

READING GUIDE

Start with a complete route

This book begins with purchased roasted cacao nibs and follows the work through a suitable tabletop melanger to finished bars. Along the way, it teaches three connected ways to understand chocolate: the ingredients you combine, the particles you refine and the fat structure you establish as the chocolate sets.

Read the first four chapters as a continuous route. Planning includes what happens after refining, so read through finishing before starting the machine. Later chapters help you interpret the result, compare formulas and choose a deliberate next change.

Allow for a long first run. The source-based schedule includes at least three hours on nibs and roughly ten to fifteen after sugar, with loading and cleanup still to add. The day plan on pp. 30-31 shows how that time fits together.

The worked machine route names the current Premier 8 lb non-tilting refiner with its redesigned stainless-steel holder. Use the instructions for your actual configuration alongside the relevant operating pages. Formula arithmetic and explanatory principles travel across machines; settings and load requirements need their own checks.

This guide draws on published chocolate-making methods and scientific references, listed on pp. 138-141. The book does not claim independent kitchen testing of its worked batches; it starts with suitable ready-to-eat roasted nibs and does not provide a raw-cacao treatment, a validated shelf life or a production plan for selling food.

How to read the graphics

Proportional bars show declared arithmetic. Process drawings show mechanisms and decisions. They are original schematics, not photographs of successful batches or measured laboratory results.

© 2026 Jay Arr. Revised edition, September 2026. The batch records and planning sheets may be copied for personal use; all other rights reserved. Type: Cacao Book Serif, derived from Source Serif 4, and Noto Sans. Original vector diagrams; sources and index at the back.

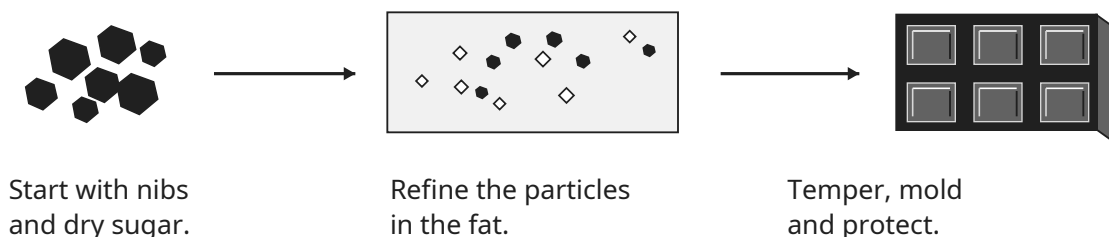
YOUR ROUTE THROUGH THE BOOK

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A bar you can understand

FROM ROASTED NIBS TO A FINISHED BAR



Particle reduction and controlled setting are different jobs. Conceptual views.

A bag of cacao nibs does not look much like a chocolate bar. The pieces are irregular, the taste is intensely bitter and aromatic, and a spoonful of sugar beside them seems a long way from something smooth enough to melt on your tongue. Yet those two ingredients can become chocolate. The work ahead is to change how their components are arranged.

The nibs already contain cocoa butter. As the nibs are ground, that fat becomes available to carry much smaller pieces of cacao and sugar. The mixture can become fluid even though the sugar has not dissolved as it would in a cup of tea. Later, a different operation guides how the cocoa butter solidifies. That is how a flowing mixture becomes a bar with a useful structure.

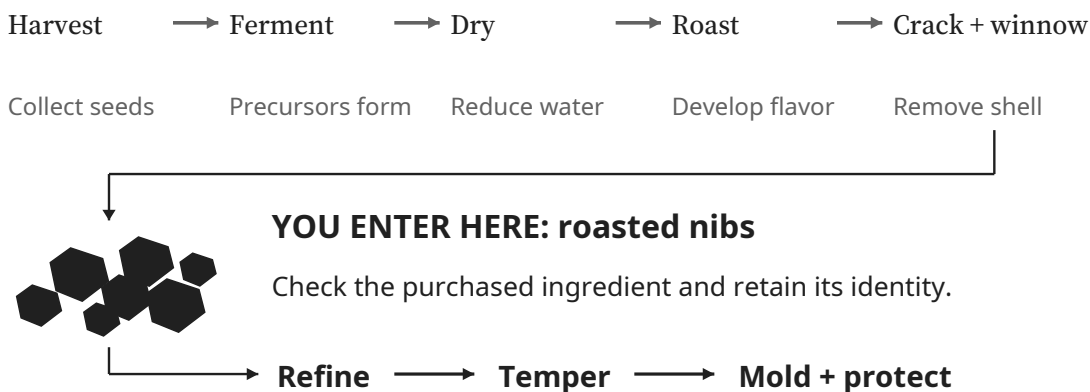
This chapter gives you the picture the rest of the book relies on. It shows where your work begins and how the bar came to be, names three questions that locate almost any change (composition, particles, crystals) and maps what each stage changes and carries forward. It ends inside the machine, inside the nibs and with the two quantities you will plan. By the end you can say which kind of change a problem belongs to before choosing a remedy.

The aim is a bar you can understand. When something changes, you should have a sensible next question: Did the ingredients change? Did the particles change? Or did the fat's crystal structure change?

1.2

Your work begins partway through

Cacao reaches the kitchen with a history. Someone has grown and harvested the pods, opened them, handled the seeds through fermentation and drying, and made decisions about roasting. Cracking and removing the shell leave the pieces we call nibs. Buying roasted nibs lets you begin after that upstream work.

BEFORE PURCHASE / THE UPSTREAM SEQUENCE, UNSCALED

The upstream history comes with the nibs. Origin gives context; suitability still needs checking.

Buying roasted nibs also means you inherit the consequences of that earlier work. Your choice of nibs brings flavor potential, fat content and processing history into the batch. A melanger gives you control over important later decisions, but it cannot return a nib to an earlier stage and choose a different fermentation or roast.

That is useful knowledge when shopping. “Madagascar” or “Ecuador” gives you context; the supplier, producer, roast, lot and condition tell you more about the particular ingredient in the bag. Regional descriptions can suggest what to look for, but they do not guarantee what you will taste.

For the first route, choose purchased roasted nibs sold for ready-to-eat use. Keep the package and lot information. Raw beans, home roasting and establishing a safe treatment for raw cacao are separate projects; they are not steps hidden inside this book’s first batch.

1.3

A very short history of the bar

Chocolate's history is much longer than the history of the familiar molded bar. A 2018 archaeological study (Zarrillo and colleagues, listed in the sources) reported evidence of cacao use at Santa Ana-La Florida in present-day Ecuador about 5,300 years ago. Later Mesoamerican cultures developed rich traditions of cacao preparation and use. A modern home maker is joining a long history of people changing what cacao can become.

Three nineteenth-century developments help explain the equipment and ingredients on your counter. Cocoa pressing, associated with Van Houten's 1828 development, made it possible to separate a substantial portion of cocoa butter from cocoa material. Makers could then combine cocoa ingredients and sugar in new proportions. Fry's 1847 eating-chocolate milestone belongs to the development of the modern bar; it does not mean that no one had previously made solid cacao preparations. Lindt's 1879 conching development became part of the story of smoother, more refined eating chocolate.

Your small machine brings refining and warm mixing into the kitchen, on a very different scale. It reduces particles in the nib-and-sugar mixture while warm mixing can also change flavor. Added cocoa butter is an optional formula choice later in the book (pp. 74 and 91).

c. 5,300 years ago	Use cacao	Evidence of an established relationship with the plant.
1828 / pressing	Separate	Cocoa butter can be separated from other cocoa material.
1847 / Fry's bar	Recombine	Cocoa ingredients and sugar combined for eating chocolate.
1879 / conching	Develop	Mechanical processing develops texture and flavor.

Unscaled milestones; each development had many hands.

1.4

Three questions explain the process

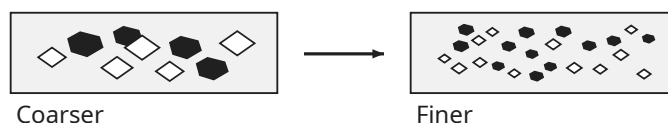
COMPOSITION

What is in it?



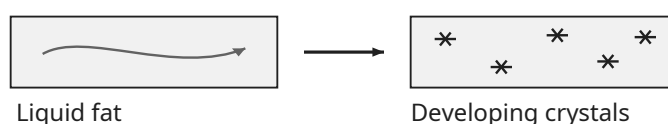
PARTICLES

How fine are they?



CRYSTALS

How will it set?



● Cacao solids

◇ Sugar

□ Fat phase

* Fat crystal

The schematics separate composition, particles and crystals. Start by identifying which question your observation raises.

What is in it? Composition is the ingredient system: cocoa material, sugar, fat and, in later examples, milk ingredients or inclusions. Changing the composition can change flavor and handling before you touch a machine setting.

How fine are the particles? Refining reduces particles. The changing particle mixture and available fat affect how the chocolate moves. Warm mixing can also alter the flavor you perceive. These changes overlap in a melanger, but they are not the same change.

How will it set? Tempering manages crystallization of the cocoa butter. Chocolate that has been refined can still set poorly if this stage is mishandled. Tempering does not make existing cacao or sugar particles smaller. Crystal state can still change how a set piece feels as it melts.

These questions prevent a common kind of confusion: applying a reasonable remedy at the wrong stage. More time under the stones may help an unfinished particle-reduction job. It will not establish the crystal structure needed for molding. Repeating tempering can address a crystal-state problem. It does not change the sugar-to-nib ratio.

Throughout the book, the same three labels will help you locate the decision: **composition, particles, crystals**.

1.4 / PROCESS MAP

What changes, and what carries forward

DIFFERENT STAGES DO DIFFERENT WORK



+ Account for seed or toppings if added. Lines connect stages; they do not promise that flavor, moisture or all physical properties stay unchanged.

Each stage of the work acts on one part of the chocolate and hands the rest on. Knowing which is which keeps you from asking a later stage to undo an earlier one.

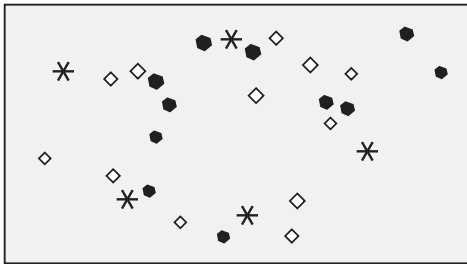
Weighing sets the recipe. Your record keeps that input ratio, 70/30 here, until you add something: running longer does not subtract the weighed sugar, and a remelt does not undo seed or a topping. That is bookkeeping, not a claim that nothing in the chocolate changes; how sweet it seems can shift as its flavor develops, and the mass you recover is not the mass you weighed in. Refining changes the particles, and the warm mixing that comes with it can change the flavor. Neither alters the recorded ratio of nibs to sugar, and neither sets up the crystals a bar needs.

1.4 / PROCESS MAP / CONTINUED

Remelting changes the crystals

THE PARTICLES STAY / THE CRYSTAL STATE CHANGES

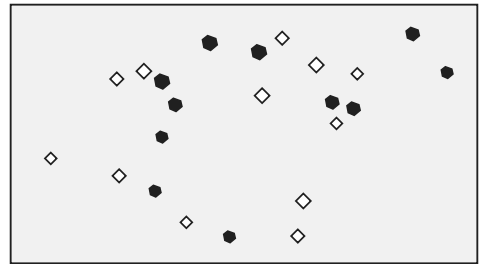
Tempered bar



melt



Complete melt



● Cacao solids

◇ Sugar

□ Fat phase

✱ Crystals

Same refined particles and ingredient additions. A new tempering cycle must establish the working crystal state again. Conceptual views.

A complete melt resets the crystal structure. It does not grind particles smaller or take out an addition, although heat is not guaranteed to leave everything else exactly as it was. Tempering then builds a useful crystal state; it does not refine the particles or change the formula. Cold chocolate meeting humid air can change the surface, which is why the book protects that transition.

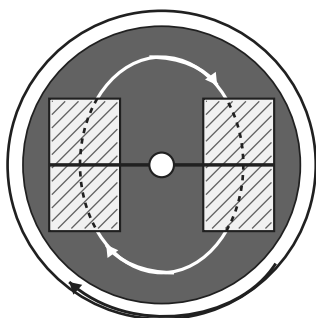
When a result disappoints you, start by asking which stage could have changed it. A sweetness question usually starts with the formula, grit with refining, and a bowl that thickens while it waits with the crystals. These are starting questions: later chapters show when the answer lies elsewhere, such as clumps after a wet addition.

1.5

What the melanger does

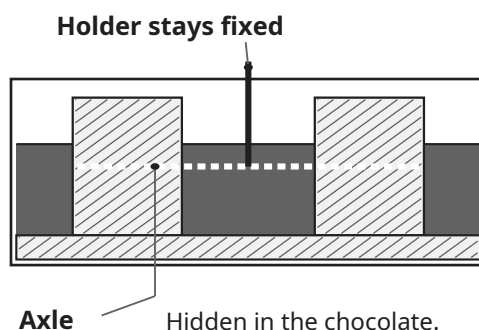
A rotating drum carries material beneath stone rollers. Repeated contact with the granite base reduces particles. As nibs break down, their cocoa butter helps create a flowing suspension. Sugar joins that moving material and is refined with it.

PLAN / LOOK DOWN



Dark: chocolate. White arrows: circulation.
Cross-line: axle. Outer arrow: drum.

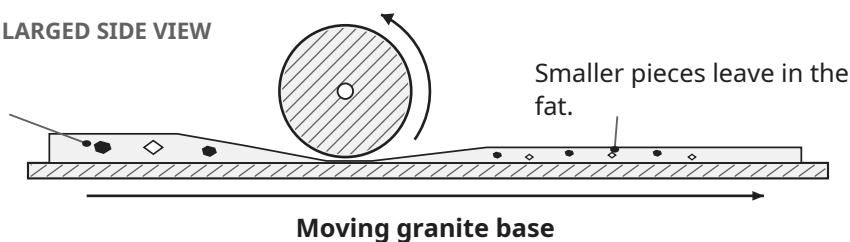
SECTION THROUGH THE AXLE



Hatched: granite. The moving base turns the rollers on their fixed axle.

AT THE CONTACT / ENLARGED SIDE VIEW

Larger solids enter.



Contact enlargement: pale fat carries cacao solids and sugar. Circulation returns material. Views and rotation are schematic; assembly follows the maker's instructions.

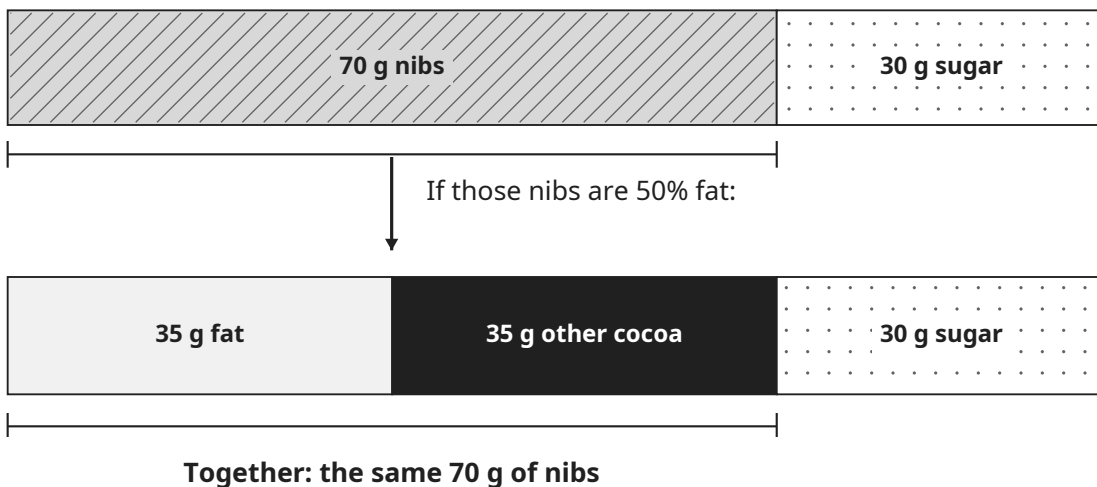
In this book's dark route, the nibs go in before the sugar. Grinding releases their cocoa butter and helps turn them into a paste that can carry the dry sugar under the rollers. The manufacturer's instructions require a creamy paste before other ingredients are added; its dark recipe also specifies at least three hours for the nib stage.

Gradual loading, a suitable load and the manufacturer's settings make the mechanism usable. These are general schematics. Use the actual model and holder instructions for assembly, pressure, heat, sampling and unloading.

1.6

The fat was in the nibs all along

SAME 100 G / READ TWO WAYS



An accounting split, not a physical one. The 50% is a stated assumption.

Our recurring dark formula is 70% nibs and 30% sugar by ingredient mass. That means 70 of every 100 parts come from nibs. It does not mean that 70 parts are fat-free cocoa solids, or that all of the rest is cocoa butter.

Nibs contain both cocoa butter and other cocoa material. To make the arithmetic visible, imagine nibs containing exactly 50% fat. In 100 g of our formula, the 70 g of nibs would contribute 35 g of cocoa butter and 35 g of other cocoa material. The sugar would contribute the remaining 30 g.

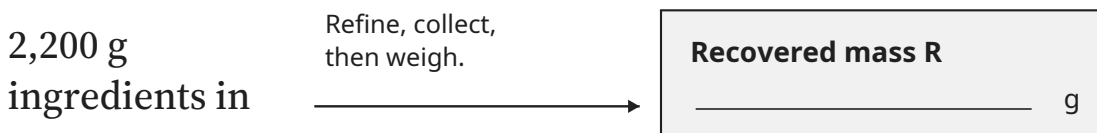
That is a teaching assumption, not a measurement of your nibs. Actual fat content varies. The lesson survives that uncertainty: an ingredient name can conceal several components, and “70% cocoa” does not tell you the total fat on its own.

You will return to this picture in Chapter 5, where two formulas can both contain 70% cocoa ingredients and still have different calculated fat contents.

1.7

One batch, one first portion

INPUT IS KNOWN / RECOVERY IS MEASURED



ARITHMETIC EXAMPLE ONLY / SUPPOSE R IS 2,100 G

300 g	1,800 g remainder
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Finish one portion. Protect the remainder as refined, untempered.

For your measured recovery: remainder = R – chosen portion. The 2,100 g figure is only an arithmetic example.

The machine needs a load that suits its operation. Your hands need a finishing portion that suits the bowl, molds and attention you can manage. Those are different quantities.

The named machine example uses 2,200 g of ingredients. Once refining is complete, you collect the chocolate, weigh what you actually recover and protect it outside the machine. A later finishing session works with a smaller portion, illustrated here at 300 g. The rest stays clearly identified as refined, untempered chocolate until you are ready for it.

This separation makes the first destination manageable: finish one portion and understand what happened. Finishing a small portion later does not shorten the refining run itself; Chapter 2 helps you plan the complete processing session.

A complete plan therefore has two parts. It accounts for the whole machine batch through collection and holding, and it prepares a complete finishing route for the first portion. Chapter 2 puts both on the same planning sheet.

1.8

Turn making into understanding

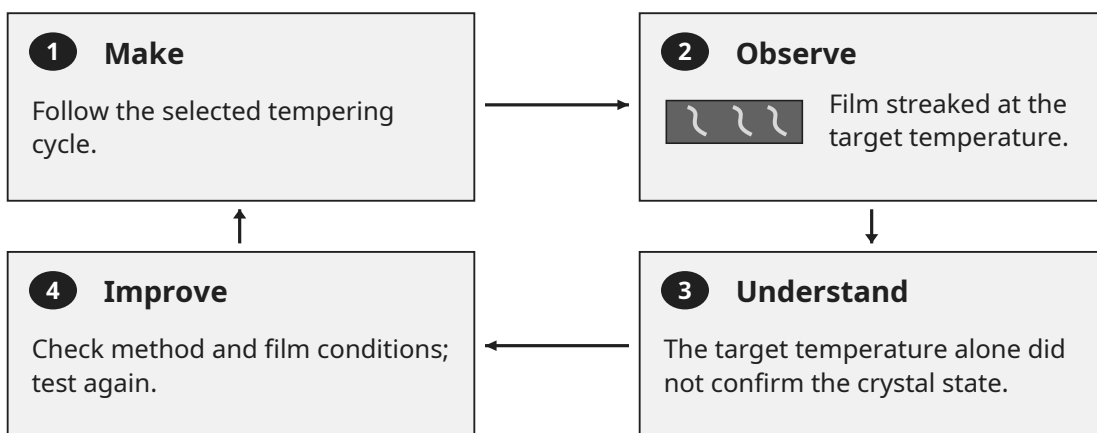
This is the route through the whole book; each chapter opens with a shorter route of its own. For a first batch, read Chapters 1 through 4 in order before switching on the machine: Chapter 2 plans the batch, Chapter 3 runs the machine and Chapter 4 finishes a first portion. Preparation includes the collection and finishing equipment, even if you use it later. Cacao origins and the milk and white extensions can wait.

If you already make chocolate, enter through the question you have. Chapter 5 helps you read ingredients and percentages. Chapter 6 separates texture, flow and flavor observations. Chapter 7 turns a goal into a deliberate formula change. Chapter 8 begins with a symptom and the stage where it appears.

You can use this book twice: first as a route through the work, then as a way to interpret it. Keep a short record as you go. A useful record connects an action with an observation; it does not need to be a diary of every minute.

Before Chapter 2, you should be able to say: which two transformations turn nibs into a bar; which three questions locate a problem; and why the machine batch and the finishing portion are different quantities. **Check yourself:** question 1, p. 126.

A HYPOTHETICAL OBSERVATION / CHOOSE THE NEXT CHECK



The observation points first to process and test conditions. Chapter 4 develops this example.