

TRAIN

HARD *Smart*

but

VOLUME I:
THE BOOK OF
STRENGTH

FOR
CLIMBING & BOULDERING

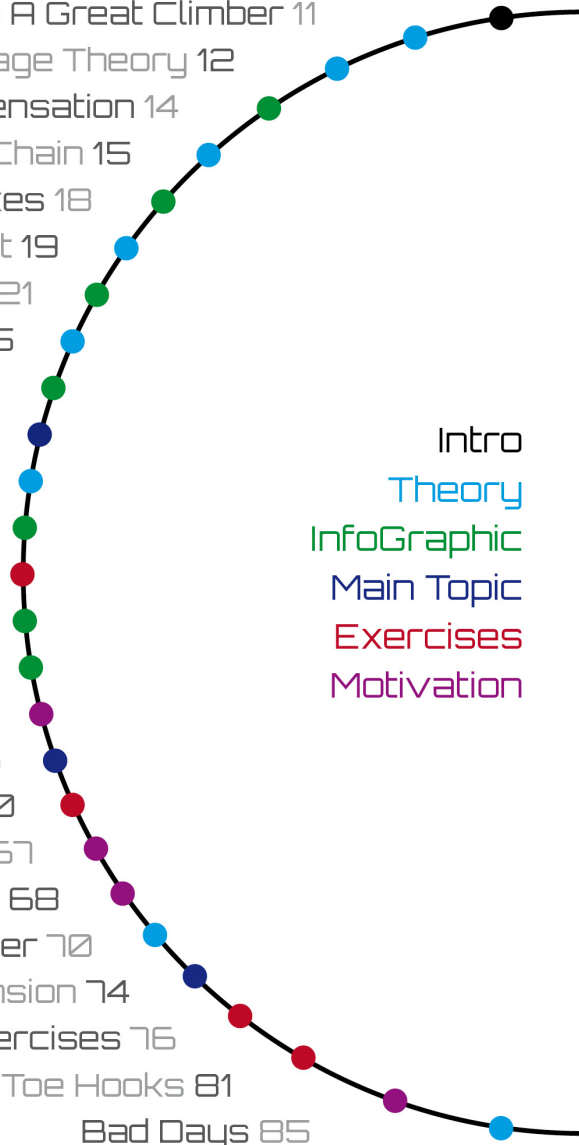
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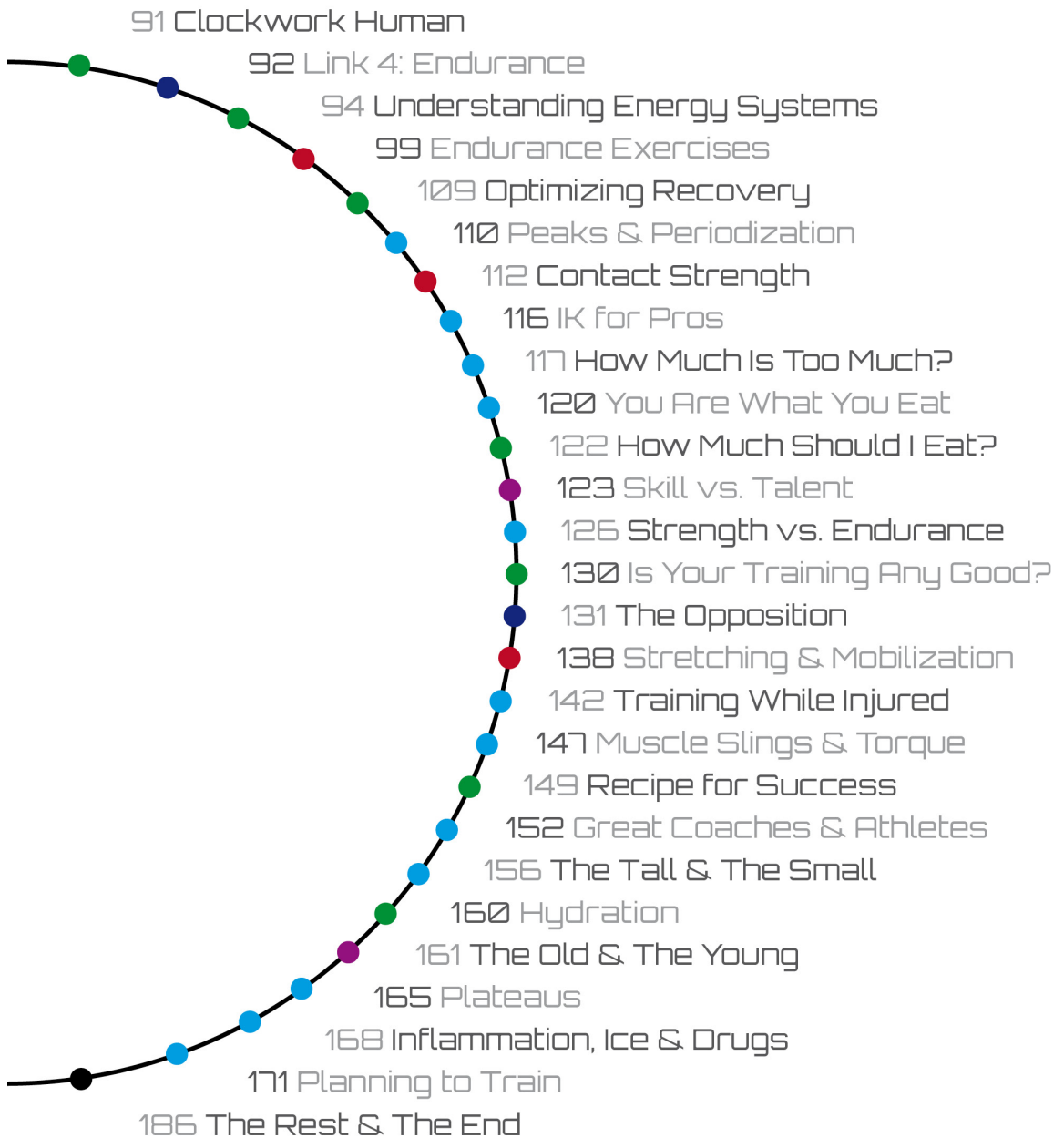
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Foreword

by Sean McColl

Nic Duerr's "Train Hard But Smart" is like having a set of coaches in your pocket.

If I didn't have my amazing coaches growing up, I would've loved to follow this book.

I started rock climbing with my whole family when I was 10 years old; we started at a local gym after our tennis club was closed. I was hooked instantly.

Throughout the bulk portion of my training, I was very fortunate to have coaches that knew what they were doing; they had great assets at their disposal and were eager to learn how to make me a better climber and competitor. Without my coaches I wouldn't be the climber I am today and might never have climbed 5.14 (8b+).

For someone that doesn't have a coach, this book is the next best thing. It encompasses all the different aspects of climbing and training at a high intense level. Having a structured, quality training schedule from "just climbing" is the difference between being one of the best in your region vs one of the best in the world.

After reading this book, I realized that I do most of it without even consciously thinking about it; this comes from the over 10,000 hours of efficient training in my past. It comes naturally to me.

For someone trying to push their limits or learn how to train better this book will

be a great asset, the perfect tool.

You will still need to train hard and it will be tough but using this as a backbone to your training will put you ahead of so many others.

One of my favourite chapters is Skill vs. Talent as it is a common question I hear people talking about. Having a skill comes from hours of training and talent comes from using your skills to your advantage. The greatest thing about climbing is there are champions of all sizes and builds.

As always, train within your limits, stay injury free and most importantly don't forget to have fun!



What this Book is and what it isn't

A few years back when I decided to truly improve my training for climbing in order to find out how far I could make it, I bought (and eventually even read) all the books on climbing training out there.

Yet in the end I was left quite disappointed.

I was looking not just for a way to train and improve climbing strength, I was looking for *the best way!*

I want to know and understand why I do a certain exercise, how it affects my muscles and body and why that will make me a better climber.

After all I had been climbing for quite a while and was at a reasonable level, but this time I wanted to *do it right*.

A lot of these books, however, seem to be little more than a collection of exercises often leaving the interested reader perplexed as to which of the 27 displayed exercises to improve finger-strength he is supposed to perform now.

Thrown into the mix are often a few training plans that are either as generic as possible or developed for a specific athlete, again leaving the reader with his different strengths and weaknesses wondering how to transfer this into an effective plan for him.

Since I had studied sport science at one of the worlds most renowned sport uni-

versities in Cologne and received my diploma with a major in Exercise Physiology and Training I knew that the research was out there. Other, more mature sports were taking advantage of it and had progressed beyond what had formerly been considered possible.

And so I began to take matters into my own hands and to apply general sport science theory to the climbing specific environment.

A ton of research, analyzing hundreds of studies and experimenting with dozens of different exercise designs later, I was blown away by how effective these exercises suddenly became once you started doing them *right*, how much stronger you would get after each training cycle.

And once I had shown these exercises to the people around me and it worked for them just as well, I began to write them down.

That proved to be only the beginning. During the following weeks, months and eventually two years, I added the necessary background information, theory and science to allow *anybody* not only to perform these exercises but to truly understand them - even if you don't have a degree in sport science.

I attempted to bridge the gap between pure theory and practical applicability,

between hard-core science and making things easily understandable for everyone. I designed hundreds of graphics and took dozens of photographs. I tried to cover every topic and provide the answers to all the important questions about high intensity strength training for climbing and bouldering.

I ended up writing the book I wish I had had a few years ago.

This book tries to provide you with a simple, understandable, specific and most of all applicable way to train your climbing specific strength effectively and improve your climbing performance.

It is not about novelty, and not about stunts.

It is not about looking hip in the climbing gym and not about big mouthing at the crag.

It is about one thing and one thing only:

Real results for real people.

This book allows you to access the latest research and knowledge of sport science in an easy and understandable way so you can directly apply it to your personal training. You will have a proven, step by step guide on how to drastically improve your climbing specific strength while at the same time keeping the risk of injury as low as possible.

I have also tried to provide you not only with the what and how but also with the why.

If I have succeeded you will hopefully understand why we train the way we train, why I picked a certain exercise over another and why I designed the parameters of an exercise the way they are. Hopefully, in the end this book will not only give you its knowledge, but also the skills and tools to analyze and adapt your training beyond the boundaries of the book itself.

There is no magic formula though, no ground breaking new theory or exercise that will allow you to climb 9a without working hard and patiently for it.

Just an honest and extensively tested „How-To“ to show you the most effective way to train.

There is one thing, however, that this book cannot do.

Buying it will not make you a better climber. Not even reading and understanding it will.

This book and its knowledge is useless unless it is truly acted upon.

You will have to provide the motivation and discipline to bring these concepts to life!

Give them one real and honest try. Complete one entire training cycle ex-

actly as described. Then analyze the results and decide for yourself if it is worth your time and effort.

Who This Book Is For

This book is for you if you are interested in reaching your true potential.

This book is for you if you are willing to work hard and have great goals set for yourself.

This book is for you if you want to get really strong.

This book is for you if you want to stay injury-free.

This book is for you if you are passionate about climbing and bouldering.

This book is for you if you have little time for training and cannot afford inefficiency.

This book is for you if you want to *do it right*.

This book... is for you!

The principles presented in this book, however, are defined by high and highest intensities and focus on strength development over skill.

For this reason they are not appropriate for novices. If you haven't been climbing for several years and have at least reached a level of 7a-7b in routes, your

time is much better spent prioritizing skill and movement development.

Climb. Climb a lot. Climb easy routes and climb hard routes. Learn how to move on the wall, develop your technical and motor skills and build a solid foundation for your climbing career. You will get stronger along the way simply through the climbing.

Once you have established this basis, then come back here and learn how to specifically take your strength to the next level.

The current state of sport science

It is important to note that sport science in general and in regards to climbing in particular is still at a very early stage of its development. There is still a lot we don't know yet or do not understand completely at this point. It is more common than rare to find results from two different studies completely contradicting each other. Some research only targets a specific subset of the population, others even just very few subjects at all.

All this makes it very difficult and complicated even for experts to filter through the available data, decide what is applicable and of importance to climbing and distill it into a usable form.

The human organism is just such a complex and complicated machine with so many individual factors intertwined with each other, that it will take decades if not centuries until we can fully under-

stand what is truly going on.

This is precisely why there is so much mumbo-jumbo going on in the climbing gym or online climbing forums. People generally mean no harm when recommending their approach to training, but often simply lack the specific knowledge and understanding of the underlying principles which is required to determine whether certain study results or training methods from other sports are transferable to climbing and to you.

Fortunately, sport science today does know a lot more than just a few years ago and through mediums such as this book is readily available to you.

And while the last word on training might not be spoken yet, even today we can drastically improve our training for climbing through all the things we *do* know.

Compared to what most people are currently doing the methods and exercises presented in this book will jump-start your training and get you right on track to achieving your full potential.

Another important goal for this book was not to waste time.

Not mine writing it, not yours reading it.

Therefore, I have tried to keep everything, from every chapter to every paragraph compact and concise.

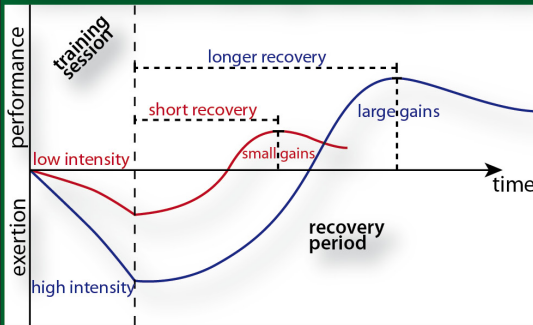
The rule I have hopefully met is:

Everything you need to know and nothing you don't.

I truly hope this book will be of value to you and help you on your way to realize your dreams!

Understanding Supercompensation

Differences in training intensity and their effects

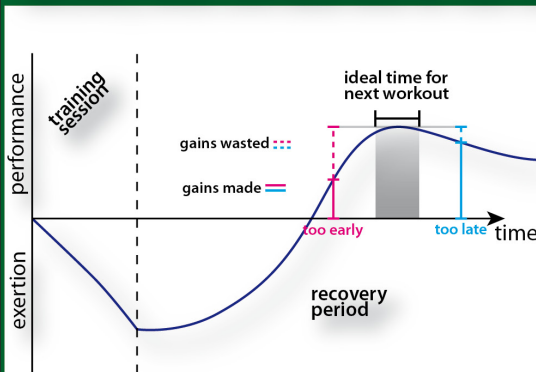


Low intensity training sessions require short recovery times but also produce only small gains.

High intensity training sessions require longer recovery periods but produce significantly larger gains.

The goal is to find the optimum constellation of training intensity versus recovery times in order to maximize gains over the period of multiple training sessions and training cycles.

Recovery times and ideal time for next workout



The ideal time for the next workout is once supercompensation is complete and the current peak of the performance level is reached.

If recovery is not yet completed and the next workout is performed **too early**, a big part of the possible gains from the last workout is wasted.

If the next workout is performed **too late**, performance is already on the decline and some gains are lost as well.

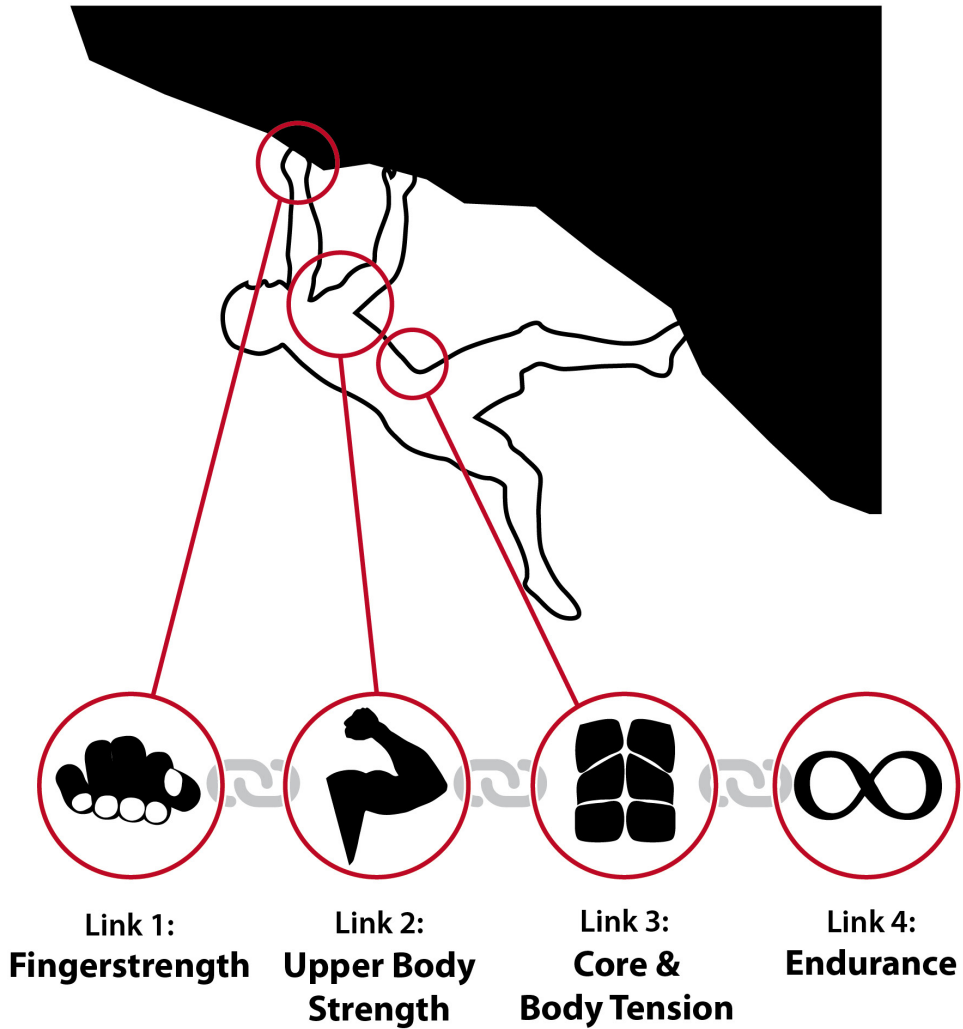
In general it is usually better both for maximizing gains as well as injury prevention to err on the side of caution and rest rather a bit too much than too little.

Recovery times of different biological systems

Acidosis	1 hour	6-8 hours	1-2 days	2 days	8 days
Electrolyte Shift & Water deficit	1 hour	6-8 hours	1-2 days	2 days	8 days
Glycogen store depletion	1 hour	6-8 hours	1-2 days	2 days	8 days
Damaged contractile proteins Aktin / Myosin	1 hour	6-8 hours	1-2 days	2 days	8 days
Damaged mitochondria	1 hour	6-8 hours	1-2 days	2 days	8 days

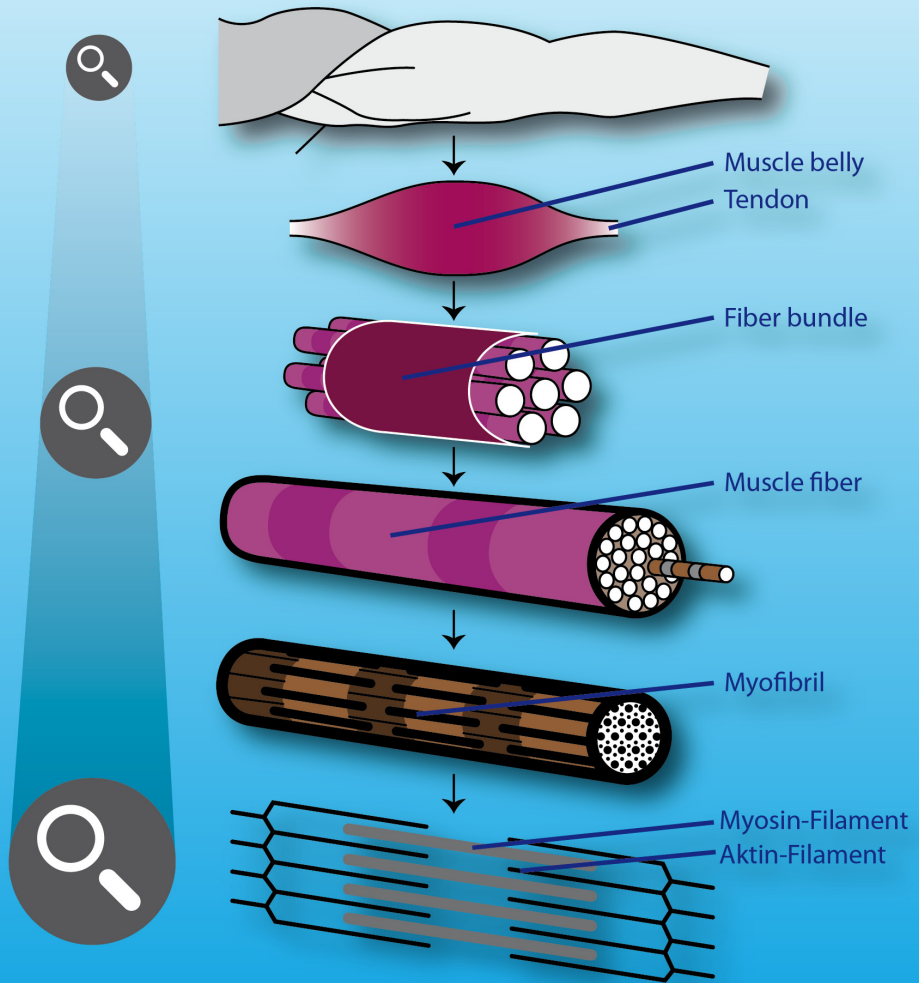
Time to full recovery depends on the intensity of the previous training, which biological system was involved or targeted specifically and the quality of the recovery period itself.

The Chain



Understanding Muscles

Part I : Structure



Link 1: Fingerstrength

Fingerstrength is certainly the most important factor in hard rock climbing.

First let's understand what defines and possibly limits the maximum available strength of a muscle before we go on to find the best methods and how to properly train them.

As you know by now, the smallest functional unit of a muscle is called a muscle fiber and is usually found together with a nerve cell called motoneuron. This pair builds the so called motor unit and is responsible for generating a force. Multiple of these units form a muscle bundle and multiple bundles the overall muscle.

The maximum force any given muscle can exert is then dependent on the following components:

- Physiological cross-sectional area of muscle fibers
- Intermuscular coordination
- Intramuscular coordination

Let's take a closer look at these components.

Physiological cross-sectional area of muscle fibers

A bigger muscle is usually stronger.

If you can increase the available cross-sectional area of a muscle by this much



as a rule of thumb, the available force that muscle can exert increases by 60 N or 6 kg. This is only a rough guideline, the precise value is largely dependent on the specific muscle, the intramuscular coordination of that muscle as well as the dominant muscle fiber type.

Also interesting to know is, that the density or weight of muscle tissue is about 1g per cm³.

Therefore an increase of the above mentioned cross-sectional area of 1 cm² in a 15 cm long muscle (such as your biceps for example) would result in weight gain of about 15 grams versus strength gain equal to 6000 grams.

In other words, the newly built muscle could carry its own weight 400 times over.

This increase of the cross-sectional area can be achieved either by a „thickening“ of the muscle fibers, called hypertrophy, or an increase in total amount on fibers, called hyperplasia.

Breaking Limits

How hard can you climb?

I am not talking about how hard you can climb right now, but about what the hardest route will be that you will ever climb.

Some people seem to have a very pre-conceived conception of what it is that is possible for them and what they „could never achieve“. But why is that? Especially in a sport such as climbing, where we always push the limit of the impossible and make it possible isn't it a great hindrance to limit oneself in advance to an artificial number?

For me one of the greatest things climbing has to offer and that cannot be found in other sports to an equal extent is that no matter how good you are there is always that one hold that is just a tiny bit too small, that one move that is just that tiny bit too far, that one route that is just that tiny bit too difficult. But if we stick with it, practice and train, suddenly what has absolutely physically been impossible only a short while ago, is now moved into the realm of the possible.

What an amazing experience!

As a side note, this is exactly why I believe that climbing is such a valuable and important experience and lesson for children.

Coming back to the question of your personal limit. Don't get me wrong, I am not suggesting that we all should ex-

pect to climb an 8C+ boulder or a 9b+ route within the next few weeks, that kind of pie in the sky expectation certainly would not be helpful or healthy.

But at the same time I see people time and again who are absolutely convinced that they will never ever be able to climb a 7c, 8a, 8b, whatever, ...

And guess what, with that attitude they probably won't.

Over the years I have been asked and thought a lot about what the level is any person could achieve.

At first my best guess was 7b+. I felt that the size of the holds and difficulty of the moves could be possible for any person, young or old, talented or not, if they were willing to work for it.

Over time I found that I might have guessed a little low. 8a is certainly way harder than any 7b+ but at the same time it is far from being impossible and it is being done by hundreds of people all over the world, of all ages and body types. So for what reason should exactly you not be able to do it if you are willing to put in the time and effort necessary?

Then came the time when I got intensely engaged in the question of how to properly train for climbing. And after

having seen the effects a targeted, specific training regimen can have on both myself and the people I coach, I can say that I was still way off.

If you ask me today how hard I think you can climb, all I can say is that in the past I severely underestimated what you are capable of.

And probably so do you.

So try not to impose limitations on yourself, neither right here and right now, nor anywhere in the future.

Try to give your best today and become just a little better tomorrow. In the end you might just be surprised to find how possible the impossible turns out to be.

Campus Plyos



Description

Find the biggest move you can comfortably do on the campus board (for example rung 1 to rung 4). Start with one hand on each rung. Drop down with the upper hand to the lower rung and immediately shoot back up again.

Speed counts, the moving hand should stay as short as possible on the lower rung.

Perform up to 6 repetitions, but stop immediately if speed decreases. Rest for 3 minutes, then perform the next set with the other hand.

intensity



max

repetitions



6 reps

rest



3 min

sets



Level I 4

Level II 8

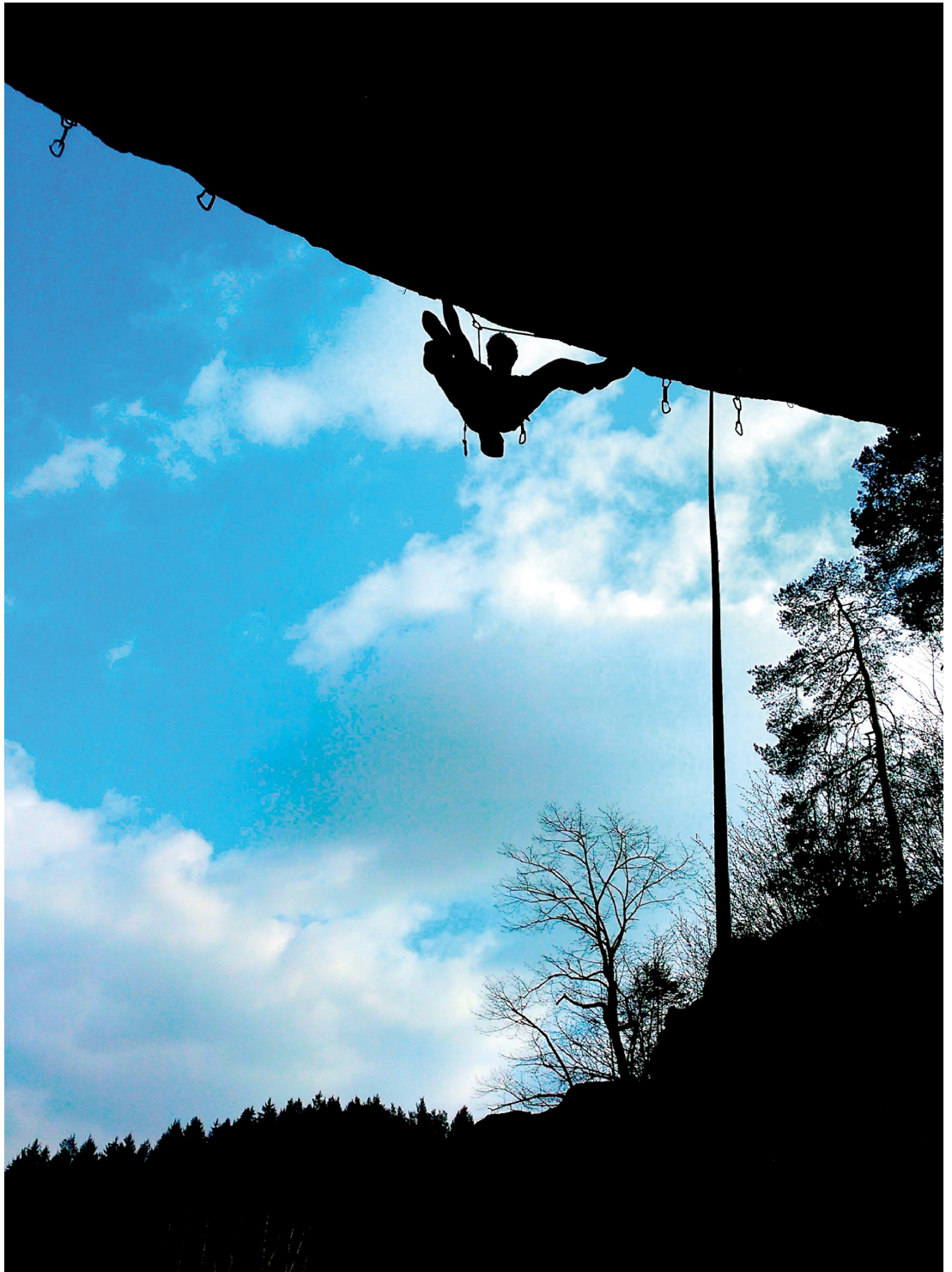
Level III 12

Is your training any **GOOD?**

Good training can always easily answer the following questions:

What exactly is it I am working on?

Why does this make me a better climber?



TRAIN HARD.
DREAM BIG.



This is a different kind of book



This is not just a collection of exercises, nor is it boring theory.

This is modern sport science and latest research, distilled into an easily understandable and most of all applicable format for modern day sport climbing and bouldering. It contains everything you need to start training more efficiently right now.

With this book you will

- Learn what smart training really is.
- Understand what exactly is going on in your body.
- Identify what is holding you back.
- Find the most efficient exercises to eliminate your weaknesses and develop your strengths.
- Master the art of designing an effective training plan.
- Discover all the information you need to get stronger, stay injury free and climb harder.
- Scientifically proven methods, tested extensively by real climbers.

Meet the Coach



Hi!

My name is Nic Duerr and I am the author of this book.

I love climbing, I love training and I love helping people. I started climbing more than 15 years ago. Along the way I got my diploma in sport science with a major in exercise and training physiology and performance.

I believe there is a big need for fact based information about training for climbing to counterbalance all the anecdotal approaches and internet nonsense.

A science based, applicable way to move our sport forward and reach our personal goals.

The thing that inspires me most is seeing someone who trained really hard achieve their goals - someone like you.

This keeps me motivated to train hard for my own projects and follow my dreams!

