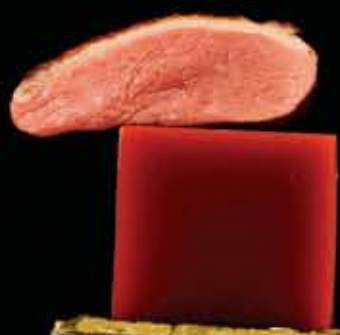


BIG BANG BOOK



ARTS & MEDIA/KITCHEN SPY
IF ESCOFFIER HAD BEEN A SCIENTIFIC PRODIGY WHO STUDIED WITH STEPHEN HAWKING AND WORKED AS BILL GATES' TECH BRAIN AT MICROSOFT, THEN HE WOULD HAVE WRITTEN THE TOUCH-ALL-BASES, MULTIVOLUME CHEF D'OEUVRE ON MODERN COOKERY NATHAN MYHRVOLD IS BRINGING OUT THIS YEAR. GREG ATKINSON REPORTS FROM INSIDE THE LABORATORY/KITCHEN. LAB PHOTOS BY JIM HENKENS.



out-li·er *n* 1. an outcrop of rock that is separated from a main formation 2. a separate part of a system, organization, or body that is at some distance from the main part 3. somebody who lives a long way from his or her place of work
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Modernist Cuisine: The Art and Science of Cooking is scheduled to be released in December 2010. The author, **Nathan Myhrvold**, is the former chief technology officer of Microsoft and co-founder of Intellectual Ventures, "a firm dedicated to creating and investing in inventions." He has spent the last three years developing what he calls an "encyclopedic treatment of modern cooking." The 2,400-page book will be released in five hardcover volumes plus a waterproofed spiral-bound kitchen manual contained in a slipcover; list price is \$625. Myhrvold's work is not only unprecedented in its scope and scale, but his credentials as a scientist are unmatched. Myhrvold graduated from high school at age 14, earned a master's degree in mathematics, geophysics, and space physics from UCLA, and another master's in mathematical economics from Princeton. He completed a Ph.D. by age 23. Since then he has contributed to the understanding of global climate change, hurricanes, dinosaurs, and the eradication of malaria in mosquitoes. Myhrvold is an active inventor, with nearly 250 patents issued or pending—including several related to food technology. While he was still at Microsoft, he took a leave of absence to undergo an intensive six week professional culinary program with **Anne Willan** at the *École de la Varenne* in Villecien, France. Anyone looking for more culinary credentials might note that Myhrvold serves as the chief gastronomic officer of the Zagat survey. "I have known **Tim** and **Nina Zagat** for

years,” he says. Myhrvold also counts food scientist **Harold McGee** among his close friends and has dined with him at **El Bulli**, **Ferran Adrià**’s temple of modernist cooking in Roses, Spain.

When he first applied to the program at La Varenne, Willan was dubious. Myhrvold had not included a work résumé. “So I turned in my full résumé listing my position at Microsoft. She called me back and said they had lots of other programs that might be more appropriate for a novice cook, and I said no, I want to do the professional thing.” Willan sent a representative (Seattle cookbook author and culinary instructor Cynthia Nims) from the school to interview this unusual candidate. Myhrvold recalls that he was asked to discuss the relative cooking times of three stocks: veal, chicken, and fish. “I got the times all right, but they recommended I do a *stage* at a restaurant.” So Myhrvold turned in an extensive *stage* at **Thierry Rautureau’s Rover’s** restaurant in Seattle, where he worked one 10 hour day a week for a period of about two years.

“I think I learned at least as much at Rover’s as I did at La Varenne,” says Myhrvold. “I used to say I only call two people boss and only one of them carries a nine-inch knife.” Bill Gates didn’t carry the knife. “He didn’t have to,” jokes Myhrvold.

In a 2008 article for *The New Yorker*, Malcolm Gladwell, author of *The Tipping Point*, *Blink*, and *Outliers*, described Myhrvold as “gregarious, enthusiastic, and nerdy on an epic scale.” And in *Outliers*, Gladwell cites Myhrvold when he proposes that success in a given field has as much to do with generation, family, and class as it does with inherent genius.

Only someone born in France in the mid-19th century could have been in a position to compile the *Guide Culinaire*, Auguste Escoffier’s thorough tome that expressed his vast experience with the cuisine of his era. And only those born in the early 20th century could have had the opportunities, the connections, and the maturity to complete *Mastering the Art of French Cooking* as both Julia Child and her editor, Judith Jones, were. It also helped that Child’s book came out when the popular first lady Jacquelyn Kennedy had just hired French chef René Verdon to cook at the White House, making French food synonymous with presidential chic for the first time since Thomas Jefferson occupied the place.

Giftedness and hard work were part of the story in the making of both of those books, but so were timing and opportunity. All these things appear to have come together in *Modernist Cuisine* as well. Myhrvold’s giftedness is unimpeachable, but his work is also a reflection of a particular time and place. Born in Seattle in 1959, Myhrvold has been in a unique position to do what he has done. A decade earlier, he might have been too firmly entrenched in traditional culinary techniques to consider the modernist movement; a decade later, someone else might have beat him to the punch. Without his Microsoft connections and the hundreds of millions of dollars he accumulated there, he might not have had the technical savvy or the financial resources to tackle what has been an incalculable personal investment in this project.

“This book,” says Myhrvold, “is something that I was in a position to do, and it wouldn’t have happened in any other way for a very long time. You know, eventually there would have been books



written about the new cooking, but who knows how long it would take that to occur.”

intellectual *adj* **1.** relating to or involving the mental processes of abstract thinking and reasoning rather than the emotions **2.** having a highly developed ability to think, reason, and understand, especially in combination with wide knowledge **3.** intended for, appealing to, or done by intelligent people **n** somebody with a highly developed ability to reason and understand, especially if also well educated and interested in the arts or sciences or enjoying activities involving serious mental effort

Intellectual Ventures is based in a suite of offices in a swank office park in Bellevue, Washington. The company also occupies

a 20,000-square-foot laboratory across town with an additional 7,000-square-foot storage space across the street. In addition to state-of-the-art ovens, cooktops, and refrigeration equipment, the culinary lab boasts combi ovens, freeze-driers, centrifuge machines, storage equipment for liquid nitrogen, homogenizers, and a spray drier. Besides the preposterously well-equipped culinary lab, there’s a biology lab, a chemistry lab, labs for photonics, electronics, “small things,” and more. There’s an insectary (basically a room for insects), housing mosquitoes for malaria research, a photography studio, and a machine shop. Additional equipment for the various labs is stored in a 30,000-square-foot warehouse in the nearby town of Kent.

For the book project, Myhrvold hired 15 people, including five professional chefs, a full-time photographer, an art director (who left his job at *Scientific American* to contribute to the project),

and various contributing writers and editors. The kitchen crew is led by Myhrvold’s co-author, **Chris Young**, who served as opening chef of the experimental kitchen under **Heston Blumenthal** at **The Fat Duck** in Bray, England, and helped develop some of that restaurant’s most innovative dishes. Young earned degrees in mathematics and biochemistry at the University of Washington and left behind his doctoral work to cook with **William Belick-**

Overleaf: Team Myhrvold called upon a refractometer, pH meter, pressure cooker, sous-vide equipment, Thermomix, and anti-griddle to produce the components of duck Apicius: duck stock, pomegranate with garum juice, quince jelly, braised turnips with saffron, spiced honey glass, date puree, and rendered duck. Photo by Ryan Smith. Man over machine: Nathan Myhrvold with a larger-than-life rotary evaporator, which he has mastered. Above: A bisected wok provides a close-up for a detailed dissection of stir-frying. Photo by Ryan Smith.



Any dish—modernist or traditional—depends on the quality of its ingredients: test tubes and bottles of spices in the kitchen lab.

is at Seattle's Mistral restaurant. While he was at The Fat Duck, Young was responsible for managing recipe development for the BBC show *Perfection: With Heston Blumenthal*. He has written extensively on the science of food and cooking for *The Fat Duck Cookbook* and has published scholarly research in the *Journal of Agricultural Chemistry and Food Science*.

Young's right-hand man in the kitchen is **Maxime Bilet**, who earned a degree in English from Skidmore, in Saratoga Springs, New York, then graduated with highest honors from the Institute of Culinary Education in New York City. He served as head chef at **Jack's Luxury Oyster Bar** before moving to London to accept a position as a *stagiaire* with the development team at The Fat Duck, where he met Young. While he was in training to become a sous chef at the London branch of **Auberge de L'Île**, he was drafted to join the culinary team at The Cooking Lab. **Anjana Shanker**, another member of the team, served as sous chef at **Scott Carsberg's** restaurant *Lampreia* in Seattle. She encouraged Myhrvold to explore curries and developed five of them using sous-vide techniques. **Johnny Zhu** helped **Eric** and **Sophie Bahn** open **Monsoon** in Bellevue and contributed his understanding of Southeast Asian flavors to the project. The chefs all worked somewhere in the neighborhood of 60 hours a week to develop and refine recipes for the book.

Crowned with wisps of graying blond hair, Myhrvold's Nordic face is punctuated with brilliant blue eyes. And when he talks about the book, his carefully modulated voice calls to mind Gene Wilder's performance in the 1971 movie *Willie Wonka & the Chocolate Factory*. At any given moment he looks like he might be about to laugh, and he often is.

"We wanted to show food to people in a way it hadn't been seen before," says Myhrvold, describing the various processes he employed to pull together what will certainly be regarded as one of the most significant books about food ever published. Lavishly illustrated with stunning photographs, many of them complex images that show bisected cooking equipment revealing food inside or on top in the process of undergoing the changes associated with being cooked, the book contains 180 "parametric recipes," which are essentially charts that provide details for adapting basic techniques to specific ingredients. The "parametrics" contain an average of 10 "formula recipes" each. Three hundred and eighty-one "example recipes" were inspired by classic or previously published recipes, or adapted from recipes contributed by working chefs specifically for the project. Forty-eight original "plated dish" recipes, which include sub-recipes and formulas for sauces, garnishes, and side dishes include an average of five separate recipes each. The voice rises and the laugh bubbles through: "I think we succeeded!"

cui:sine # 1. a specified style of cooking, especially one that is notable for high quality See also *haute cuisine* # 2. the range of food prepared by a particular restaurant, country, or individual

"The first volume of the book, *History and Fundamentals*, is about the history of modern cuisine. Well, actually," enthuses Myhrvold, "it's about the history of *all* cuisine. We start at the Stone Age!" Everything Myhrvold undertakes is characterized by a no-holds-barred, sky's-the-limit approach that broadens the playing field and opens up worlds of possibilities in every project he undertakes. His interest in cosmology and quantum field theory led him to a post-doctoral fellowship with cosmologist Stephen Hawking; dabbling in photography incited a lifelong interest in nature and wildlife photography that won him an International Conservation Photography Award in 2008; and an interest in barbecue prompted him to compete on a team that won first place in several categories at the 1991 World Championship of Barbecue. So it seems only fitting that what started as a 500 page treatise on sous-vide technique should expand into this behemoth work. In order to put the modernist culinary movement into perspective, and to sate his vast intellectual curiosity, Myhrvold unfolded layer upon layer of background material.

"Where did modernist cuisine come from? Where did nouvelle come from? What are the forces that shaped fine dining around the world? And what's the philosophy behind this? Because one of the things that's interesting about modern gastronomy is that it's quite intellectually oriented, a little more philosophical perhaps than in ages past.

"Originally the book was going to be a book about sous-vide," he says. Did **Thomas Keller**, with his 2008 book *Under Pressure*, beat him to it? "No, not really. That wasn't..." he hesitates. "Our sous-vide chapter is still a very different work than Keller's book. Keller's book is partially about technique, but a lot of it is about his great recipes. Most books are only about recipes; they're not about techniques, because the techniques are already out there. They'll only explain a chef's particular tweak on a technique." Keller's *The*

French Laundry Cookbook, for example, has a sidebar about a *cartouche*, “where he puts a little parchment paper floating on top of saucapans. That’s a technique. But 90 percent of that book is about his unique recipes, which is great!

“Our book is more about the science; it’s more about the technique; it’s more about the why. Our book is more like the **Jacques Pépin** book *La Technique* or The Culinary Institute of America’s big textbook that’s like ‘here’s all the techniques.’ So we’re much more like that. I think by the time all is said and done, we’ve got more than a thousand recipes in the thing, so it’s not like we don’t have any recipes!” he exclaims. “But we also have recipes that are very diverse. Our goal is not to say: ‘Here’s how I cook a particular recipe at my restaurant,’ because we don’t have a restaurant. We don’t have a single style. We’re trying to describe a whole movement of cooking.”

This means the book includes hundreds of pages of material that wouldn’t be found in any other cookbook. “For instance, I didn’t see how I could talk about sous-vide without talking about food safety, because food safety is very connected to sous-vide. There’s been all sorts of controversy about it. But then I couldn’t talk about food safety without talking about microbiology. Like why do you call being infected with an organism food poisoning? Most chefs don’t even know that!” There are also multiple “stories” in the book. “We

tell the story of James Watt, for example, and explain what a watt is. These parts are like garnishes. You don’t necessarily eat them, but they add something. If we had a publisher, I would have to leave some things out, make things more accessible.”

Child, when she reluctantly conceded to reduce what would have been her multivolume work to a single, more approachable volume, wrote to an editor that she “might even manage to insert a note of gaiety and a certain quiet chic” into the work. Myhrvold seems determined to do something along those same lines.

“We cover an enormous amount of background material, but we try to cover it in a way that’s interesting, engaging, and fun, rather than just make it seem like work or make it seem very technical. This isn’t written to be a textbook! A textbook doesn’t have to be fun because it’s an assignment.” He’s cracking himself up now. “We wanted to do irresponsible things with microwave ovens.” But he quickly pulls himself together and shifts focus to a sidebar piece about pots and pans. “We did a bunch of computer modeling to say: Look, are copper pans really better than aluminum? And the answer is: The burner matters more than the pan!” He’s Wonka again, and his excitement is contagious. “It turns out that if you have a little burner and a big pan, you’re screwed no matter how good the pan is! That’s why traditional kitchens had those flattops.

“Also in the first volume we talk about some fundamental science—microbiology, and then, based on microbiology, food and health. We also have a chapter about what’s good for you. Is foie gras really killing you or not? Or steak. Or whatever. We talk about the fundamental physics of water and of heat.”

One concept that excites Myhrvold is the difference between wet bulb and dry bulb temperatures, a notion he calls “the most important concept in cooking that you never heard of.” Most calibrations of temperature are dry bulb measures; they simply measure the temperature of the air. Wet bulb temperature, measured with a thermometer wrapped in wet muslin, takes into account humidity, which it turns out, has a tremendous impact on how rapidly something cooks. “If we succeed in educating people about this one concept,” he says, “we will have made a great contribution to the culinary field.

“Food, because it’s mostly water, feels only wet bulb temperatures,” says Myhrvold. “In Chicago in the winter, your oven is baking about 20 degrees lower than it would at the same temperature setting in New Orleans in the summer. Also, how full is your oven? The variations all have to do with wet bulb temperatures. With a combi oven or a Cvap, we control this phenomenon.”

An attempt to provide a practical application of wet and dry bulb measures morphs into an enthusiastic testimonial on the advantages of cooking in a combi oven, which simultaneously steams and bakes with convection. Myhrvold describes how he would produce a perfect fried egg. “To get the perfect fried egg white, you need to cook it to 175 degrees Fahrenheit or 79 degrees Centigrade. But to get a sunny-side up egg yolk, it needs to be 145 degrees Fahrenheit or 63 degrees Centigrade! So you have to cook them in two stages! Cook the whites first and then add the yolks. And you can hold these almost indefinitely in the combi oven. Perfect eggs for 200? No problem!”

A combi oven is also employed in the book’s formula for a perfect



Chefs Maxime Bilet (left), Nathan Myhrvold (center), and Chris Young (right) assess a sauce rapidly clarified with the aid of a centrifuge.

roasted chicken. The breast meat is injected with brine. “There’s really no need to brine the dark meat.” Then the bird is hung inside the oven and slowly steam-baked to produce crisp skin and tender meat. “A combi oven is not just a labor-saving device—the way it’s always sold—it’s a quality improving device. Most restaurants don’t have a combi oven, and the restaurants that do mostly just use them as a holding cabinet. This is pretty unexplored territory.

“We wanted to show the best possible way to do something. We didn’t want to be limited to what you can do at home or even what you can do in a restaurant. I love *Cook’s Illustrated*,” he says. “I love the empirical approach; but they always stop just when I want to get going. They have to produce results that can be duplicated in a regular home kitchen.” But what if you weren’t limited that way? What if you could use any piece of equipment, any length of time? If there is a way to do something without specialized expensive equipment, the book offers options, “but if there isn’t an easy way to do it, we go ahead and provide the recipe anyway. We didn’t want to simplify anything or dumb it down. I think there is already a cookbook called *Cooking for Dummies*. They did that. I don’t need to.”

expert *n*. somebody with a great deal of knowledge about, or skill, training, or experience in, a particular field or activity
2. the highest grade of marksmanship in shooting, or somebody who has achieved this grade. “*An expert is a man who has made all the mistakes which can be made in a very narrow field.*” —Niels Bohr

The second volume is called *Techniques and Equipment*. “So there we’ve got a big chapter called ‘Traditional Cooking,’ where we go through and explain how traditional cooking processes actually work. We use a mechanism we call the cut-away, which is where we have a picture of food while it’s cooking that’s annotated to explain all the processes that are going on. We felt we had to do this because, although there have been some great books on food and cooking, like Harold McGee’s *On Food and Cooking: The Science and Lore of the Kitchen*, many of the basic ideas in cooking weren’t explained in a very graphical way to people. We use graphics and cool pictures to explain things in a way that you wouldn’t otherwise get. The idea is that if we make something beautiful and simple looking graphically, we can draw folks into a topic that otherwise might be

a little bit scary and a little bit technical.”

If this approach seems to allude to the whole modernist movement, wherein chefs make elaborate preparations attractive to diners in order to draw them into a new way of thinking about and experiencing what they eat, it applies more directly to the work at hand. One page of the book shows a cut-away of frozen supermarket lasagna in a microwave oven. “We cut the lasagna in half and we cut the microwave oven in half so you could see all the working parts.” Sidebars

describe what microwaves are, how the oven generates those waves, and how they impact the food inside.

Another cut-away reveals what’s happening on the grill and inside a ground beef patty resting above the coals. “People will say, ‘How did you do that?’ And the answer is simple. We really cut stuff in half! This one was difficult because the coals kept falling out!” The images are composed of several layers. “You have to end up taking multiple exposures because when you use a flash to get the burgers lit like that, the coals don’t look so glowing. To get the coals glowing, you take a longer exposure without the flash. So you use a lot of photographic techniques to get the image.” In some of the cut-aways, a piece of glass was used to contain the ingredients inside the cooking vessel and then Photoshop editing was used to remove any evidence of the glass. “But this really did happen! We really had

two hamburgers perched there on the side with live coals.”

The grilled hamburger picture also illustrates another point. “When people hear about the book, they’re going to think it’s all about Adrià’s stuff, stuff you’d see at *Alinea* in Chicago, and we have a lot of that. But we’re also happy to show you how hamburger grilling actually works. So I think that even if you’re a totally committed traditionalist and you’re not interested in hydrocolloids at all, I still think we’ve got cool stuff for you.”

In a cut-away of a brisket over coals, sidebars describe contributors to flavor. “Smoke is a contributor to flavor; so is fat. Fat flare-ups give food the grill flavor. We did some interesting research on this. It turns out that if you have shiny sides on the inside of your grill, it cooks way more evenly. For the same reason those mirrors at Nordstrom, where you look and you see infinite copies of yourself, we came up with this technique of lining the chamber with foil, but if you go to Home Depot and get a piece of air-conditioning duct, it works great, too. Here’s how we discovered it. Here’s a mathemati-



High-tech lentil salad: sous-vide cooked green lentils mixed with minced pickled cherries, Sherry gel cubes, sliced green hazelnuts, diced radish, chervil, and frisée tops, dressed with cherry vinaigrette, and garnished with a cherry coated foie gras pop, chamomille blossoms, and shards of dried cherry/hazelnut nougatine. Photo by Ryan Smith.

cal calculation of the intensity of the heat from a grill as you move away.” The cut-away includes a diagram of the calculated sweet-spot for any item cooked over coals. Another calculation reveals the ideal distance between the rods on the surface of the grill.

One compelling image shows a piece of fish resting in a pool of white wine as it is being broiled. The accompanying example recipe is attributed to **Frédry Girardet**. “Because white wine evaporates at a lower temperature than water does, it keeps the fish from over-

cooking. I found this in his book years ago and liked it. He never made a big deal out of this, but we decided we would and explain it because it’s such a cool technique.”

With equal sobriety and no sense of irony, another cut-away shows a Ronco “Showtime” rotisserie with a duck inside. Like the oven, the duck is neatly cut in half. Here, Myhrvold wanted to show the importance of keeping food in motion while it’s exposed to heat. In a cut-away of a plancha or griddle, he reiterates the

Equip yourself Nathan Myhrvold’s legion of chefs, writers, editors, a photographer, and an art director used an astonishing aggregation of technologies to produce *Modernist Cuisine*. Below, **Chris Young**, chef and co-author, divulges his favorite tools in the lab’s formidable culinary arsenal, with commentary:

Very useful tools **Digitally controlled water bath** (Sousvide Supreme, VWR, Polyscience, Lauda). “The best tool for any culinary endeavor that requires accurate temperature control; we used several baths for preparing multiple dishes at different temperatures simultaneously.”

Liquid nitrogen (Thermolyne). “Useful for myriad prep tasks and producing special effects.”

Modern combi ovens (Rational, Winston Industries CVap). “One of the most versatile tools for a kitchen.”

Vacuum sealer (Hualian, Foodsaver, Henkelman, Ary Vacmaster, Multivac). “Greatly improves the precision and flexibility of cooking in water baths and combi ovens. Sealers are also handy for preserving, compressing, and expanding foods. Chamber sealers are the best.”

Homogenizer (Omni, IKA, Netzsch Premier Technologies, Avestin). “Tabletop rotor stator or more sophisticated ultra high pressure homogenizers produce the smoothest and most stable sauces, purees, and emulsions.”

Pacojet (Pacojet). “A unique, powerful grinder that turns frozen solids into ice creams and sorbets as well as superfine pastes and purees.”

Vacuum pump (Büchi). “Useful for filtration and desiccation.”

Magnetic stirrer and hot plate (Corning). “Great for temperature-controlled heating-while-stirring tasks, such as dispersing and hydrating hydrocolloids.”

Autoclave (Yamato, Tuttnauer). “An incredibly useful automated pressure cooker for large applications like stock making.”

Centrifuge (Thermo Scientific, Beckman Coulter). “Clarifies liquids and separates fats and solids rapidly and thoroughly.”

Useful but specialized tools **Ultrasonic bath** (Branson). “Improves ability to extract flavor.”

Vacuum tumbler. “Accelerates brining, curing, and marinating.”

Blast chiller. “Chills food quickly.”

Smoker (Bradley, Traeger, Cookshack, BBQ Guru, Enviro-Pak). “What can I say. I love smoked food.”

Freeze dryer (VirTis-FTS/SP Scientific). “Entirely unique way to dehydrate food while preserving flavor.”

Vacuum oven (Fisher Scientific). “Makes baking under reduced atmosphere possible; bakes up the lightest meringue you can imagine.”

Rotary evaporator (Büchi, Yamato). “Distills and concentrates flavor at very low temperatures to avoid changing flavors with excessively high temperatures.”

Less expensive but essential tools

Digital scales (Ohaus). “Measuring by weight is the only way to be accurate. I like to have one scale that weighs up to 5 kg with an accuracy of +/- 1 g and a second that goes up to 200 g with an accuracy of +/- 0.01 g.”

Laboratory sieves (Newark Wirecloth). “Available in sizes from 20 microns to several centimeters. Far superior—and less expensive—than a good chinois.”

Pressure cooker (Kuhn Rikon). “Unrivalled for stock making but handy for speeding up all kinds of cooking jobs. Vastly underrated by many cooks.”

Inexpensive pressure filtering setup. “Intended for home brewers and winemakers, but invaluable for filtering juices easily and efficiently.” —C.Y.

point. “Here’s why you flip food: basically, it’s to make a very high heat source seem like it’s a less high heat source from the point of view of the interior of the food; it’s averaging the temperature. The reason to do that is to have less of an overcooked area on the surface. Another way to do that is to cook the food sous-vide to the ideal doneness and then simply sear it.

“Then after traditional cooking we have a chapter on modern ovens; that’s combi ovens, Cvaps, microwaves. We have a chapter on the modernist kitchen that goes through liquid nitrogen, centrifuges, dryers, all of the different kinds of weird equipment that have entered kitchens in the last 20 years as science and scientific labs have become an inspiration, a place to actually borrow equipment from, not just knowledge from.”

In the lab, Young prioritizes some of the “weird equipment” he used to develop recipes for the book. “If I had to choose—and restaurant owners always have to choose based on space and funds—what I would spend my money on and dedicate my space to would definitely include a centrifuge.”

Essentially a whirling apparatus, the centrifuge is standard in scientific labs because it efficiently separates denser particles (like platelets) from lighter ones in a liquid (like blood). The first culinary application came in 1864, when Antonin Prandtl used one to separate cream from milk. Centrifuges are still used to do that. Centrifuges are also used in the sugar industry to separate crystals from the liquid in which they’re suspended. Visitors to Disney World can experi-

ence what it’s like to be inside a centrifuge if they board the Mission: SPACE ride there. In the culinary lab, Young uses a standard counter-top model to separate solids from liquids in a fresh tomato puree. The resulting tomato “water” is brighter and fresher-tasting than a similar concoction derived from dripping for several hours. “The yield is much higher, and it’s so much faster! If I ever have a restaurant kitchen again,” says Young, “I’ll have at least two of these.

“I think I’d also have to have a rotovap,” says Young, musing again on how he might equip his ideal restaurant kitchen. Properly known as a rotary evaporator, the instrument is designed to separate liquids into component parts by evaporation. If you change the pressure inside a chamber, you alter the boiling points of liquids, and they evaporate at lower temperatures. “If you boil orange juice at regular atmospheric pressure to concentrate it, it tastes like piss; but if you do it at a cooler temperature, you can save all the volatile oils and put them back. This is what commercial processors do when they make frozen orange juice concentrate. But you can also use it to make rose petal essence or any other kind of essential oil.” The rotovap could also be used to distill alcohol. “But we don’t do that,” Young is quick to add. “The feds would shut us down.”

Another of Young’s favorite pieces of equipment is a dairy homogenizer. By passing liquid under high pressure through a small orifice, a homogenizer breaks up the globules of butterfat in whole milk, reducing the size of the fat particles and rendering a more stable emulsion. “It’s like a blender on steroids,” he notes. “With this



A cutaway view of a pot of steaming broccoli affords Team Myhrvold the opportunity to discuss the dynamics of steaming (for more on steaming see page 54). Photo by Ryan Smith.

thing we can construct creams.” To make the ultimate pistachio gelato, for instance, Young constructed a pistachio cream made up of pure pistachio. “Lactose and butterfat in the standard recipes makes gelato taste like milk no matter how much pistachio is involved, but I can replace the cream and milk with pistachio milk and cream and make a gelato of pure pistachio.” But he didn’t get the formula for the ultimate pistachio gelato right the first time he tried.

“Our philosophy at The Fat Duck,” says Young, “was we better be failing constantly or we’re not really trying anything new. And we want to fail as quickly as possible so we can get on to the thing that *does* work.”

physics *n* the scientific study of matter, energy, force, and motion, and the way they relate to each other (takes a singular verb) *n pl* the physical processes, interactions, qualities, properties, or behaviors of something

The third and fourth volumes of *Modernist Cuisine* are entitled *Meat and Plants* and *Ingredients and Preparations*. “And there,” says Myhrvold, “we take meat, which for us includes fish, poultry, and seafood as well as mammal meat, plants, and some new sorts of ingredients and preparations: thickeners, gels, emulsions, foams. Oh! And then wine and coffee; coffee because, damn it, we’re from Seattle, and the rest of the world ought to learn how to make a decent cup of coffee. One of the incendiary things we say around here is that you’d go broke if you served the kind of coffee you get in most Michelin three-star restaurants as a street vendor in Seattle. And I think it’s true!” This time the laugh is beyond Wonka, almost maniacal. “A street vendor in Seattle has to make a pretty damn good latte because guess what? There’s one across the street! And there’s three **Starbucks** a block away! Wine is also a sort of neglected topic. It’s treated as this almost religious thing, a little bit like the Japanese tea ceremony. We have a sort of nontraditional take on it.”

For these chapters, Nims, the very woman who served as gatekeeper for Willan questioning his credentials when Myhrvold first applied to La Varenne, was drafted to help out with the language. “I wrote some initial drafts of the coffee and wine chapters, but I don’t think I was the sole author of a single line,” she says. “I operated as a part of the team every step of the way, and every paragraph was definitely a group effort. I also wrote some initial drafts of the chapters on thickeners, gels, emulsions, and foams. But I’m obviously more of a word person than a scientist. I mean, I didn’t even do well in Physics 101.”

Physics is really at the heart of this work. “McGee,” says Myhr-

vold, “calls my book the physics cookbook. He already covered the chemistry. And I think that’s appropriate. He was married to a chemist for a long time. But I’m a physicist. We tried to make sure that all the science was useful.”

In an era when provenance of ingredients is almost as important as what’s done to them, especially on the West Coast, one might wonder if Myhrvold has any thoughts about the significance of where and how ingredients are obtained. “We can be as farm-to-table as anybody. But the bottom line is quality. Usually that means local, but if we have to use FedEx to get something that’s better quality, we’ll do it.”



A conventional bouquet garni unconventionally being vacuum dried to intensify the aromatic potency of the herbs.

cook-book *n* a book containing recipes for preparing food or, more generally, detailed directions for a process of any kind

Volume Five is called *Plated Dish Recipes*. “Throughout the other volumes we have example recipes and parametric recipes. A parametric recipe is similar to the idea of a master recipe, like you find in some books except that we’ve boiled it all the way down to a table and a bunch of steps. The table gives you the key parameters. In gels, for example, we give various formulas for making all kinds of different gels. There, the processes are almost identical; it’s the parameters that are different.

If you’re using gellen, you use this amount; if you’re using pectin, you use this amount and then add this other thing.”

The complete work contains 180 of these parametric recipes, which contain an average of 10 formulaic recipes each. “So we’ve got tons of recipes. We also have example recipes, which are focused on a particular topic with a particular aim, some of which we developed ourselves, some of which were given to us by various chefs. We have two kinds of these recipes: adapted from something we made up and those inspired by Escoffier. But he’s dead and he wouldn’t recognize the recipes anyway. But there’s a key idea that we took, all of which are about piece parts, except in this volume. Volume Five is about a full plated dish where we give all the garnishes. It’s often a bunch of side dishes. In many cases the plated dish is really the whole meal. And those run the gamut of things from really abstract modern dishes like something you might find at The Fat Duck or Alinea to American barbecue. We have seven different barbecue sauces from all over the United States, we have a map that shows where they’re from, and then we have all these barbecue side dishes. So that’s like a whole barbecue thing.”

A sixth volume may be thought of as the capstone of the entire project. “We took the most important recipes and tables, and because this is a large book—it’s 13 inches tall by 11-something inches wide, like a coffee-table book size, there are five volumes like

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that—we got some feedback from some people who thought it was too big and too pretty to put on a counter. So we decided to add a sixth volume that is just reference materials and recipes printed on waterproof paper and spiral bound. A kitchen manual.” One might wonder if the kitchen manual could be purchased separately. “Not yet.”

Given enough resources and time, Child might have written a much more comprehensive version of *Mastering the Art of French Cooking* than the one that Alfred A. Knopf presented to the world in 1961. The draft she submitted earlier to a different publishing house was 700 detailed pages on nothing but poultry and soups. “We were far more interested in readers who were devoted to serious, creative cookery,” she mused in her memoirs. “We knew this was an audience that needed and wanted attention. It would, however, be a relatively small audience. Furthermore, the publishing business was in a period of doldrums.” So she cobbled the manuscript down to fewer pages, fewer recipes, emphasized the simpler *cuisine bourgeoise* over *grande cuisine*, and submitted the book again.

Escoffier, when he published the *Guide Culinaire* in 1903, had to face certain limitations too: “I didn’t want the *Guide* to be a luxurious work of art or a curiosity that would be regulated to library shelves. I wanted it to be a tool more than a book, a constant companion that chefs would always keep at their side.” But he acknowledged in his memoirs, “At a time when all is undergoing modification and change, it would be foolish to claim to establish the future of an art which is connected in so many ways to fashion and is just as changeable.”

“The publishing industry,” says Myhrvold, “always wants something that’s very mass market, something between the level of **Denny’s** and **Ruth’s Chris**, and most cookbooks are aimed at that level, or something a little lower than that. We wanted to aim a little higher. Still, we couldn’t include everything. Shanker asked why we don’t include curries; and I sort of said OK. I mean we had seven barbecue sauces, why not five curries? But then someone suggested we do China next. And I had to say no. I mean we cover all the techniques used in Chinese cooking,” but Myhrvold feels he couldn’t possibly cover anything like a comprehensive sampling of Chinese recipes. “Undoubtedly someone will look at this and say, ‘My God, you have 5,000 pages! Couldn’t you have left *something* out? But what would we have left out?’

“Several people from the publishing industry have approached us and said they would be interested in helping us get this thing into print *now* that it’s almost done. But when I ask them if we had approached them at the beginning and asked if they would publish this thing, they just laugh. From the beginning we took the position that we wanted to make the book that we wanted to make. And that’s what we’ve done.”

Any chef or culinary student fortunate enough to lay hands on this monumental work will probably feel much the same way. This is the book we wanted someone to make. ■