

Keys to Good Cooking: A Guide to Making the Best of Foods and Recipes

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The answers to many kitchen conundrums in one easy-to-use volume, from the author of the acclaimed culinary bible *On Food and Cooking*.

From our foremost expert on the science of cooking, Harold McGee, *Keys to Good Cooking* is a concise and authoritative guide designed to help home cooks navigate the ever-expanding universe of ingredients, recipes, food safety, and appliances, and arrive at the promised land of a satisfying dish.

A work of astounding scholarship and originality, *Keys to Good Cooking* directly addresses the cook at work in the kitchen and in need of quick and reliable guidance. Cookbooks past and present frequently contradict one another about the best ways to prepare foods, and many contain erroneous information and advice.

Keys to Good Cooking distills the modern scientific understanding of cooking and translates it into immediately useful information. Looking at ingredients from the mundane to the exotic, McGee takes you from market to table, teaching, for example, how to spot the most delectable asparagus (choose thick spears); how to best prepare the vegetable (peel, don't snap, the fibrous ends; broiling is one effective cooking method for asparagus and other flat-lying vegetables); and how to present it (coat with butter or oil after cooking to avoid a wrinkled surface). This book will be a requisite countertop resource for all home chefs, as McGee's insights on kitchen safety in particular—reboil refrigerated meat or fish stocks every few days. (They're so perishable that they can spoil even in the refrigerator.); Don't put ice cubes or frozen gel packs on a burn. (Extreme cold can cause additional skin damage)—will save even the most knowledgeable home chefs from culinary disaster.

A companion volume to recipe books, a touchstone that helps cooks spot flawed recipes and make the best of them, *Keys to Good Cooking* will be of use to cooks of all kinds: to beginners who want to learn the basics, to weekend cooks who want a quick refresher in the basics, and to accomplished cooks who want to rethink a dish from the bottom up. With *Keys to Good Cooking* McGee has created an essential guide for food lovers everywhere.

Harold McGee writes about the science of food and cooking. He's the author of the award-winning classic *On Food and Cooking: The Science and Lore of the Kitchen*, and writes a monthly column, "The Curious Cook," for *The New York Times*. He has been named food writer of the year by *Bon Appétit* magazine and to the Time 100, an annual list of the world's most influential people. He lives in San Francisco.¹

GETTING TO KNOW FOODS

Good cooking starts with a good understanding of its raw materials, the foods we cook.

We're all familiar with the foods that we regularly buy and eat, and the more we cook, the better we get to know them and the way they behave. But foods have histories and inner qualities that aren't obvious from our everyday encounters with them, and that determine their value and behavior. The more fully we know our foods, the better we can choose them and cook with them.

I first encountered the inner world of foods decades ago as a student, when I headed to an unfamiliar section of the library and found shelf after shelf devoted to the science of food and agriculture. I browsed in them, and at first was startled and amused by what I saw: photographs taken through the microscope of meat fibers and the way they shrank as they cooked, microbes growing in yogurt and cheese, the oil droplets jammed against each other in a bit of mayonnaise, gossamer-thin gluten sheets in bread dough. But soon I was mesmerized. And though I'd stopped studying science years earlier, I found myself drawn into what was going on behind these scenes, into the nature and behavior of the protein and starch and fat molecules that they were constructed from. It was thrilling to begin to understand why meats get juicy when cooked just right and dry when overcooked, why milk thickens into yogurt and cheeses have so many textures and flavors, why well-formed bread dough feels almost alive to the touch.

The language and ideas of science are less familiar than our foods are, and I know that their strangeness can be off-putting. Try to put up with them anyhow, and don't worry about the details. Just start by knowing that there are details, and that they can help you understand cooking and cook better. Then, when a question comes up, when you really want to know more, use the brief explanation in this book as an entry point to the world of details that's out there to explore.

WHAT FOODS ARE

Foods are complex, dynamic, and fragile materials.

Most foods come originally from living plants and animals, which are nature's most intricate and active creations. Some—fresh fruits and vegetables, fresh eggs, shellfish from the tank, yogurt—are still alive when we buy them.

Living things are fragile. They thrive in the right conditions, die and decay in the wrong ones. Their tissues can be damaged by physical pressure, by excessive heat or cold, by too little fresh air or too much, and by microbes that start consuming them for food before we can.

Most foods are produced on farms or ranches or in factories far distant from our kitchens. Before we can buy them, they have been raised, harvested, prepared and packaged, transported to the market, unpacked, and displayed—and require careful temperature control and gentle handling throughout to minimize their deterioration.

Our food plants and animals have been bred and selected over thousands of years and come in countless different varieties, each with its own advantages and disadvantages.

The quality of a food is a general measure of how well it fulfills its potential for providing nourishment and the pleasures of flavor, texture, and appearance.

Food quality depends on many factors. These include the variety of plant or animal the food comes from, how that plant or animal lives, and how the food is handled in its progress from farm to plate.

HOW FOODS ARE PRODUCED

Cooks today can choose foods from a wide and sometimes confusing range of production systems.

Most foods are produced in "conventional" large-scale industrial systems that are designed to minimize production costs and food prices, and maximize shelf life. Conventional foods are produced and shipped from sources all over the world, wherever labor and other costs are low enough to offset the costs of transportation.

Most meats come from farm animals raised largely or entirely indoors, with little living space, on manufactured feeds that often include materials the animal wouldn't normally eat (fish meal, rendered animal remains and waste), antibiotics to stimulate growth and control disease, and sometimes with growth-stimulating hormones.

Most fruits, vegetables, grains, and cooking oils come from plants grown with industrial fertilizers, herbicides, and pesticides. Some crops have been genetically modified with modern DNA technology, which may reduce herbicide and pesticide use.

Most fish and shellfish are produced in aquaculture, the water- animal version of intensive meat production, in confinement and on formulated feeds. Some fish and shellfish are still harvested from the wild.

Most prepared foods are made from conventional ingredients, and usually include texture stabilizers, natural or artificial flavor concentrates, and preservatives. They're industrial approximations of the original kitchen product, designed to minimize price and maximize shelf life.

Conventional systems have important drawbacks. Conventional agriculture and meat production, and aquaculture, can cause damage to the environment, the spread of antibiotic-resistant bacteria, and unnecessary animal suffering. Harvesting wild fish and shellfish has depleted many populations to dangerously low levels.

Alternative production systems attempt to remedy various drawbacks of conventional systems. Many foods are now advertised or certified to have been produced:

☐ organically, without the use of industrial fertilizers or pesticides, genetically modified crops, or most industrial additives, and with minimal use of antibiotics;

☐ sustainably, without damaging effects on the local or global environments, or on wild populations;

- ❑ humanely, with consideration for the quality of life of farm animals;
- ❑ fairly, with farmers in developing countries receiving a good price;
- ❑ selectively, without the use of genetically modified crops, certain hormones or antibiotics or feeds, or preservatives or other additives; or with the use of high-quality or heritage varieties;
- ❑ locally, with fewer resources spent on transportation.

Food production terminology is neither precise nor tightly regulated. The terms are loose at best, and because some justify higher prices, they may be used to mislead or deceive.

Be skeptical about alternative production claims, but not cynical. All food choices, even casual ones, influence the agriculture and food industries and the people who work in them, and have a cumulative impact on the world's soils, waters, and air.

CHOOSING FOODS

Good cooking calls for good ingredients. Cooking can mask the defects of mediocre or poor ingredients, but it can't make the best foods with them.

Foods land in our shopping carts with a history. Their genetic background, their variety or breed, and everything they go through from farm to display case influence their quality and what we can do with them.

Think about your priorities and choose foods consciously. If production practices and their consequences matter to you, then check the credentials of the suppliers and buy accordingly.

No particular production method is a guarantee of food quality. Both conventional and alternative foods can be mistreated or spoiled during the harvest or later handling.

Learn to read the signs of quality in the foods you shop for. The chapters in this book describe what to look for in each food.

Check the ingredient lists on prepared foods to know what you're really buying.

Care for the foods you buy to preserve their quality. A long hot car ride from the store can cause damage as much as mishandling at any other stage.

INSIDE FOODS: FOOD CHEMICALS

As with all material things, including our bodies, foods are composed of countless invisibly

small structures called molecules. We eat so that food molecules will become our body's molecules.

Molecules come in various families or kinds, and we call those kinds chemicals. Many chemical names—proteins, enzymes, carbohydrates, saturated and unsaturated fats—are familiar from nutrition guidelines and packaged food labels. They're becoming common cooking terms because they can help cooks understand what their methods are actually doing to change foods.

The major chemical building blocks of foods are water, proteins, carbohydrates, and fats. These chemicals, and the changes they undergo during cooking, create the structures and textures of our foods.

Water

Water is the primary chemical in fresh foods of all kinds, and a major ingredient in most cooked dishes. The cells of all living things are essentially bags of water in which the other molecules are suspended and do their work.

Water is what makes foods seem moist. Its loss is what can make them seem unpleasantly dry or pleasantly crisp.

Water is also an important cooking medium. We cook many foods in hot water, or in the watery fluids from other foods.

Water can be acid, alkaline, or neutral—neither acid nor alkaline. Acidity and alkalinity affect the reactions of other food molecules and are important factors in cooking. Acid liquids include fruit juices and vinegar, and taste sour. Alkaline ingredients include many city tap waters, baking soda, and egg whites, and taste flat.

The boiling point of water is an important cooking landmark. It's instantly recognizable as bubbling turbulence, and it marks a specific temperature, 212° F/100° C at sea level (lower temperatures at high altitudes), that is hot enough to kill microbes, firm meats and fish, and soften vegetables.

The boiling point of water is an important cooking limitation. It is too low to develop the rich flavors of roasting and frying, which develop increasingly quickly above 250° F/120° C.

Water in foods can slow their cooking. When foods are heated in the hot dry air of an oven or barbecue, their surface moisture evaporates and cools them.

Proteins

Proteins are the main building blocks in meats and fish, eggs, and dairy products.

Proteins are the sensitive food chemicals, easily changed by heat and by acidity, and the

reason that meats and fish are tricky to cook well.

Picture proteins as separate long threads, more or less folded up, crowded together in a watery world.

Proteins coagulate when the temperature rises to 100 to 140° F / 40 to 60° C and the threads unfold and stick to each other, forming a solid mass of stuck threads with water pockets trapped in between. This is why heating causes meat and fish flesh to get firm and liquid eggs to solidify.

Coagulated proteins dry out when they are cooked hotter than their coagulation point and stick more tightly to each other. This is why meat and fish flesh quickly get hard and dry, why eggs get rubbery, and why precise temperature control helps cook these foods just right.

Acidity can also cause proteins to coagulate, even at low temperatures. This is why acid-producing bacteria set milk into yogurt and an acid marinade firms and whitens pieces of fish in ceviche.

Enzymes are active proteins: proteins that change other chemicals around them, and so change food qualities. Meat enzymes make meats tender and more flavorful. Some fish enzymes turn fish mushy and unpleasantly fishy. Enzymes in fruits and vegetables cause discoloration and destroy vitamins.

Cooking inactivates enzymes and prevents them from changing foods further, because like other proteins they're sensitive to heat and acids.

Gelatin is the exceptional insensitive protein. Instead of its molecules staying separate at low temperatures and sticking together irreversibly at high temperatures, they cluster together to form a solid gel when cool, melt when heated, and can be repeatedly gelled and melted.

Carbohydrates

Carbohydrates are the main building blocks in foods from plants: vegetables, fruits, grains, and so on.

Sugars and starches are carbohydrates that plants use to store energy, and that we can digest, absorb, and use for energy.

Fiber is the common name for the other carbohydrates that plants use to build the walls of their cells, and that we can't digest and absorb well. They include pectins, gums, and cellulose.

Carbohydrates are not as sensitive and easily changed as proteins. When heated, most of them simply absorb water and dissolve. This is why ordinary cooking softens plant foods.

and why precise temperature control is not important in cooking most of them.

Carbohydrates are also extracted from plants and used as purified ingredients.

Sugars contribute sweetness to foods. In large amounts they also create a thick body-as in syrups-or a creamy or brittle solidity, as in candies.

Starch is a bland carbohydrate, the main chemical in grain flours and also sold in pure form. Starch molecules are long threads, and plants pack them into dense granules, the familiar powdery particles of cornstarch and other pure starches. When cooked in liquid, the granules absorb water and release the long threads, creating thick body in sauces and solid structure in baked goods. Starches from different sources-wheat, corn, potato, arrowroot, tapioca-have special qualities that suit them to different cooking uses.

Pectin is a bland carbohydrate whose long molecules thicken jams and jellies.

Agar, xanthan gum, guar gum, and locust bean gum are bland carbohydrates from seaweed, microbes, and seeds whose long molecules are also used to thicken and stabilize sauces, ice creams, and gluten-free baked goods.

Fats

Fats and oils are chemicals in which animals and plants store energy. They're commonly extracted and used as purified ingredients. Unlike proteins and carbohydrates, they are fluids, and provide a delicious moistness to foods. Unlike water, they can be easily heated to temperatures far above water's boiling point, and help create the characteristic flavors of roasting and frying. They also carry aromas better than water, and help flavors linger in the mouth during eating.

Other Books

Cooking the Whole Foods Way, Provides recipes for cooking with natural foods, including grains, beans, seafood, vegetables, pastas, and breads

🔍 🔍 🔍 🔍 🔍 . Your Complete, Everyday Guide to Healthy, Delicious Eating with 500 Recipes, Menus, Techniques, Meal Planning, Buying Tips, ... An understanding of food as energy makes it easy to create delicious, healthful meals."