Episode 8: Zach Caldwell waxes poetic on ski waxing (auto summary and outline)

The following summary was prepared by a machine. It has not been independently checked by a human. I would recommend using it to get a rough sense of what the episode discusses, and/or you can use the time stamps to zero in on a specific part of this not-short episode that is of interest to you. The AI bots actually did a pretty good job with this outline; this should be of some use if you are not in a position to listen to all two hours of this straight through at once and want to zero in on a particular topic.

Summary

- **Ski waxing with industry expert Zach Caldwell.** 0:03
    - Zach Caldwell, owner of Caldwell Sport, discusses waxing in episode 2 of a 3-part series.
    - Jon introduces the topic of waxing and explains that the show will not cover specific products due to the complexity of the topic.
- **Ski grinding and production quality.** 2:31
    - Expert skier Zach Caldwell explains how to prepare new skis for optimal glide.
    - Speaker 2 highlights improved production consistency and finishing lines in recent years, resulting in better quality factory-produced skis.
    - Investments in chilling and finishing lines have led to a significant reduction in the temperature of the grinding process, ensuring cleaner grinding and better quality skis.
    - Grinding skis for local conditions in North America can significantly improve performance.
    - Speaker 1 explains the importance of water cooling and lubrication in grindstone production, highlighting the need for clean and chilled water to maintain the quality of skis.
    - Speaker 2 discusses the upgrades made to factories to improve grind quality, including the use of finishing lines and hand finishing by race service technicians.
- **Ski grinding and waxing techniques.** 11:14
    - Speaker 1 discusses the importance of custom grinds for skis, mentioning that Wall Sports provides grinds for racing and high-performance skis.
    - Speaker 2 emphasizes simplicity in the waxing process, advocating for minimal steps to achieve the desired result.

    - Leonid Koosman, a Russian guy living in Sweden, wrote a dissertation arguing that waxing and stone grinding skis are unnecessary and that metal scraping is faster.
    - Claude Preca, a Canadian skier and creator of an old wax line, has been using only cola products (not wax-based) for ski waxing and has seen improved results.
- **Waxing skis and saturating base material.** 16:19
    - Speaker 2 explains that high-quality ski base materials are made by compressing ultra-high molecular weight polyethylene grains under high pressure, resulting in a monolithic block with crystalline and amorphous structures.
    - Speaker 2 acknowledges the complexity of the process and the difficulty of reproducing the desired properties, even for companies like Apple.
    - Speaker 2 explains how heating the base of skis allows wax to mix with the material, keeping it moist and easy to work with.
    - Speaker 2 explains the importance of waxing skis, including keeping the base elastic and hard, modifying bulk properties, and reducing static electricity buildup.
    - Heat box process is used to saturate the base with wax, gradually over time, and can put a lot of wax into the base using this method.
- **Waxing ski bases with heat box.** 22:51
    - Speaker 2 found that using a heat box to apply wax to a ski base resulted in approximately 0.5 grams of wax being absorbed into the base over 5-6 ironing cycles.
    - Speaker 2 challenges the myth that a lot of wax is needed in the base, suggesting that only a small amount is required.
    - Speaker 2 explains how adding layers of hard wax to a cold surface can purify the signal and create a harder base.
- **Ski waxing techniques for faster skis.** 26:56
    - Speaker 2 mentions Chris Cable, a skier with dual citizenship in Canada and the US, who recommended applying a layer of green paraffin before the skis get good.
    - Speaker 2 and an unnamed person discuss the use of hard wax in skiing, with Speaker 2 explaining that a hard wax layer can carry heat well and improve performance.
    - Speaker 2 describes the process of race hardening skis, which involves heating the base of the ski to a specific temperature range (147-150°C) to chemically harden the base and improve performance.

    - Speaker 2 shares an anecdote about preparing skis for a World Cup race, including saturating the base with wax, race hardening the ski, and waxing with the wax of the day to achieve optimal performance.
- **Ski waxing and grinding with industry insights.** 32:24
    - Speaker 2 offers aftermarket grind service, including hardening, but prices it high to discourage use.
    - Speaker 2 discusses race hardening skis, a process they've coined to describe the controlled hardening of skis without damaging them.
    - Speaker 2 has tested race hardening multiple times and is confident in the process, despite some reports of slowed ski performance.
- **Waxing skis for better performance.** 36:11
    - Speaker 2 recommends applying 3-5 soft paraffin applications with an iron at 120°C for DIY waxing.
    - Speaker 2 advises ironing in continuous slow paths with a room-temperature ski.
    - Speaker 2 emphasizes the importance of using an iron set to the appropriate temperature for the wax, avoiding overheating the base or core of the ski.
    - Overheating the wax can cause it to become amorphous and lose its integrity, leading to shedding of carbon black and polyethylene fibrils onto the base.
    - Taking slow passes with the iron and avoiding multiple passes in quick succession can help prevent overheating and damage to the ski.
- **Ski waxing techniques and tools.** 42:18
    - Speaker 2 recommends ironing wax onto skis in 3 passes, allowing them to cool between passes, and repeating this process 3-5 times for new skis or after re-grinding.
    - Speaker 1 repeats this process, using a high-melt-point wax like Toko yellow or Swix, and then scraping and brushing the skis before repeating the ironing process.
    - Speaker 1 and Speaker 2 discuss using different brush combos for absorption and hardening wax, but Speaker 2 prioritizes scraping off heat box wax instead of brushing for early prep.
    - Speaker 2 uses more than the standard amount of hardening wax (1.5-2 grams) to carry heat during the hardening process.
- **Waxing and preparing skis for racing.** 46:38

    - Speaker 2 explains the importance of uniform hardening in base material for ski waxing.
    - Speaker 2 explains how they prepare their skis for different conditions, including cold temperatures and racing, using various techniques and tools.
    - Speaker 2 emphasizes the importance of manually inspecting and preparing the kick zone of their skis for successful racing.
    - Identify kick zone by observing wear on skis after skiing.
- **Waxing and preparing skis for racing.** 52:44
    - Avoid sanding in Chevron pattern, instead sand parallel to long axis of ski for better durability.
    - Skis waxed with natural paraffins penetrate skin easily and leave shine, while floral-free waxing emphasizes procedure and old-school techniques.
    - Pat O'Brien asked David to create a special wax for continual ski base servicing to improve performance.
- **Ski waxing techniques for optimal performance.** 58:30
    - Speaker 1 asks Speaker 2 about the optimal frequency for waxing skis, considering the abrasiveness of the snow and the skier's skill level.
    - Speaker 2 recommends hardwaxing every 100k and liquid parrafin before every training session, citing consistent conditions in the mountain west.
- **Waxing skis for training with a focus on simplicity and effectiveness.** 1:01:44
    - Speaker 1 is preparing to train on race skis and wants to know how many passes to make with the iron and scraper.
    - Speaker 2 explains different wax selection methods for recreational skiers who don't need race-ready skis.
    - Speaker 2 recommends letting the wax sit overnight on skis to allow for proper cooling and re-stabilization of the base.
    - Speaker 1 is hesitant about this approach, citing the potential for the wax to solidify too quickly and not provide adequate time for the base to re-stabilize.
- **Waxing skis for better performance.** 1:06:57
    - Speaker 1 recommends using a crayon or dripping wax to apply a small amount (1-2 grams) to the ski, as it's faster and less messy than scraping.

    - Speaker 2 prefers using a thermoplastic shield on their iron to rest the plastic on the ski base without damaging it, and drips a single continuous bead along the ski for even application.
    - Speaker 2 demonstrates how to quickly wax cross-country skis using a heated iron, explaining the importance of using the right temperature and technique to avoid damaging the base.
    - Speaker 2 emphasizes the importance of scraping and brushing the skis to remove all wax, rather than leaving some on to take off with the brush, and provides tips for effective scraping and brushing techniques.
- **Brushes for ski maintenance and their effectiveness.** 1:12:08
    - Speaker 2 uses a fine steel brush and a nylon brush for brushing skis, with the steel brush for cleaning the structure and the nylon brush for polishing.
    - Speaker 2 recommends using a coarse metal brush (like Red Creek's "monster brush") for removing excess wax from skis, creating a snowstorm effect.
    - Speaker 2 prefers rotor brushes for ski preparation, finding them to be faster and more efficient.
    - Speaker 1 is unsure if Norris has their monster brush, asking if he has it and suggesting a rotor brush versus hand brush comparison.
- **Ski waxing techniques and tools.** 1:16:18
    - Speaker 2 explains how rotor brushes work by replacing elbow grease with speed, but people often push too hard and damage the brushes.
    - Speaker 2 recommends using a polishing brush for nylon, and Speaker 1 seeks clarification on classic layers for cold training.
- **Cross-country skiing waxing techniques.** 1:19:31
    - Speaker 2 emphasizes the importance of using a clean base and building up with a binder for optimal kick wax performance.
    - Speaker 2 uses a sharp putty knife to apply layers of wax without using wax remover for training, selecting skis with a pocket shape for optimal performance.
    - Speaker 2 explains the importance of pocket shape in ski performance, emphasizing the role of angular force contribution in kicking.
    - Speaker 2 demonstrates selective wax application to enhance kick support in different snow conditions, using cushion wax under foot for initial bite and higher viscosity wax for high-force kicking.
- **Ski maintenance and racing tips.** 1:24:30

    - Speaker 2 advises against spending too much time waxing skis, suggesting a quick and simple process to avoid overcomplicating things.
    - Speaker 2 encourages listeners to prioritize benevolent neglect when caring for their skis, recognizing the effort they do put in and acknowledging their skis' ability to handle some abuse.
    - Speaker 2 highlights the inverse relationship between speed and input, particularly in waxing, and how it can impact race performance.
- **Ski waxing strategies for local races.** 1:29:33
    - Speaker 1 recommends preparing race skis for a local event by narrowing down a fleet of skis based on expected conditions and using local knowledge to inform wax choices.
    - Speaker 2 advises using established points of wisdom from local skiers to inform wax choices, such as a star green and Toko cold powder combination at the Alley Loop race.
    - Speaker 2 recommends researching local knowledge and skiers' results to gain an edge in competition.
    - Speaker 2 advises testing skis on the snow to determine the best wax temperature, rather than relying on general guidelines or pre-made solutions.
- **Skiing gear and preparation for long distance races.** 1:35:11
    - Recommendations for selecting and preparing skis for a big race, including how many pairs to bring and how to test them beforehand.
    - Institutional knowledge and local product insights are crucial for cross-country skiing races.
- **Race-day ski waxing strategies.** 1:38:39
    - Speaker 2 discusses the importance of gathering information in advance for race day testing, as making informed decisions earlier is often not practical due to limited choices.
    - Speaker 2 emphasizes the importance of using robust solutions that have a wide range of options, as everyone's guess is as good as anybody's in the face of uncertain weather conditions.
    - Speaker 2 emphasizes the importance of field testing skis on the actual course, rather than in a controlled environment, to gain valuable insights for race day.
    - Speaker 2 suggests starting with simple tests on two skis, then adding variables and layering to find the best solutions, rather than trying to achieve perfect control in a product line.

- **Waxing strategies for cross-country skiing races.** 1:43:49
    - Speaker 2 advises self-supported racers to team up with friends and divide tasks to gather information and test skis more efficiently.
    - Speaker 2 suggests that spending too much time on controlled testing may not be the most effective approach, and instead, relying on institutional knowledge and on-site observations can lead to better results.
    - Coordination and planning can help teams combine resources and benefit from each other's expertise.
    - Speaker 1 acknowledges making mistakes by trying to outsmart race conditions instead of adapting to what's in front of them.
    - Speaker 1's wife has criticized them for waxing skis based on expected race conditions that don't materialize.
- **Ski prep and travel for race.** 1:50:07
    - Preparing skis for travel after a race: iron wax vs. travel wax.
    - Speaker 2 suggests using old athletic socks or a protective layer to cover skis during air travel to prevent damage from dragging on the tarmac.
    - Speaker 2 acknowledges that some damage is unavoidable, but recommends packing skis in a protective bag with T-shirts around the tips and tails to minimize damage.
- **Proper ski storage techniques.** 1:54:38
    - Protect skis from damage by bundling base-to-base with ski ties or cling wrap, and packing poles and clothing in the tip and tail.
    - Speaker 2 discusses the importance of properly cleaning and waxing skis after a season, especially if they have been exposed to harsh conditions like mud and sunlight.
    - The speaker emphasizes the difference between skis that need thorough cleaning and waxing and those that can be left in a bag and taken out in the fall without any issues.
    - Speaker 2 believes it's a good idea to put on storage wax over the summer to protect skis from damage.
    - Speaker 2 acknowledges that some people may be invested in the work they've already done and may be resistant to new information.
- **Ski waxing techniques and best practices.** 2:01:22
    - Speaker 2 emphasizes the importance of using a good iron and keeping tools sharp to avoid damaging skis during waxing.
    - Speaker 2 advises against over-waxing or using old wax, as it can lead to poor ski performance and damage.

- Speaker 2 discusses the importance of knowing how to use and stop using certain expressions, with Speaker 1 expressing gratitude for the valuable insights shared.
- Speaker 1 invites listeners to send questions for a future podcast with guest Mr. Caldwell, and thanks various individuals for their contributions to the podcast.