most runners to splurge on sunglasses. But the Huntress's luxe build quality and lens clarity are undeniable. They were noticeably crisper and clearer for discerning between undulations on trail terrain, shadows cast from buildings and streetlights, and glints of sun through clouds and heavy tree canopies. When winter returns, polarization can make it difficult to see black ice on the road. The Huntress's 30 percent

polarization blocks some glare while letting us distinguish slick patches better than the rest. But the cheaper pairs still sufficed for marathons, ultras, and track racing with no slippage or soreness. Pick the Mach G if you have a strong preference for how much light you want to let through—more lens tint options offer the widest visible light transition (VLT) range to choose from. Grab the Tifosi Shwae for style; its steel frames feel more chic than Goodr's plastic.

REAPPLY SUNSCREEN WITHOUT BREAKING STRIDE

► If you head out for daylong excursions on the trail, or you're just a heavy sweater, you'll likely need to reapply sunscreen. That means toting along a bottle, adding ounces to your pack, and spending extra time slathering on and rubbing in white goop.

Venture Wipes created a solution. These tiny sunscreen wipes are individually wrapped so you can tear one open and swipe on an extra layer of UV protection—without unscrewing a lid or even stopping your run. Smaller than a packet of GU, they take up no more space than a hand wipe and fit easily inside the zippered pocket of your running shorts or the side pouch of a hydration vest.

Two testers tried them during a few hot, humid, and sunny weeks on a trip to the Florida Keys.

THE VERDICT // The wipes performed well on their days filled with runs, water sports, hiking, and paddleboarding—with one exception. They don't offer much volume. To cover her whole body, one tester needed 10 packets. But that's not what they're made to do. They work best for touch-ups in high-sweat or the most-exposed areas of skin, like the tops of the shoulders and the back of the neck. In those scenarios, the wipes glided on smoothly with no rubbing-in required and no sticky residue.

We found they prevented burns as capably as our tube of SPF 30 control sunscreen. Ideally, though, we'd prefer higher SPF protection.

PROS:

- ✓ SPF 30
- ✓ BIODEGRADABLE
- ✓ OXYBENZONE-FREE
- ✓ LIGHT, CLEAN SMELL

CONS:

- ✗ ONLY WATERPROOF FOR 45 MINUTES
- ✗ SIZE COULD BE LARGER
- ✗ CAN BE DIFFICULT TO OPEN

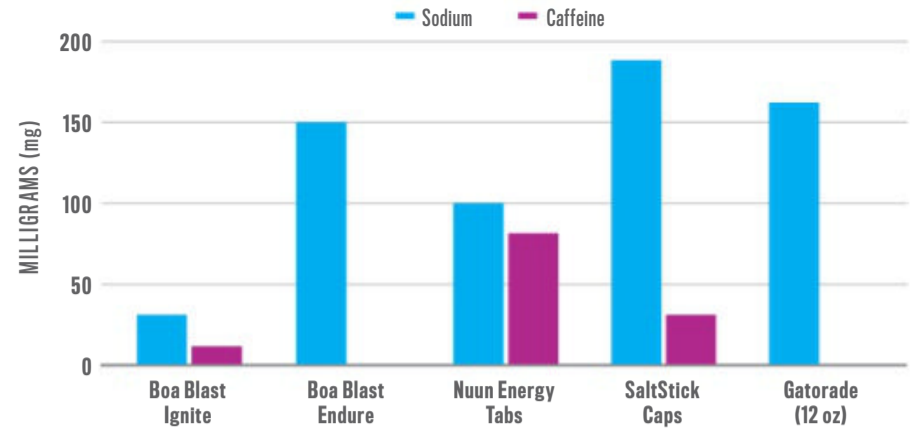




BOA IGNITE KEYS SPECS

- PRICE: \$20
- TASTE: 8/10
- ONE SERVING: 2-second spray
- SERVINGS PER BOTTLE: 20
- CARBS: 1 g
- SODIUM: 30 mg
- CAFFEINE: 10 mg

SODIUM AND CAFFEINE CONTENT ACROSS SUPPLEMENTS



CAN A MOUTH SPRAY HELP YOU HYDRATE FASTER?

► Between sports drinks, gels, gumies, salt tablets, and even chewing gums, there’s no shortage of ways for runners to get an extra hit of sodium and electrolytes during a race or long training session. However, this nutrition company has found one more method: a handheld spray.

The difference in the delivery method isn’t just for novelty. According to the brand, an oral spray allows sodium and electrolytes to be taken up quicker by the body. Absorbed in the mouth, this means the product can bypass the digestive system, and get to your muscles faster. If you’ve ever cramped in the middle of a run, you know that every second counts when you’re seeking relief.

The sodium and electrolytes in Boa sprays can help. Pro runner Des Linden uses them before her tough workouts

and on race days, and she says it works for her. Gear editor Morgan Petruny wanted to see how well it works for the rest of us joggers and non-elites.

“As a salty sweater, I know I don’t replace enough of the sodium that I lose midrun. And, even on the hottest runs and treadmill efforts, I rarely rehydrate with a sports drink that delivers extra electrolytes. During a sweaty treadmill workout—after which I brushed dried salt crystals from my calves—I felt more alert after a few sprays. It was easier and much quicker to take than chugging Gatorade, too, and I much preferred it to salt tablets, which I have tried in the past,” says Morgan.

“While I needed five spritzes of the Ignite to feel a benefit, its lemony flavor still wasn’t too sour. I needed less of the berry-flavored Endure, but it had a slightly bitter aftertaste.”

THIS VEST OUTSHINED OUR OTHER HI-VIZ GEAR



► GoFluo says its gear will keep you visible from 150 meters away. For reference, a car traveling at 60 mph can cover that distance in just 5.5 seconds. We measured out the same distance along different stretches of our local neighborhood loop, lit by either streetlamps or just the moon. On a pitch black night, after 10:30 p.m., we used the glow of a car’s headlights to illuminate the vest’s reflectivity.

We found that 150 meters is quite a claim—our car’s beams couldn’t even reach that distance. Still, this vest impressed us. From 50 meters, the material captured and reflected any light we cast near it for prominent, clear visibility. Up to 100 meters, we had moderate visibility and were able to confidently discern that the wearer of the vest was a human (not a trash can or street sign). Beyond that, the vest remained visible, but no longer gave us the full confidence of being seen. Its water resistance and elastic hood kept us dry in early spring drizzle. We even wore it alone over a sports bra without any chafing. It’s a bit heavy, and the clunky zipper pulls flop around, but neither are deal breakers.

GOFLUO ULTIMATE BODY-GLOWER RUNNING VEST

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- WEIGHT: 209 g (7.37 oz)



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M.S., R.D., C.S.C.S.

INTRODUCTION BY
PAUL KITA
FOOD & NUTRITION
EDITOR, MEN'S HEALTH



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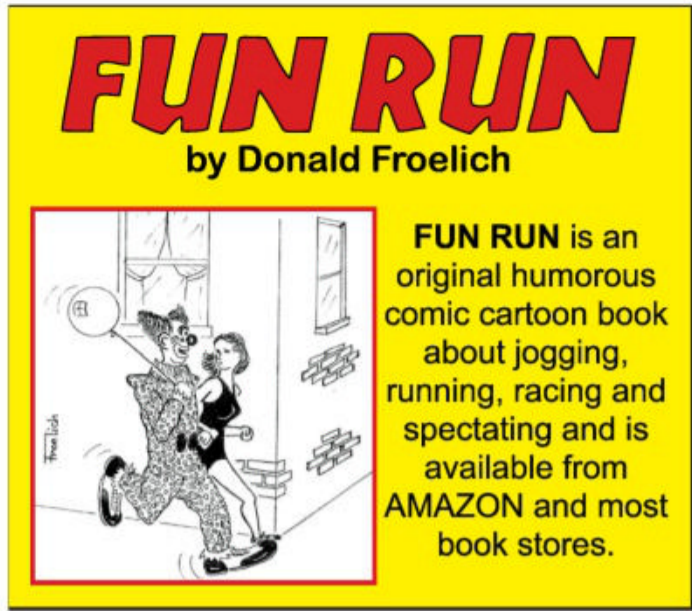
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	7-9	26"	30"	30"	34"
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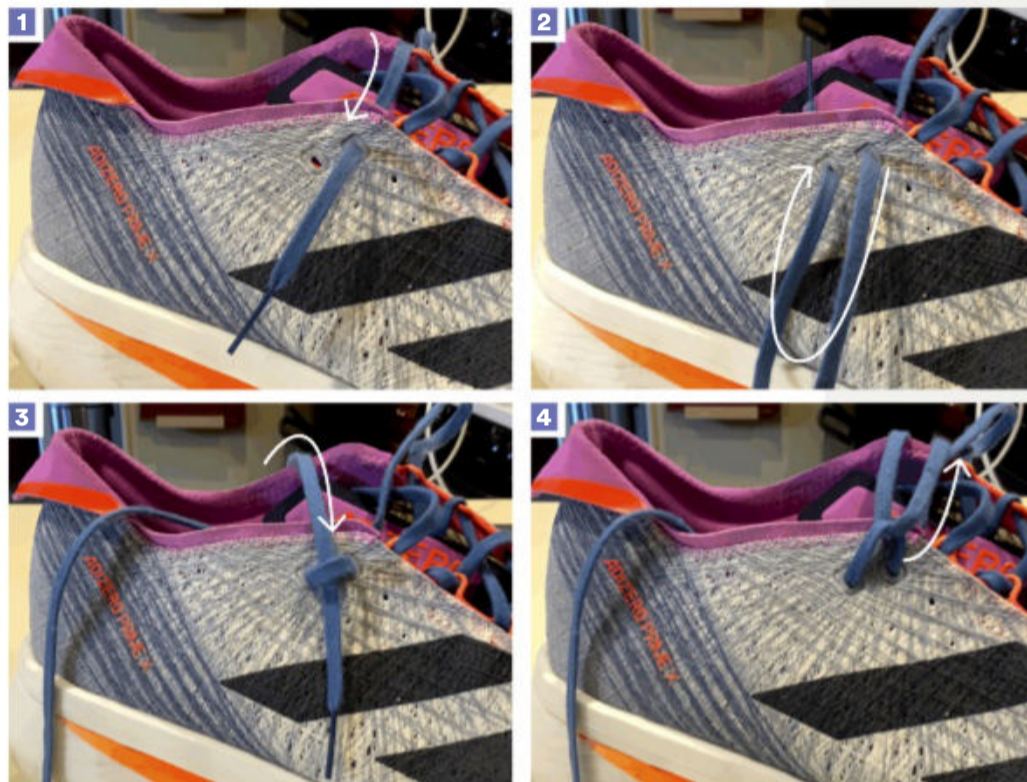
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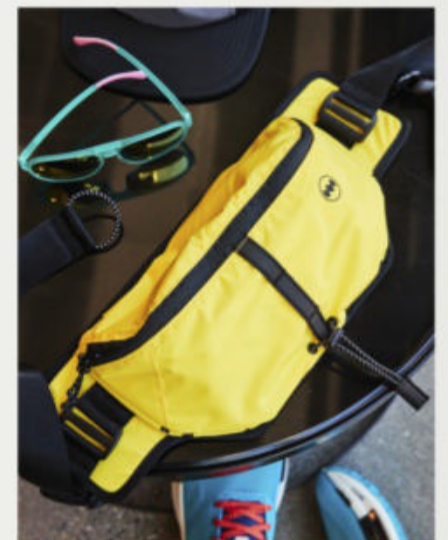
playlists to get you pumped up (or relaxed) the next time you head out. Rock out with some nostalgic '80s hits or find an audiobook that makes the minutes fly by. We've even got songs that are designed to match your running cadence. Fire up your headphones and browse our library at runnersworld.com/playlists.



LOCKED AND LOADED

Do you ever find your feet sliding around inside your shoes? Runner-in-Chief Jeff Dengate showed members in the weekly Sunday newsletter how to tie the perfect knot to lock their heels in place:

- 1 / Lace up your shoes the normal way, coming OUT the second-to-last eyelet with the free end of each lace.
- 2 / Pass each lace IN the last eyelet on the same side it came out of, creating a little loop.
- 3 / Now crisscross your laces and pass the ends down through the loops you just made.
- 4 / Pull tightly and tie your knot.



YOU TEST IT



Angela J., of Conroe, TX, tested out Janji's Multipass Sling Bag (\$58), which

features a cross-body strap to reduce bouncing. "This bag has become a staple for my shorter runs," she says. "I've used belts before, but the space in those was too small or they wiggled around too much. This one stays in place. However, I still use a hydration belt for my longer runs (10-plus miles), as I need more water access."

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WHEN NATURE CALLS

Everyone knows that coffee is a surefire way to trigger a prerun bowel movement. But did you know that almonds are a bathroom shortcut, too? They're packed with heart-healthy fats, protein, and fiber—plus, the high magnesium content gets your intestines excited. "Magnesium neutralizes stomach acid and moves stools through the intestines," says Molly Morgan, a registered dietitian and nutritionist. Grab a handful on your way to the trailhead or toss some into your morning smoothie.

A scenic landscape photograph showing three cyclists riding away on a dirt trail. The terrain is rugged with large, rounded rock formations and sparse vegetation. The sky is filled with soft, golden light from a low sun, creating a warm atmosphere. The text is overlaid on the upper portion of the image.

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