

BUILD YOUR OWN EARTH OVEN

3d edition

revised

expanded

updated (& pdf'd, too!)

A low-cost, wood-fired,
mud oven, simple
sourdough
bread,
perfect
loaves

KIKO DENZER
WITH

HANNAH FIELD

FOREWORD BY ALAN SCOTT



PRAISE FOR THE 2ND EDITION:

Creative. Innovative. Brilliant. This is the definitive book on how to build an adobe oven...

— **William Rubel, author, *The Magic of Fire***

Build Your Own Earth Oven is the essential book for those who want to do just that. It is worth many times its price in avoided labor and frustration, and the ample and enjoyable illustrations are a great guide to those (mud builders and dough makers) who use the right brain more than the left. Go on — Get Dirty!

— **Dan Wing, co-author, *The Bread Builders, Hearth Loaves & Masonry Ovens***

...[It] will awaken in you and connect you to the artisan vision, where earth meets hand meets spirit.

— **Peter Reinhart, author, *The Bread Baker's Apprentice*, and *Crust and Crumb***

...simplicity itself: brief, brisk, artful, and well-written.... explains the principles of breadmaking with a few deft strokes...Graceful, well-detailed, and empowering

throughout, this book can justly claim to have pioneered new cultural territory: fruit of a new movement for sustainability, it celebrates the pleasure of living well with the earth.

— **Peter Bane, *Permaculture Activist*.**

...the most enjoyable, down-to-earth and sensible account of building what you all need in your back gardens...His instructions for the building are clear as rainwater, his advice...intelligent and sound...

— **Tom Jaine, *Petit Propos Culinaire*, UK.**

Kiko Denzer's gift is to bring together in one small book both the means to make an inexpensive oven which will surely bake wonderful bread, and a gently impassioned explanation of why to do this matters.

— **Andrew Whitley, Founder, *The Village Bakery*, U.K.**

The illustrations really make it accessible, and the information is such a good blend of science and love.

— **Mark Peter Keane, author, *Japanese Garden Design***

I've always wanted a brick oven but knew I'd never be able to afford one. When I discovered your book I was thrilled.... what you teach is simple, humble, affordable and attainable!

Kiko Denzer began sculpting earth in 1994, after giving up professional life to grow food & make other art. His latest book is *A Work of Art: Rediscovering a Way of Working for Beauty*. He also teaches, publishes, carves wood, and grows really good garlic. **Hannah Field** baked at the Cumbrian (wood-fired) Village Bakery, and at The Celtic Baker in London; she now raises non-certified organic boys & vegetables, and does massage therapy. They live in Oregon, where they make and eat a lot of bread, as well as sharing a home, garden, & two boys.

● **Food & Cooking / Home & Garden** ●

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READER RESPONSES TO THE PREVIOUS EDITION:



We really wanted a wood-fired outdoor brick oven, but...the cost to have one built would range from \$3000 to \$6000. ...*Build Your Own Earth Oven*...was definitely the right solution... affordable and something we could do for ourselves. So we built one and it works beautifully! ...The whole cost was only about \$100. The two of us were able to build it with no extra help.... It is a wonderful learning experience as well as a valuable skill for homesteading, promoting simplicity and self-reliance. Mixing the clay with our bare feet was a blast! We have been baking all of our sourdough bread in this oven, once or twice a week, for over a year now and couldn't live without it. [It] can actually handle two loads with only one firing. Furthermore, the heat lasts up to 10 hours after baking the bread, even in the winter, so it is efficient to use for cooking other things too.... beans, soups, potatoes, pizza, cookies, focaccia and even dehydrate fruit and herbs....

P.S. ...We have people begging us for the bread and they're always wanting to come out to our place and see the oven. It's quite a hit...thanks to you!

— L. Kevin & Donna Philippe-Johnson

"I did it all by myself and it cost \$21 – and it changed my life! I would recommend [the book] to anyone."
— Sarah from Wisconsin, on National Public Radio's *The Splendid Table*, with Lynn Rosetto Kasper, who suggests using your oven "for anything and everything;...."

I just wanted to say that I love your book. I have seen and worked out of a lot of books on natural building, building technology, materials, and design, and have been frustrated with their shortcomings, and I am very happy to have found your book. It covers all the bases, the hands-on, the architectural, the nuts and bolts (or shall I say mud and sand), the use, the philosophy, resources, some theory, and does so without being either flaky or too disorganized to be of any use. It's a great resource and workbook... and inspiration.... I still rave about the oven we used to cook pizzas.... Each pie took about 2.5 to 3 minutes, and that was even while cooking 2-3 at a time. ...I look forward to trying it out here at home with a small demonstration project oven for starters. Thank you,

— Adam R., email

Well Kiko, what can I say? I'm blown away. It's an absolutely marvellous book, written with good humour and a lot of common sense. And more importantly to me, a positive can-do attitude, and sound ethical philosophy without resorting to preaching. The ovens you make and feature are so beautiful... The eyes nearly popped out of my cranium at the sight of that magnificent phoenix: hey! we could turn our horno into that!

— Violeta Balhaus, writer and educator, Australia.

Hi Kiko! Well, your book has inspired others here in Budapest in a round about way. I have been ranting and raving about the greatness of it since I read it and now several people are asking to see my oven. ...The kids took a peek at your book, went out in the rain and built themselves an oven! ...they just burned their second fire in it. ...Considering that they are 8, 7 and 4 years old I think they did an amazing job....

— Robi Dawson, Budapest, email

I'd always assumed that it took a skilled bricklayer to make something like this. But I took one look at the book, and I thought to myself, 'I can do this.' ...this has been my chance to be the sculptor, the folk artist, that I'm never going to be. Yes, it's an oven, but to me, it's also a real piece of art.

— Dennis Tank, in the *Minneapolis Star Tribune*

Build your own Earth Oven is a SUPER book....it's a good alternative to a brick oven, which for some may not be affordable especially if they have to hire most of it done.

— Gisele @ Mountain Tops Milling

I am happy to say the three bakings I have done so far have been a great success. The pizzas have been incredible. I also baked sixteen batards of naturally leavened bread. Out of this world. ... I marvel at the fact that aside from the fire bricks its entire make up is elements from the ground I stand on. Incredible. ... Thanks again for the inspiration and instruction.

— **Matthew R., email**

Thank you for your book. I've always wanted a brick oven but knew I'd never be able to afford one. When I discovered your book I was thrilled.... You made building my own mud oven easy to understand. After reading the Bread-Builder's book... I was very depressed because... having a brick oven was out of my grasp, but what you teach is simple, humble, affordable and attainable! Thanks again...

— **Kevin, email**

What a great book! What beautiful ovens! I've helped build a couple of ovens and plan to build more.... Thanks for writing your book and for being such a valuable resource for doing things a simpler, better way.

— **Charlie W., email**

Dear Kiko, Got your wonderful book and have been reading and reading. I have never really built anything in my life... so much of this is new. [Later]: I have finally finished my oven... what a wonderful process... thanks....

— **Jacky, email**

Thanks for your sensible suggestions especially regarding our ways and perceptions on building, cooking, eating, etc. Looking forward to experimenting and learning more.

— **Jeremy B., email**

Build your own Earth Oven... teaches principles and the nitty-gritty of construction, coupled with an abundance of artistic imagination. I recommend it to anyone even considering such a venture.

— **Jerry Lofquist, France**

Hi Kiko, I've greatly enjoyed your book, and used it to learn how to build a cob oven at the urban farm I run... I am very excited to begin baking bread and am hoping to be able to sell baked goods at the farm stand we run.... thank you so much for sharing your knowledge.

— **Willow, email**

...I've practically memorized your Earth Oven book in preparation for building ours. My husband wanted to have a beautiful foundation and we'd thought about buying some colored cinderblock and then behold! beautiful hewn stone! ... [As] soon as the weather cools, we're gonna build our first oven.

— **Cathy Wilson, email**

Kiko, I'm currently a Peace Corps volunteer in Ecuador... and I was recently in a neighboring volunteer's site using your book to build a wood fired oven. We had a great time and plan to bring the experience home to the US and do it some more there. By the way the volunteer... plans to develop an income generation project in her site using the oven model.... Anyway, thanks for making that great book....

— **Brooks Stanfield, email**

Hi Kiko, I've been a professional plasterer for 40 years now, probably halfway through that time I went stale on the whole scene, and started sculpting, mainly rock and marble carving, so I let the plastering drift more and more out of my life, that is until I came across your book on mud ovens, that, coupled with the fact that I love baking bread, a light went on inside me, so I put the plasterer\sculptor\baker together and hey presto, I had so much fun and excitement, 2 of my nieces helped with the mudding, I'm now grading some of our land in the woods to build a haybale cottage, and am planning to mud it also. Thank you so much for taking the time to share your experiences, they really did inspire me to "do it"... [see oven photo in color section]

— **Paul Cooke, California, email**

Dear Mr. Denzer, Thanks so much for your wonderful book. I recently finished a tour of duty in the Philippines as a Peace Corps Volunteer and found that, of all we attempted, earth ovens were among the most welcomed and sensible projects. While the opportunity to eat something other than rice informed my decision to build an oven, all manner of benefits accrued throughout the process. The people with whom I worked and lived began, I feel, to see the value of things closer to home, especially after baking for the first time. Two of the ovens we constructed are even being incorporated into the local school's curriculum! ... Thanks again for your thorough, and positive book.

— **Peter E., email**

Dear Kiko, Firstly I'd like to thank you for your lovely book "build your own earth oven." I did build an oven following the details in your book.... It's been made with all local ingredients, stones, wood and clay.... I love my oven and perhaps it's the best thing I have ever built....

— **David P., Tasmania, Australia, email**

Kiko, we just lit the first fire in our cob oven! so you can count this as another testimonial from happy and excited oven-builders! ... your book was a really great guide through the process. and what was really great is that we discovered how flexible and forgiving the whole process is.... it works! we're drying it out now and plan to cook this weekend if not sooner.

[later]: Hello Kiko! We have been so inspired by your book that we built an oven at a friend's house and have another planned at another friend's house since his daughters had such a great time helping us build the first one. Now we're thinking about building a communal oven in the city...

— **Mike D., email**

Kiko, Thank You, Thank You, for A great book. I am a pizza addict and was a childhood pyro and so glad that I found your book!

— **Peter D., New York, email**

Hi Mr Denzer! I'm Stephanie, I live in Québec, Canada. I built this summer a gorgeous earth oven and I want to thank you for making that technique so simple to understand and to undertake! We really liked the idea of a sand form versus twig frame, as it has been done here for many years... As you know, there's a tradition here about earth ovens, and elder people around us were very pleased and impressed with our project! They were first skeptical towards the sand form technique, but finally found that it worked well and that is was a very good idea! Some of them were remembering having very sore hands after making the famous alder frame! Anyway, we made lots of good friends around that oven! So thanks again, for your advice and wonderful book!

— **Stephanie G., Québec, email**

Dear Mr Denzer, First off I'd like to thank you for your marvellous and inspirational book 'Build your own Earth Oven'. I live in the UK and have some friends who live in the US who have recently bought land on the shore of Goose lake CA/OR. A few weeks ago I went to visit them, and with the help of your book built an Earth Oven out of the resources available on their land. This was one of the most satisfying things I have done, nothing quite compares to making a naturally leavened loaf (with leaven started on day one of the project and refreshed with the local stream water), and baking it in an oven made with your own hands out of materials you harvested within 1/4 mile of the oven's location. The oven building fostered a great sense of community amongst all the people that dropped by over the days we were there (as did the eating of the bread and pizza). Thanks again for your wonderful book.

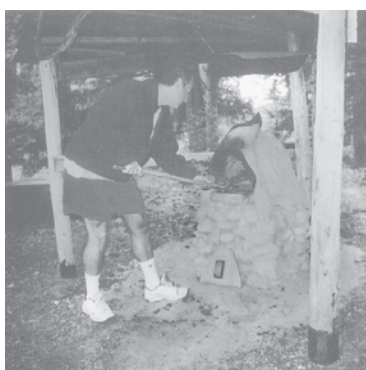
— **Gavin C., email**



A PLAIN WORK OVEN

"A group of friends came over and we created the oven body in a day. It fires well, but the interior is a bit small, and we enlarged the door to handle our stew pots. Our family bakes 4 loaves of sourdough bread each weekend; before and after, we bake stew made of leftovers, a bit of venison, and garden vegetables. The base is local rock; the sand for the cement and the oven mix came out of the foundation hole."

— Sam Droege, Maryland



FRIENDS, FIRE & DREAMS

"It was a community effort really, that included our Olympia Waldorf School 3d grade and other friends. The oven went up in 2 sessions separated by a week in between. The roof structure actually took a lot longer and was by far the most expensive part of the project. Actually, the cedar shingles were the only expense at roughly \$60. We bake about once a week and often have guests young and old who want to participate in the process. In many ways this hearth has added a warm glow to the heart of our home. It's wonderful to have this fire presence activating friends and dreams."

— Warren Cohen, Olympia, WA



ORDER OF THE OVEN

"...Your book set off a cascade of events in my life, starting with the gathering of materials, planning and replanning, daubing mud and plaster and baking bread and pizzas. Now I'm a disciple of the Order of The Wood-Fired Oven. Friends and family scatter when they see me, because they know that's all that I want to talk about!"

— Ron Henderson, OR



SQUEALS OF DELIGHT

"...The oven has become a focal point when friends come to visit...I fire it up and let the bread rise, and we sit in the shade of a nearby tree so we can smell it baking. We've learned to savor the process..."

....I built it outside of a miniature village in my backyard. My whole family joined in...The village has five buildings, and while my grandkids enjoy them, they never felt much kinship...because I did it for them (even though they helped...). But mixing the cob while getting deliriously muddy, and hearing squeals of delight while stomping in some more...it's a sound that touches the soul..."

— Greg Jones, Eugene, OR

MUD ADVENTURE

"Have finally put the finishing touches on the oven.... We were planning to bake this weekend but the weather has deterred us.... thank you again for... sharing of your knowledge. A friend of mine was so enthusiastic that he asked me to build an oven for/with him. So the summer is looking good with more mud adventures. I'm working on a peel at the moment and hoping that the weather will change soon."

— Christo, Schagen, The Netherlands



2.5 WEEKENDS

"Bought your book a month ago and just finished plastering. It took me 2.5 weekends but I had to get materials and pour the slab it's sitting on. Thanks for your wonderfully thoughtful and inspiring book!"

— Todd Deangelis

REFERENCE FOR LIVING

"Your Earth Oven book has been more than just a project guide for my wife and I, it truly is a "how to" reference for living, especially in this crazy fast paced world that we constantly find ourselves up against here in Seattle. I think I've read through it three times now. We also recently purchased your new "Dirt Art" book, and are equally excited about using and learning from it. As my wife is getting her teaching certificate for art education she is using some of the concepts you share as she develops her description of her teaching philosophy for class. Keep doing what you're doing... Thanks a bunch."



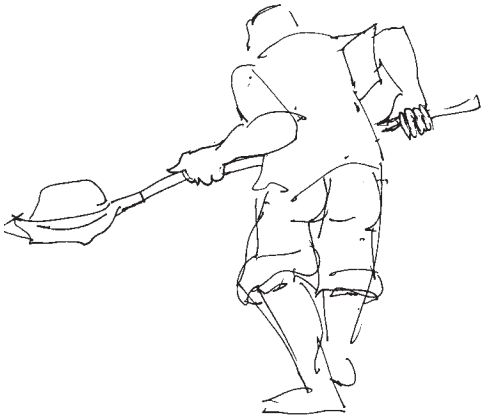
— Brooks Stanfield, WA



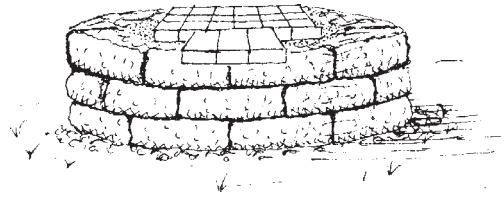
KIDS MOST HELPFUL

"I met Kiko and Hannah at a workshop where they they built a small earthoven in a couple of hours. I was amazed at how easy it was. So when I came home, I built a foundation and got some buckets of mud. I had 3 kids round for the weekend and anybody who has had kids milling around like there is no tomorrow, knows that 4 channels on TV is not enough.... Just as things got out of hand, I produced the mud and found that the kids were most helpful."

— Knut Caspari, Norway

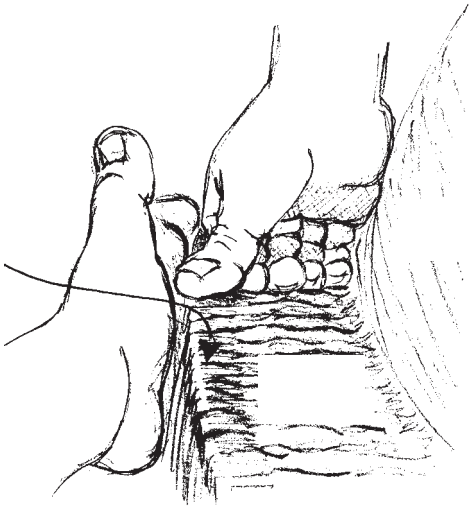


DIG DIRT!

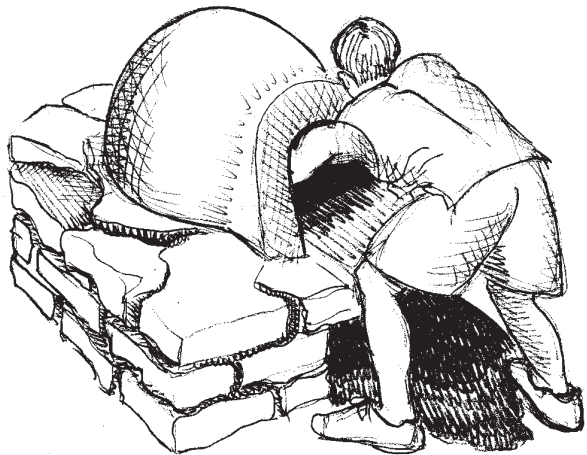


LAY A FOUNDATION

1. DIG DIRT, MAKE A BASE

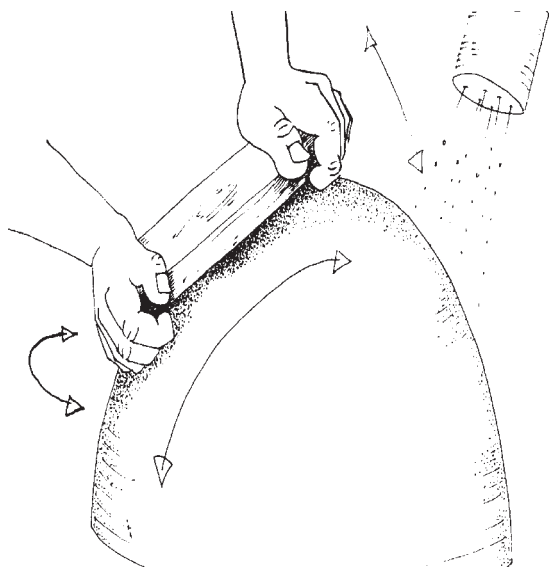


BUILD UP LAYERS



REMOVE SAND

3. MAKE AN OVEN

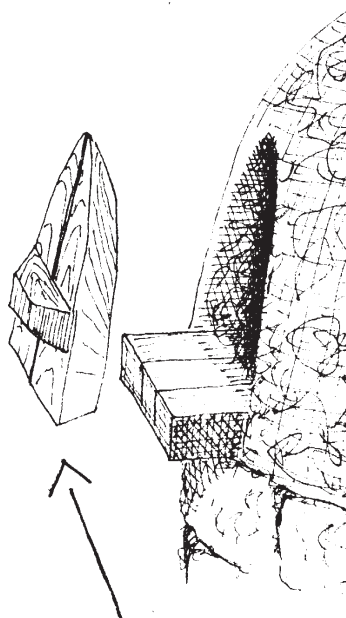


MAKE A SAND FORM

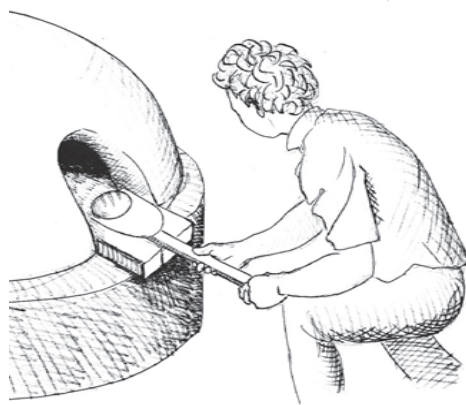


MIX MUD

2. MOLD SAND, MIX MUD



MAKE A DOOR



GREAT BREAD!

4. DRY IT OUT, BAKE BREAD!

ALSO BY KIKO DENZER:

***Dig Your Hands in the Dirt:
A Manual for Making Art out of Earth***

Make a Simple Sundial

Earth Art, A Catalog

*Build Your Own Earth Oven
A Low-Cost, Wood-Fired Mud
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Perfect Loaves,*

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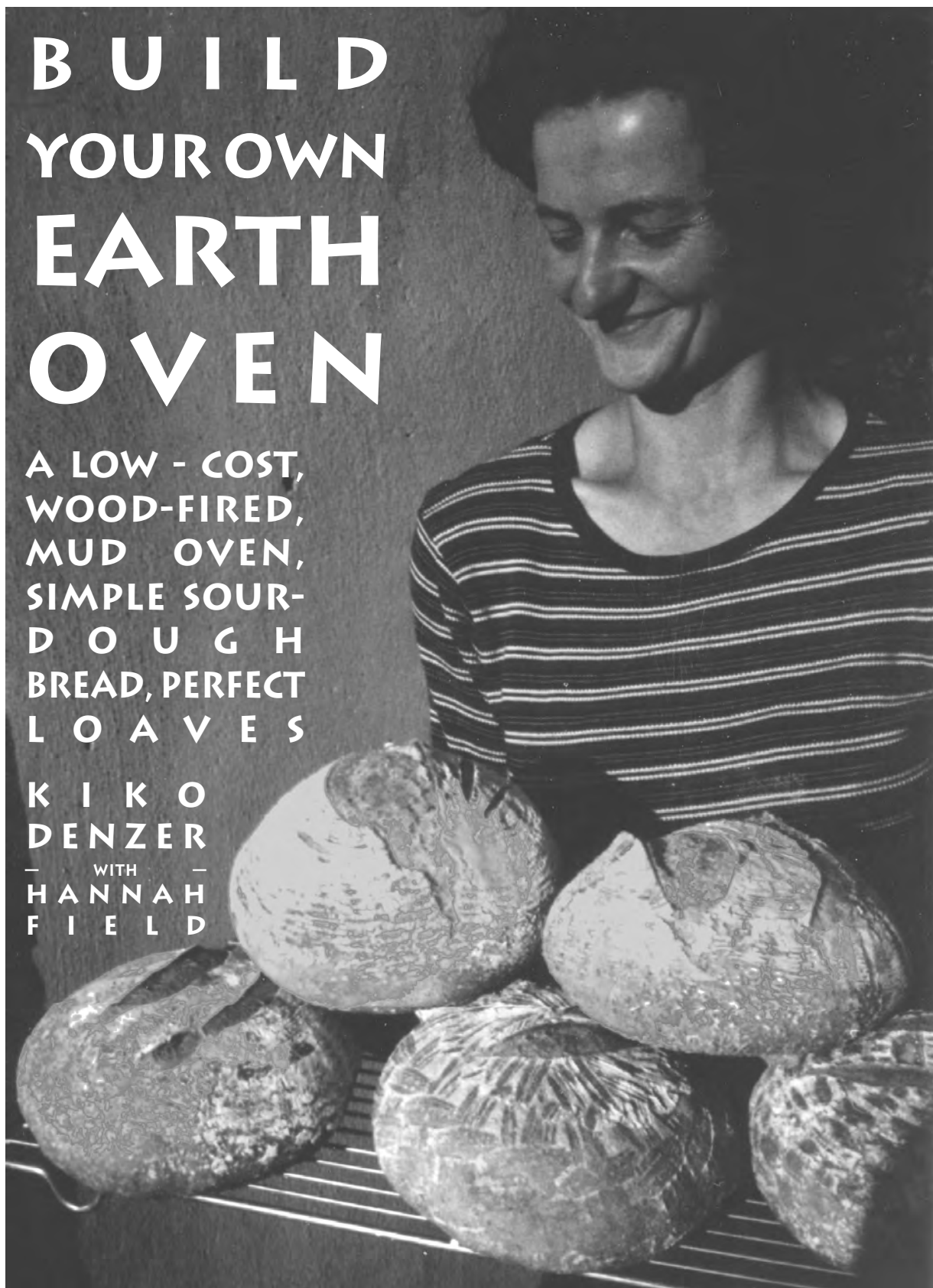
FOR ISAAC & EBEN

Talking is teaching.
Listening is learning.
Education is sharing.
Experience is a seed,
and even the bitterest seed will grow.
Culture is the fruit of common experience —
a common responsibility, and
our common wealth.
If work is love made visible,
then love is everywhere you look.

BUILD YOUR OWN EARTH OVEN

A LOW - COST,
WOOD-FIRED,
MUD OVEN,
SIMPLE SOUR-
DOUGH
BREAD, PERFECT
LOAVES

KIKO
DENZER
— WITH —
HANNAH
FIELD



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FOREWARD

Ovens and bread exemplify how simple connections to land and food, through simple and appropriate technologies, can heal many ills. The publication, in 1984, of the Laurel's Kitchen Bread Book brought to light the virtues of using whole grain flours in bread baking and for the first time published a recipe, or rather a process, for baking naturally yeasted breads. These breads required a wood-fired, brick or earthen oven and helped to spawn the "sourdough" revolution.

Kiko's book brings basic information about such ovens (and a basic approach to good whole grain bread) back to the home, so families can be empowered to bake their own healthy bread. Making one's own bread is an essential break from the industrialized model that manufactures our basic foods for us – and for all the wrong reasons. We have been surreptitiously colonized, but here is one small way to evolve beyond this grip.

It has always been my opinion that it is better to instigate such alternatives here in our own culture before running off to change the world — the third world in particular — for it is we who have been saturated with materialism and now feel a dire need for a new direction in spiritual and personal growth. The rest of the world is watching and can learn from us if we lead.

Education is the path and good books are the instructions to follow when all else fails. Keeping in mind life after industrialization, Kiko's book is exemplary and holds one of the keys to this vital non-violent social change.

— Alan Scott, Oatlands, Tasmania, 2007

7 ARGUMENTS FOR MUD

1. MUD IS FUN.

Your kids can help you build an earth oven. *This is very important.* Do they know more about computers than they do about the earth that feeds them? With mud between their toes (and dough between their fingers), they can learn how it feels to be a plant, with roots that can taste the fertile soil, and leaves that eat sunlight!



2. MUD IS FAST.

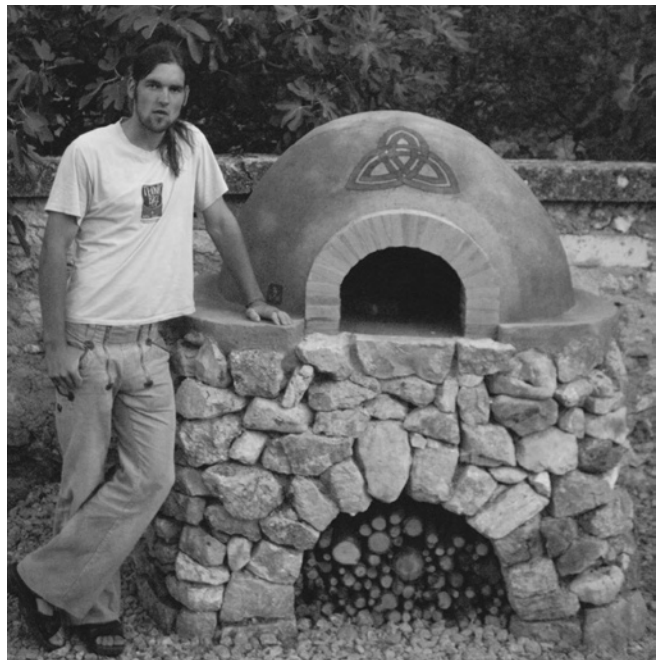
I've built 12" diameter demo ovens in 15 minutes, and full-size ovens in half a day.

3. MUD IS ART.

The simple, round shape of the oven is plenty art, but you don't need to stop there.

4. MUD IS CHEAP.

A scrounger can make a mud oven for free. If that's not you, you need not spend more than \$100. Start small: a 21" diameter oven will bake several loaves, small pizzas, chickens, etc. and requires little wood and shorter firing times. My biggest mud oven is 4x4 foot inside; 9 foot diameter outside (see color section). Others have built bigger.



5. MUD IS COMMUNITY.

Shared ovens have long been the heart of communities. That still seems to be true in some families, neighborhoods, co-housing groups, parks, or when a new restaurant opens. Some come "if you build it;" others may want to jump in, get dirty, and build it with you!



6. MUD IS ADAPTABLE.

You can make a fast-firing, thin-walled pizza oven, a big oven for a home business, a small camp oven, a sculpted outdoor kitchen with seating, and more. You can build right on the ground, on sawhorses, or on a permanent foundation of stone, brick, or cob (earth).



7. MUD IS BRICK.

Fire turns mud to brick (quality varies with soil, clay content, your mix, etc.). The ovens at left are modern specimens of an old tradition of German “backofens” made of special mudbricks that include manure and sugar! The two layer design features an insulation gap between the first brick shell and the second (the first course of the second shell is visible at bottom). *Holger Laerad, photos.*



PREFACE TO THE THIRD EDITION

For thousands of years, ovens have been modified, adapted, specialized and re-invented for many purposes. This book has only been around for ten years, but after 20,000 copies (translation into Norwegian!), many workshops, and feedback from near and far, I need to update my teaching text! First, I've revised and re-organized all the information so it's easier to use and understand, and developed a simple, super-insulated design that will hold heat longer and cook more food with less fuel burnt.

Second, my wife Hannah (whom I met when this book was just a pamphlet), has greatly improved our bread — and the bread chapter. She's simplified real sourdough to just four steps that you can adapt to your own schedule. Meanwhile, we've started milling the grain we bake (and hope one day to grow). A few bread-hungry neighbors trade us for foods we don't raise, and that adds leavening to our community.

Third, a brief mention of mobile ovens in the last edition generated a disproportionate number of inquiries. Chapter seven offers a variety of options and examples. I'm also posting more info at handprintpress.com (including notes on trailer design by Dan Wing, co-author of *The Bread Builders*, and owner/builder of a well-traveled mobile oven.)

Fourth, feedback from builders in Africa, Indonesia, and South America has raised questions of fuel shortages and deforestation. While I haven't tried to address those issues, it is true that a masonry oven requires heating up not just bread dough, but a whole heavy oven, too. While you can be efficient with a masonry oven (either with daily use, or by using all the residual heat as the oven cools), other wood-fired designs use less wood to cook more bread. What's most appropriate? I don't have an easy answer, but have tried to address the issues as best I understand them in chapters six & seven, and to offer more resources.

Last and most, *the* most gratifying feedback I've gotten has been from readers who have rediscovered in the dirt something essential, useful, and beautiful. I've included many of their wonderful stories and ovens. And am grateful!

If the hearth is the heart of the home, ovens extend that out into the community. But an oven is *still* just a hole in the ground; and a house is merely a bigger hole with a smaller fire. Build one, and you can build the other.

— Kiko Denzer, 2007



IF YOUR MUD
MAKES SNAKES,
IT WILL MAKE
AN OVEN, TOO

Bob Carlson, photo



PREFACE TO THE SECOND EDITION

Mud — earth, clay, soil, dirt, the stuff under your feet — is a near perfect building material. Thousands of years ago, the first oven was made of mud. People all over the world still bake in earthen ovens, and the best ovens in the fanciest

bakeries are typically made of brick — which, after all, is just kiln-fired mud.

If you're a beginner, remember: even if you've never built a thing, your hands will show you how if you'll just start. We are all born into the tradition of building and making — it's how we learn to tie shoes, cook eggs, swing a hammer, drive a car, and even how to play video games or surf the web (technology still begins, and usually ends, with our hands).

Building a mud oven isn't complicated. Pay more attention to what you're doing than to what I've written. Common sense and experience will be your best teachers. If you're uncomfortable or feeling doubtful, go slow. Take a break if you don't know what to do next. Solutions will come, and they will come easiest if you aren't in a hurry.

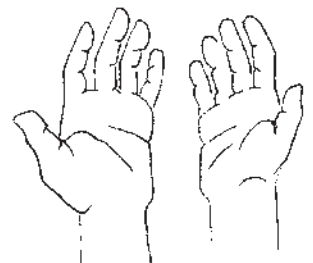
Granted, a good oven alone doesn't make good bread, which is why this book includes an introduction to real sourdough bread. But a mud oven (with help from the baker) can produce perfect bread — equal or superior to the fanciest \$5 loaf. I once took ten loaves of mud-baked bread to a wedding party for a German friend — five sourdough rye, and five sourdough wheat. All his German family and friends said, "this is just like home!" and asked where they could buy it. Some of them begged for a loaf to sustain them as they travelled in a land not known for its bread. I later made a

pizza oven for a local summer festival. My wife Hannah was head baker and a caterer friend provided dough and toppings; they made and sold about 250 pizzas per day, each one cooked to perfection in two to three minutes. People raved.

A mud oven is also a good place to make mistakes: under-cooked lumps, and burnt crusts. But under-cooked dough can lead to grand discoveries: I sliced, toasted, and crushed up some under-cooked bread once because I was loathe to throw away good (almost) raw material. I put the granules in jars on my shelves. One breadless morning, I decided to try soaking the stuff in milk with a little sugar — and heard echoes of Euell Gibbons praising the flavor of “wild hickory nuts.” Now I always keep some on hand, even when I don’t under-cook the bread. As for burning bread, I have learned that “burnt” is a matter of opinion. In some European countries, crusts that others might consider burnt are prized for the more intense flavor of the caramelized crust. And while charred is charred the world over, you can always cut away the burnt bits. Once, as an experiment (and because it was ready to bake and still rising fast), Hannah cooked a loaf in a 700 degree pizza oven. In less than ten minutes, the bread came out black, but we pared off the crust, and found it perfect inside. And of course, sometimes when you bake in a mud oven, you get sandy grit in your crusts. Materials vary, and while most of them work, some work better than others. When I get sandy bread, I just trim the crusts, bake in pans or on paper, or build a better oven.

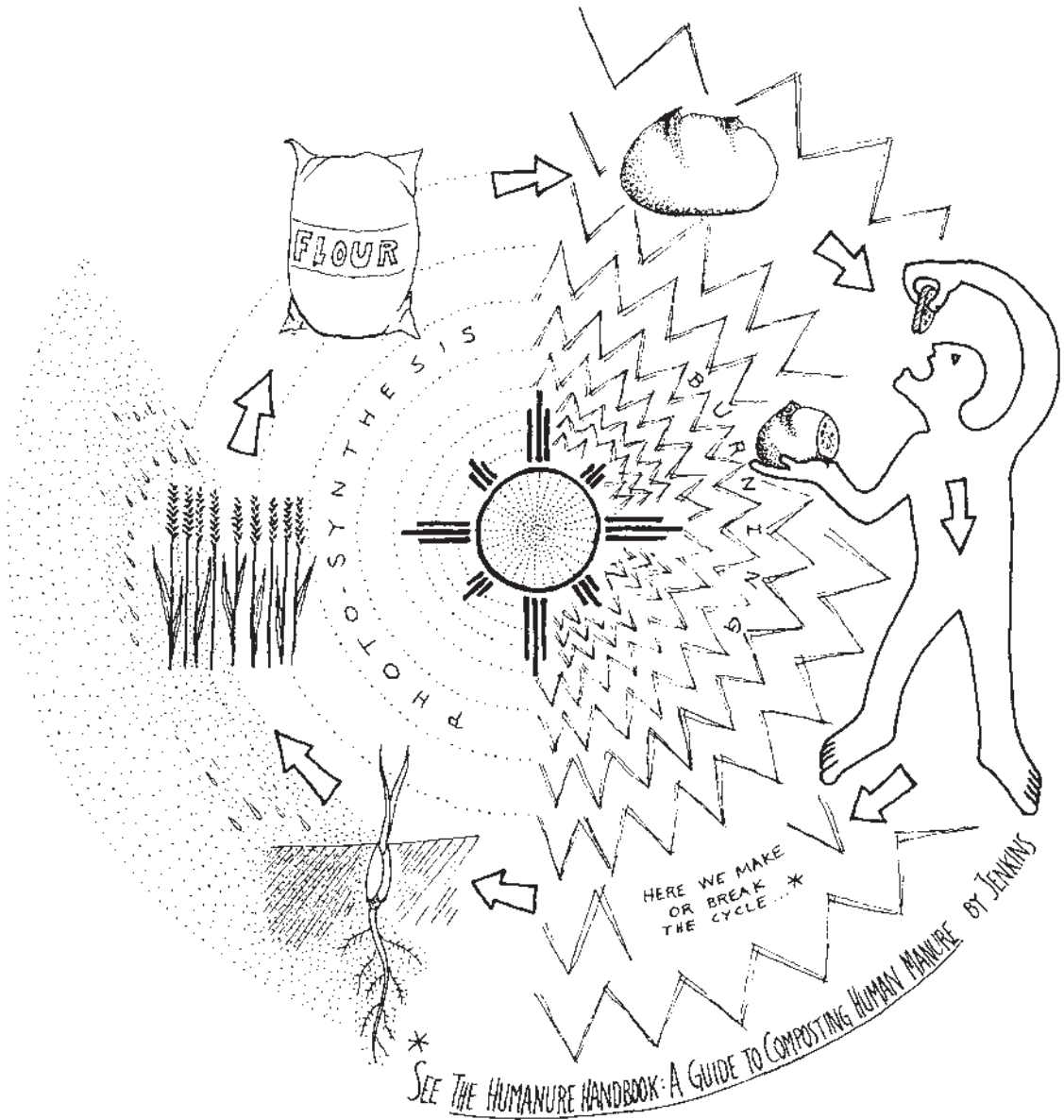
Making things means making the most of your mistakes. There are also, of course, risks and responsibilities. Oven fires are well-contained, and pretty safe, but you can’t be too careful! Watch your fire, but also build so that an un-watched fire can’t spread to timber, grasslands, buildings, etc. Where I live, there’s no fire department, and I don’t have fire insurance. I have to be careful, and have tried to convey prudence and caution in what I write. However, you may want to check your plans against local fire and/or building codes and make sure that what and how you build won’t compromise your insurance policies. For more comprehensive technical or safety information, you could start with titles in the Resources section.

Good building and baking to you! Please do let me know if you have questions or suggestions (or photos!) that might help to improve a future edition.



THE BREAD CYCLE

FROM PHOTOSYNTHESIS TO BURNING AND BACK
(SEE ALSO CHAPTER SIX)



A BREAD STORY:

Five things alone are necessary to the sustenance and comfort of the 'dark ones' [Indians] among the children of earth: The sun, who is the Father of all. The earth, who is the Mother of men. The water, who is the Grandfather. The fire, who is the Grandmother. Our brothers and sisters the Corn, and seeds of growing things.... Who among men and the creatures could live without the Sun Father? for his light brings day, warms and gladdens the Earth Mother with rain which flows forth in the water we drink and that causes the flesh of the Earth Mother to yield abundantly seeds, while these, — are they not cooked by the brand of fire which warms us in winter?

— from *Zuñi Breadstuff*, by Frank Hamilton Cushing, 1920

INTRODUCTION

WHY A WOOD-FIRED, EARTHEN OVEN?

Let's start with bread — real, naturally leavened, sourdough bread. Many books make it seem mysterious and difficult — which it isn't. However, like any living thing, and most real food, real bread differs according to circumstance. So the secret to good bread is like the secret to good dancing: know your partner, and practice! Bread, however, and cooking, involve more than two partners: you have the ingredients, the cook, the tools, the oven, the eaters....

Our kitchens sometimes get in the way: we turn on the radio/TV/ipod; we're in a hurry to get the meal done before the next activity, the mail is on the counter, the dog is at the door, the phone is ringing, etc. Or it just seems easier to buy the damn bread.

Building and baking in a wood-fired earthen oven restores beauty, savor, and real bread by restoring the essentials: earth, water, air, and fire. And it requires you to participate. In most modern kitchens, you don't have to feel the heat, watch the fire, or grow the ingredients. Similarly, bread machines and commercial yeast require little or no attention. They take care of themselves. But if you don't have to pay attention, you can't participate, and if you don't participate, you can't know.

What happens when you make bread in a wood-fired oven? Plants transform the energy of the sun into fiber, food, or fuel; fire transforms fuel into energy; water dissolves and lubricates stony soil, creating the clay that you model into a massive oven; the oven absorbs and holds the energy of the sun released by burning wood. After a couple of hours, the oven is so hot you can remove what's left of the fire and bake the dough you made from sun-ripened seeds, living sourdough culture, and water. The hot, dense earth radiates heat at a steady rate (like the sun!) so you can cook not just bread, but also beans, meat, potatoes, soup, vegetables, pies, cakes, cookies, scald milk for yogurt, and finally, dry out the wood for your next fire. The Zúñi story at left says essentially the same thing, but poetically. The drawing says it visually. This book is a way to do it.

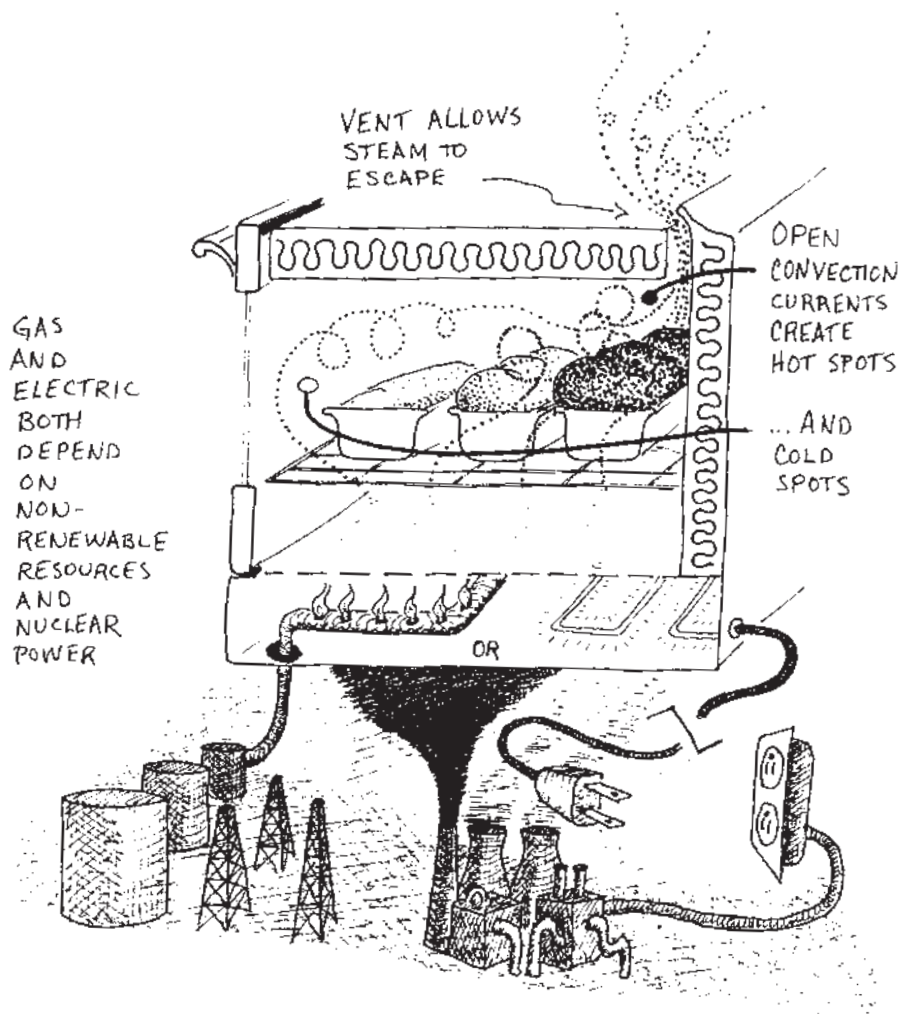
Back to bread and ovens: Radiant heat *does* seem to make



AN OVEN STORY FROM COLORADO:

[W]e spent three good days chopping straw and making mud, and now we are enjoying our oven so much... We have had to experiment with the timing... is the oven ready? is the dough ready?, etc.... but we are getting there! ... My grandmother, a Sicilian immigrant, built her own brick oven wherever she lived. I was fortunate enough to be old enough to help her with the baking during the late 30s.... (Did you know that there are still the remains of the Roman earthen ovens in the ruins of Pompeii? We saw them a few years ago... and I was amazed.)

— Lennie Kakalecik,
photo & story.



better bread. Why? When you bake, you transfer energy, through fire and oven, from wood to dough. How you transfer that energy makes a difference. There are three options: radiation, convection, and conduction.

Heat is energy ("it's a verb, not a noun.") Most fundamentally, it, *radiates* its energy via electrons, which are present everywhere — radiant transfer allows heat to travel even through the emptiness of deep space. *Conduction*, on the other hand, requires direct contact between molecules of solid materials (think of an egg on a hot frying pan). *Convection* is what happens when heated liquid or gas expands. Expansion makes it lighter than its surroundings, so it "floats" (thus it isn't "heat" that rises, it's heated water or air).

The conventional oven in your kitchen heats the air and that's what heats and cooks your bread. Even with no hot or cold spots, baking more than two loaves in such ovens requires arranging them so every loaf is heated equally. So-called "convection" ovens try to improve the situation with a fan that hurries the hot air around, but that often dries the

bread as well as cooking it. Baking stones help, but they are substitutes.

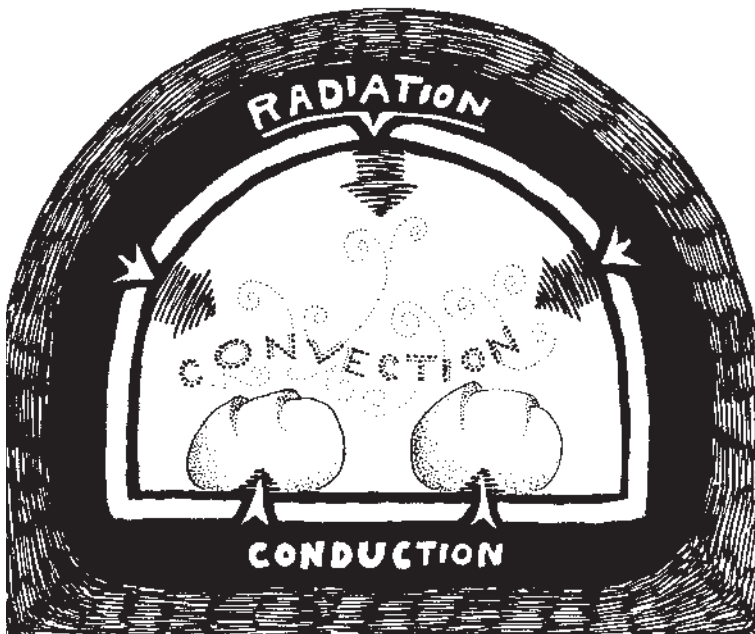
An earthen oven bakes your bread using all three kinds of heat transfer: *radiant* heat from the hot walls; hot bricks *conducting* heat directly into the bottom of the loaf, and hot, steamy air *convected* throughout. With all this heat from every direction, many loaves cook as easily as one.

In addition, the different kinds of heat working together improve “oven spring” — the irregular air holes and high loaf that occur when a vigorous batch of yeasty dough gives a final surge of activity in response to all that heat. In addition, the superhot steam caramelizes the sugars in the outside layer of dough, producing a lovely, substantial, and flavorful crust.

Radiant heat is fundamental to our very existence — from it we have sun and seasons, photosynthesis and weather, food and shelter, and of course, wheat and bread. The architect Christopher Alexander says that humans have a biological preference for radiant heat — his answer to why people prefer an open fireplace to an open heating vent. Perhaps that’s another reason why bread is better baked in a wood-fired oven....



ANNE'S LIZARD
OVEN, WALES, UK
Anne Belgrave, photo



EARTHEN
OVENS MAKE
GOOD BREAD
BECAUSE THEY
MOVE HEAT
THREE WAYS:

1. *Radiant* heat, from hot, massive walls
2. *Conducted* heat, from direct contact with a hot brick floor
3. *Convected* heat, from hot, moving (& steam-charged) air.

EARTHEN INSPIRATION

The Hand-Sculpted

House, by Evans,

Smith, and Smiley, is

a complete guide to

building with earth, from

siting and foundations,

to walls, roofs, floors

and finishes, as well as

the larger context of

how our homes impact

our relationship to

nature and each other.

Spectacular Vernacular,

by Carolee Pelos and

Jean-Louis Bourgeois is

an inspiring collection

of photos and essays

documenting the

earthen tradition as

practiced in Africa.

EARTHEN BUILDING, OR: WHAT IS “COB” ANYWAY?

Mixed with sand, water, and straw, a clayey-subsoil will dry into a very hard and durable material; indeed, it was the first, natural “concrete.” In the Americas, we call it “adobe,” which is originally from the Arabic, “al-toba,” meaning “the brick.” Invading Moors brought the word to Spain from North Africa, where an ancient mud building tradition continues today.

I learned about earthen building in the British tradition, where the same basic material is called “cob,” from an old English word meaning “lump.” The Brits skipped the step of forming bricks, and made their walls by packing wet blobs of mud on top of each other, letting them dry, and carving them smooth. Five-hundred-year-old cob houses are still common in Devon, England, where they are listed on historic registers, and highly valued.

Protected by roof and foundation from direct rain and snow, cob holds up very well, even in damp, windy Devon. I built a cob house in the temperate rainforest of the Oregon coast range, and it is much warmer and drier than my wooden cabin — not to mention safer from fire, and less vulnerable to bug damage.

But whether you call it “earth,” “cob,” “clay,” or “adobe,” it’s all mud, and the oven you make will be very much like thousands of other ovens — some of which were probably built by your ancestors, because mud ovens are indigenous around the world. As you get to know your own local materials, you’ll surely come up with your own improvisations and improvements, and the terms to go with them. So the earth claims us.



TRADITIONAL COB

Devon, England. Many hundreds of such houses date back centuries.

My wife’s aunt and uncle live in one that is recorded as having been a priest’s ‘hovel’ 700 years ago. Note the carved corner on the closest building, and traditional thatched roofs.



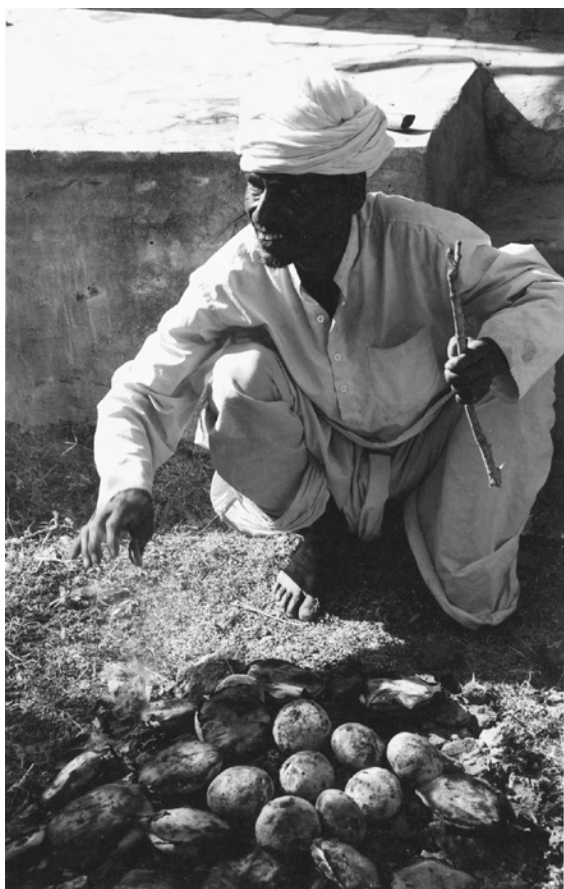
MUD MAN OVEN & COTTAGE, OREGON, 1995

Ovens (and bakers) are best sheltered under a deep eave like this, or a freestanding roof. More roofing options are covered on pp 22-23, and in photos throughout. Ovens can also be built indoors with standard chimneys (and safety measures). The cottage here is located in Oregon's temperate rain forest and remains in excellent condition after more than ten years of exposure with no exterior "finish."

Built by Ianto Evans, Michael Smith, and Linda Smiley, it has helped to revive a widespread interest in earthen building in North America.

At right: the oven door is under the fish chimney.





HOW TO CATCH HEAT

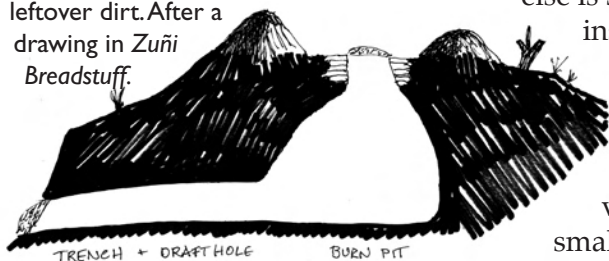
The purpose of an oven is to capture and hold the heat of a fire to cook your dough. Methods for doing this haven't changed at all over the millenia, and all the techniques are still in use today.

In India (photo at left), *batti*, made of wheat dough, are cooked on a fire fueled by dried cow dung: simple and immediate. On the opposite page, top, women in Tunisia bake on an unglazed clay "griddle" over a typical three-rock fire, perhaps the most common cooking "appliance" on the planet. Note the quantity of bread, and the fuel located between the rocks so the baker can adjust the fire as needed. Below that, a Moroccan baker cooks flatbreads on a "kanoor," a metal container lined with earth. Her griddle is the clay lid of a cookpot called a "tagine;" but she'll also cook breads on the oven's inside surface, a design and use similar to a classic

BAKING "BATTI" IN
HOT COALS & ASH
Lillian Chou, photo.

Below: an underground corn roasting oven, ancestor to the "horno," and big enough so people could get in to load and unload the corn.

The upper opening was rock lined for stability. The two small mounds are probably leftover dirt. After a drawing in Zuni Breadstuff.



"tandoor" (see page 104). Either way, the appliance is simply a container for holding heat, like your Kenmore range.

Perhaps the first oven was simply a hole in the ground big enough to cook a feast. In the southwest as little as a century ago, the Zuni dug such holes in hillsides, filled them with fire, and when hot, re-filled them with corn that still wasn't ripe by the end of harvest time. Green stalks were added, the openings plugged (sometimes they blew out), and the whole tribe feasted. Leftovers were dried and stored; the event took days.

The oven in this book is not much different: an earthen "hole" on a brick floor; a simple door wide enough for fuel and food, but small enough to keep heat in, and high enough for air and smoke to flow in and out for good combustion. (All else is simply modification of shape; or added

insulation, chimney, ash slot, or separate burn chamber.) A fire in the hole provides heat. When it's hot enough to bake, you sweep it clean, and cook.

Some foods, like 2-minute pizza, roast vegetables, or steak may need an added small fire at the side or rear.



DIG YOUR HANDS IN THE DIRT

Making one small, quick oven could give you far more confidence than several books, so I'm recommending a small practice oven or three to learn about materials and techniques.

A few hours of experience will give you a much better grasp, not only of the building process, but also of how to make the best use of both your materials, and your oven.

So, read as much as you need, but do get started! I know of at least a couple of ten year olds who built ovens with little more than imagination and an idea.

One was a neighbor girl who read about an oven made by packing earth around an old wooden barrel which was then burned out (drawings and text on the next page). Since there weren't any old whiskey barrels around her house, she used a cardboard milk carton and made a beautiful mini-oven.



*Naomi Duguid/
ASIA ACCESS photos, from
Flatbreads and Flavors,
by Duguid & Alford.*

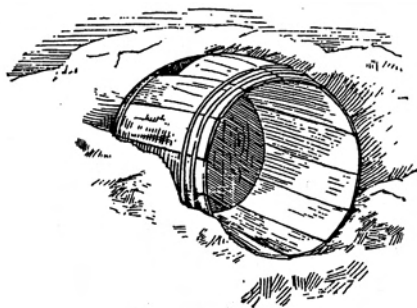


FIG. XII.—Barrel in Bank.

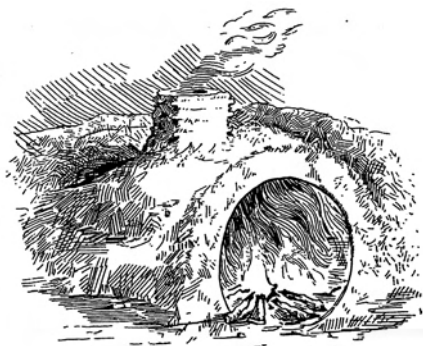


FIG. XII.—Heating the Oven.

The second was a story I read on the web by a former Cockney kid from London. Between the wars, he (or she?) recalled how the family (along with “most of London”) went to the Kent Hop gardens to pick hops, “earn a few bob for Christmas,” and give the kids a rare fresh air holiday. They slept in huts and cooked on paraffin stoves or out in the open. Store bought bread was a long walk away, so this ten year old built mom an oven out of an old tin drum covered with the clay-soil of Kent — and gained many friends on Sundays, when everyone wanted to cook their roast.

So the only real requirements are inspiration and desire. The rest of this book is just the details of one version of a human tradition that we all belong to, and that begins with the cultivation of grain, some ten thousand years ago. Here we go:

EXPERIMENTS: 3 HOLES IN THE GROUND FIRST: A MUFFIN OVEN

You’ll need a pile of sand a bit bigger than your oven, bricks for the hearth floor, and building soil (not your best garden soil, but the tough, sticky clayey stuff below. How to identify building soil is covered more thoroughly later, along with other technical matters, but for now, see how much you can do just by feel).

Assemble a rectangle of three or four bricks on a flat spot. Wet some sand, and make a nice firm, hemispherical mound of sand all the way to the edges of the bricks (some of the bricks will stick out where you’ll cut the door). The sand mound should be a bit higher than it is wide. Drape it with a layer of wet newspaper.

Mix 3 or 4 parts sand and one part of your building soil. Mix thoroughly with enough water to make a firm dough. Add building soil if it seems too sandy, and vice versa. Pack a

“[A] bake-oven can be made of clay and an old barrel....

[M]ake a good, rousing fire in the barrel,...until all the staves are burned out and the surrounding clay is baked hard.

This makes an oven that will bake as well, if not better, than any new patented stove or range at home.....

If...you have no barrel..., there are other methods that will answer for all the cooking necessary to a party of boys camping out.”

— D.C. Beard, in *The American Boy’s Handy Book*.
Milan Chuckovich, bottom photos.



2 inch layer of this dough solidly around sand and bricks until you have a larger version of your original mound.

For a door, draw a nice arch on the front, about $\frac{2}{3}$ as high as the oven, and nearly as wide as the brick floor. Cut it out with a knife or spoon. Remove the sand (the newspaper will indicate when you've gone far enough).

Build a fire in your oven to dry it out. Use very fine kindling, or dry twigs. It should burn merrily, but if it chokes and smokes and seems to want more air, move fire and sticks around, take some out, and generally play with it. If that doesn't fix things, cut your door higher.

After it's totally dry, you should be able to heat it up to (at least muffin) baking temps in about an hour or so (since it's so small, you'll have to tend the fire to keep it burning well). When you're ready to bake, clean out all the fire, coals, and ashes, put in your cookies, and cover the opening with a piece of wood or what-have-you. Don't be too disappointed if it doesn't hold heat for very long. At this scale, the opening size can significantly diminish the ability of the oven to hold heat.

Now you should know a lot about how your mud feels and behaves: how does it combine with sand? How does it shape and pack? How hard does it get when dry? How well does your sand make a form? How do your bricks hold up to fire? Were you able to get a fire burning in the back of the oven? How did you clean out the hot coals and ashes? How long did it take for the masonry to get hot?

Are you ready to try it on a larger scale, and see if you can't get a loaf of bread out of it, too!?

SECOND EXPERIMENT: A 1- OR 2-LOAF OVEN

You'll need a bit more mud, sand, and bricks. For a 22 inch diameter oven, allow about three 5-gallon buckets of sand for the form, and about four buckets of mud-sand mix for the oven itself. And enough bricks to make a square floor (or "hearth").

If you want it up off the ground, make a ring of rock, cinder block, or even logs or cordwood. The ring should be about 3-1/2 feet in diameter, at least a foot high, and solid enough to contain a filling of tamped rubble, rocks, gravel, and sand. When it's good and solid, level it off smooth with sand so your bricks will set firm and flat.

The main difference between this oven and the one before is that now you're working at a scale where it pays to take some measurements.



MAKING MINI-OVENS:

You can make them on a single brick, or more (at this scale, a high door is needed for a good fire). Tom Rizzo's kids made 5 tiny ovens. He passed on his favorite comment, from his wife, "who decided to do this...sort of on a lark. She supports the idea of building a mud oven, but really it was my idea. Well, she called and told me what she and the kids were doing and she said, 'It was FUN!! I had no idea it would be this much fun! All of the kids are just giggling.'"

Tom Rizzo, top photo





A SMALL, ONE-DAY OVEN:

This is about a 22-1/2" oval oven: just big enough for small pizza! The base is firebrick on concrete pavers on 2x planking on sawhorses (hasn't burnt through yet!) I thought it would be very temporary, but twice a year for more than 5 years, my folks have fired it up to feed guests at their semi-annual "meadowfest" and craft fair; in the winter, it's covered with a tarp.

- Your sand form should be 12-16 inches high.
- Door width should be about half the hearth diameter (10-12 inches).
- Door height should be 63% of the height of your sand form (7.5 - 10 inches).
- The mud layer should be 3-4 inches thick (no thin spots!)

In addition, for baking a loaf of bread directly on the brick hearth, you'll want tools to remove the fire, clean the hearth, and load the loaves into the oven. You'll also want a door to hold heat and steam in the oven while you're baking (if you make it before you make the oven, you can pack the mud right over it, for a perfect fit).

You may find that it takes a few firings before you get good baking results (residual moisture will keep it from reaching proper temperatures). But after you've baked in it for a while, you may start wishing it would hold heat a bit longer. Which leads us to:

THIRD EXPERIMENT: A LAYER OF INSULATION

This one doesn't require you to start from scratch. In fact, all you need to do is add two (or three) more layers to your existing oven.

The first layer is insulation, to hold in the heat. The second layer is a finish plaster, to protect the insulation, provide a smooth surface, and perhaps to decorate. The third layer is sculptural embellishment, to taste.

My favorite insulation is coarse sawdust — usually free for the taking, or cheap, and easy to use. Mixed with a paint-like mixture of your clay subsoil and water, it will become a workable dough, and will also be heat and fire proof.

Mix clay and water until it's a smooth (non-lumpy) liquid that coats your skin like very heavy cream (called "slip" by potters). Pour a gallon or two into a wheelbarrow full of sawdust. Mix and knead it thoroughly with the sawdust. Add only as much slip as needed for stiff dough. Pack it around your oven in a layer 2-4 inches thick (you'll need 3-6 buckets full, or 15 gallons).



To finish, make another couple of buckets of mud-sand mix, but wetter, and add some fiber — finely chopped straw (or manure from grass fed ruminants: cows/horses etc.). The shorter the fiber, the smoother your oven. Smoosh it over the insulation layer. All tools are good: palms, fingers, flat boards, a metal spatula or masonry trowel, a kitchen knife or spoon. Play!

This oven may satisfy all your needs, especially if you mostly want pizzas and/or just a loaf or two, or need the oven just for special occasions, or for an experience of building with earth. On the other hand, you might want a better oven if:

- you find yourself doing lots of pizza parties and need to be able to make bigger pies than you can fit in the door,
- you want to bake bigger birds or roasts,
- you've started to appreciate the way the slowly declining heat lends itself to pots of beans and stews and desserts, and you want to get more of those kind of dishes out of a single firing, or
- you simply want to bake more loaves/food more often than your little oven will sustain (and you're starting to think about a small business...), or
- you've just been waiting for the book to get to this point in the first place!

The shape is longer than wide, because that's all we could do with the bricks we had. Without readily available sand, I used soft Minnesota topsoil for the form, and then made the oven itself of pure subsoil, which was a nice mix of clay and silt that cracked a bit on drying, but not so much as to be problematic. I fired it dry the day after I built it, and we baked right away!

A SIMPLE DESIGN, A BETTER OVEN

This last design can equal a professional brick or pre-cast oven in performance, and can be adapted for commercial use.

Two design aspects are primary: one is the level of the hearth, which is at a good working height for the baker — waist high, or roughly 40 inches. The other is insulation: this oven is fully insulated, under the hearth and over the top. This insures that all the heat is retained where you want it for as long as possible, rather than being drawn out through the floor of the oven into the cold ground.

There are foundation options to suit every budget and every timeline — each has its plusses and minuses. Sub-floor insulation is a bit trickier than insulating the dome, as it has to support the weight of hearth bricks and the structure of the oven itself. Neither aspect, however, requires more skill than does a basic oven — just a bit more time for design, planning, and material decisions and, perhaps, a bit more care in the actual construction.

All of this will be covered in full later on, but for now, we'll assume you've built your foundation and made your insulated base. The rest of the oven is the same as oven number three! There are refinements worth considering (especially a brick doorway, chimney, and ash slot), but these won't substantially alter the basic process or result.

Once completed and fully dried out, you'll find that the oven gets hotter faster, and holds heat *way* longer than an oven with an uninsulated floor.

The rest of this book details the steps for building this super-insulated model.. If you want the simpler model, you can skip the subfloor insulation, but read that section before you decide. It's harder to draw on paper than it is to do. And once it's done, the rest is simple. Your main choice is whether to do it all at once, or in pieces.

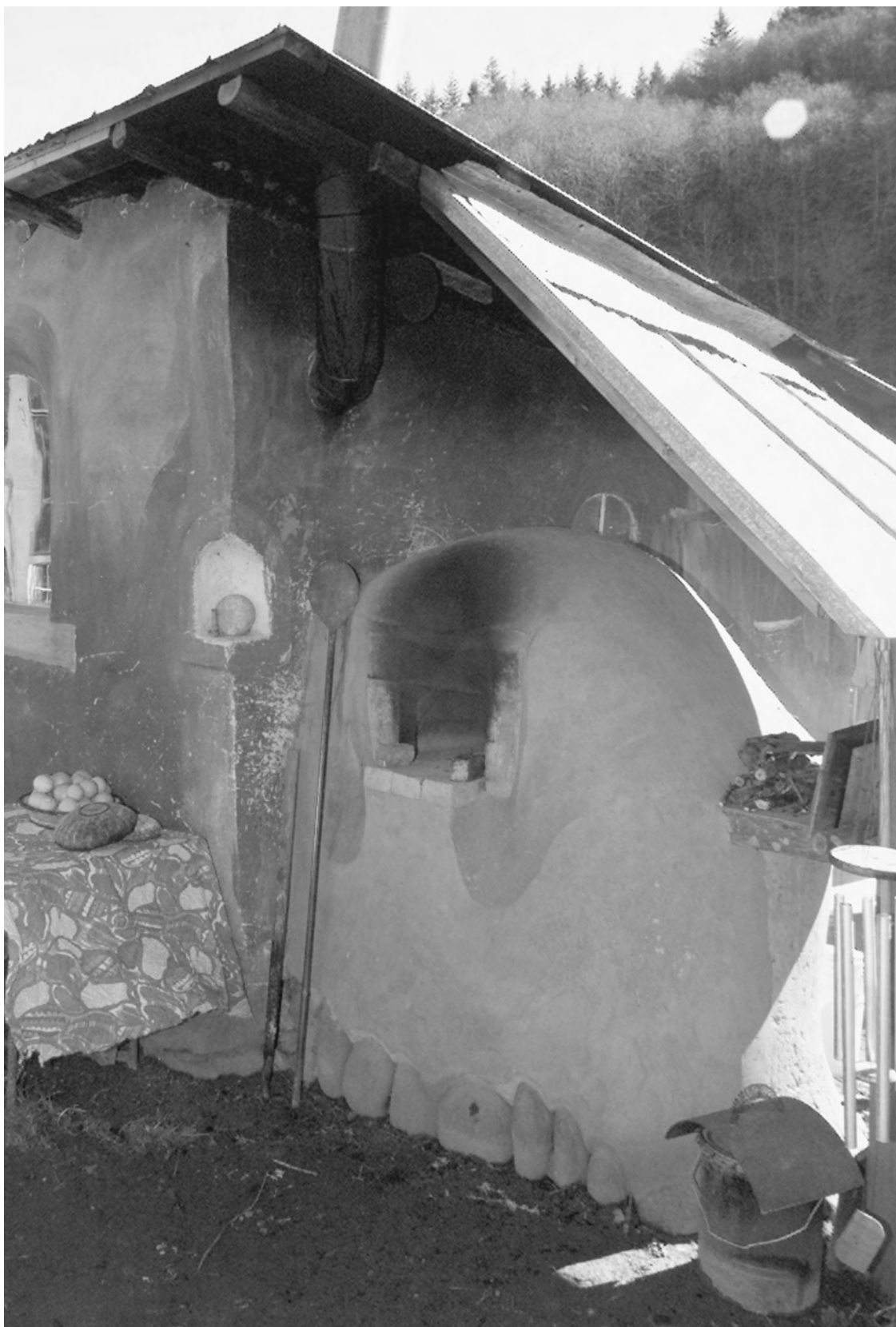
CONSTRUCTION & DESIGN DETAILS

The base is a single ring of urbanite faced with the lovely round river rock. Above that are cylindrical walls of cob, filled with rubble and what-had-we. Ideally, I'd have extended the shed roof (and the work shelf) out to cover the baker, too, but such a roof would have blocked traffic through an essential driveway. So we make do by improvising a work table with boards and sawhorses.



OUR HOME OVEN

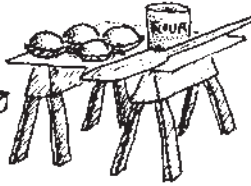
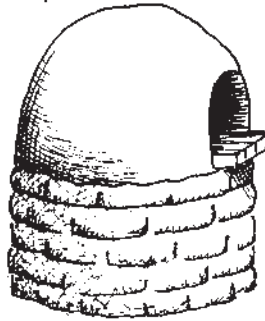
The hearth floor is 23x32 inches, big enough to bake eight or nine loaves at a pound and a half each. It has 6 inches of insulation all around, and holds enough heat to easily bake 15 loaves (about 23 pounds of dough) in two batches, as well as roasting vegetables or meats, baking pies, cakes, cookies; slow-cooking beans, soups, or stews, not to mention overnight rice pudding and scalding a gallon of milk for yogurt. Next morning, it is still over 200°F — perfect for drying wood for the next firing. The bits of brick in the doorway support the firing door. At left, note the stack of firewood on the bucket — enough for one firing (or a bit more)! The building is made of earth, too.... (M. Chuckovich, photo, right)





FIRE WILL
BURN EASIER
WITH DOOR
FACING AWAY
FROM WIND —>

SAFE
DISTANCE
FROM
FLAMMABLES

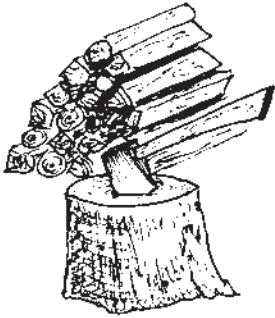


ROOM
TO
WORK

WHERE'S
THE
KITCHEN?

ACCESS TO
WATER (FOR
COOKING + SAFETY
BOTH)

WHERE'S
YOUR
WOOD
SUPPLY?



LOCATING YOUR OVEN

Might it be the center
of a beautiful (cob?)
enclosure? If a living sod
roof is too ambitious,
consider a garden wall
to embrace the oven and
the eaters....
(see photo, p. 95)



CHAPTER ONE: SITE PREP, DESIGN, MATERIALS, & TOOLS

So you've gotten your hands dirty, learned a lot, and now it's time to build a permanent oven of a size that suits you, and also one that will hold heat as long as possible so you can make the most of the fuel you burn.

As with all indigenous building methods, the emphasis here is on the satisfaction of making something beautiful and useful with what you have on hand. Why "source" a list of standardized materials, all manufactured and sold (at your cost) for narrowly defined purposes that might not match yours, when you can dig up the earth under your feet, and look around home and yard (or your neighbor's, or the dump or dumpsters) to see what might serve? Especially when it comes to foundations, a little bit of innovation can save lots of work and/or expense.



AN OVEN IS
AN OUTDOOR
KITCHEN

Think how best to
make it work for you:
Especially for pizza, it
helps to have easy flow
from prep to oven.
Maria Denzer, photo

LOCATION

Where your oven lives can make a big difference in how well it works for you. Answer the following questions first:

- Is it convenient to where you'll be doing the work of preparing your bread and other foods?
- Is it roughly level, or will the foundation require extensive digging?
- Is it in a place where you'll be able to use the oven when it's cold, dark, or rainy?
- Are there any good spots already protected by a roof or overhang?
- Which way does the wind blow? Will smoke cause problems for you or neighbors? Will it require a chimney? (You can also wait & see, and add a chimney later.)
- How will the oven itself affect its surroundings? Will a big mass be overwhelming? Can you design it to "fit"?
- What are the fire hazards and safety issues?
- Is it convenient to where you store your fire wood? Might your wood shed (safely) serve as oven shed, or vice-versa?
- Will your plans need to be approved for compliance with the building code, or to protect against possibly voiding fire insurance?

OVEN SIZE: FIT TWICE THE LOAVES IN HALF THE SPACE

A 22.5" oven gives you more than 2.5 square feet of cooking floor. But since you can easily bake two batches of bread with one firing, in effect, you get more than 5 square feet: twice the loaves in half the space.

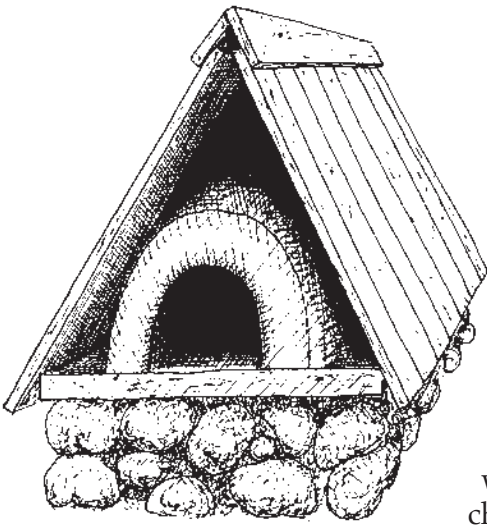
You can build bigger, of course, but that means more time and materials, not to mention wood to chop and longer firing time. For those who do need a larger oven, however, the materials chart on page 30 specifies amounts for three sizes.

The rest of the process is basically the same, no matter the size (unless you get really big, which is partially addressed on page 114). Keep in mind, too, that a 48" oven is restaurant sized: enough to make *lots* of pizza, as well as other dishes, and a few hundred loaves of bread a week (though it's probably not big enough for a full scale bread operation).

A fully insulated oven can cook for up to 12 hours or more (this will vary with the oven, but see photos & caption on p. 18-19 for an example). To determine the size you need, ask yourself if you intend to bake daily, weekly, monthly, or twice a summer? Just breads? Or meat too? Your favorite roasting trays or stew pots may dictate size. You can also lay out loaf

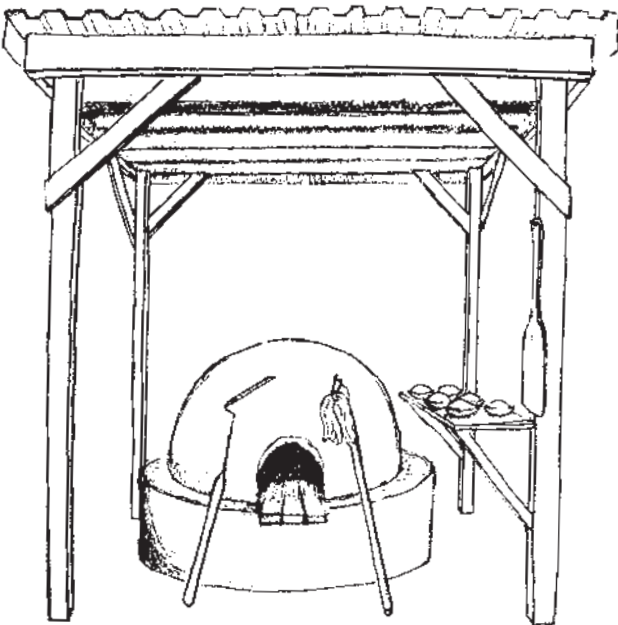
pans, baking trays, or rounds of paper as big as you make your loaves, and see how big a circle (or oval) you need to contain it all. (Remember that hearth loaves rise and/or spread, and that a wider door (to accommodate cookie sheets or large pizzas, for example) may necessitate adjusting the shape of the oven to make it deeper or wider.) And if your "ideal" size seems huge, remember that you can bake in batches.

If you build bigger or smaller than specified here, use the illustrations to sketch out your own plans — even rough drawings will help you visualize the work ahead



TWO ROOFING OPTIONS

Above: a Canadian-style oven with a traditional A-frame roof; **below:** a simple shed roof on poles with room for a bread shelf and tools





WORK IS LOVE MADE VISIBLE. AND IF YOU CANNOT WORK WITH LOVE, BUT ONLY WITH DISTASTE, IT IS BETTER THAT YOU SHOULD LEAVE YOUR WORK AND SIT AT THE GATE OF THE TEMPLE AND TAKE ALMS OF THOSE WHO WORK WITH JOY. FOR IF YOU BAKE BREAD WITH INDIFFERENCE, YOU BAKE A BITTER BREAD THAT FEEDS BUT HALF OUR HUNGER.

- KAHILIL GIBRAN, THE PROPHET

CHAPTER FIVE: SIMPLE SOURDOUGH BREAD

'ARTISAN' BREAD

There's no true artisan bread in America, because we have sold out the ways of life that made it possible. Artisan products were made by craftsman and traded in a craft economy where value was born of life, labor, love, and beauty, and varied according to need. From a bit of flour and water, and a bit of honest labor, a baker made a beautiful loaf of nourishing bread, and used it to pay for flour and salt; the farmer paid the miller in grain, and gave the tanner skins for leather to give the shoemaker in return for shoes. So baker, miller, farmer, shoemaker fed and clothed each other, and knew the value of things by their own sweat and pride. Anything left unused went back to the soil and kept it fertile. In a pinch, money filled in when there was nothing to trade. Such nourishment we can hardly understand, much less know.

We are born into an industrial "growth economy," in which we manufacture garbage and destroy nature. Everything is for sale and nothing lasts. Most of us survive enslaved to jobs, and can only watch as nature is "developed" into "goods" that we "consume" and then send to the landfill so the economy can "grow." Relationships are reduced to money, an extreme and distorted simplification of life's beautiful complexity. Instead of reality, we get "reality TV."

The baker must pay cash for flour, rent, utilities, insurance, bringing the bread to market, not to mention milk for the children. Boom — a loaf of good bread seems cheap at five dollars. But money is not a value, it's a means of exchange. Bakers and other artists will attest that price doesn't equal value. It's not money that makes beauty and flavor — it's hands, love, art.... And the beautiful loaf, created in love and ferment, is only truly beautiful when eaten by the body that will transform it again, into new life and new love....

So. If you want artisan bread, become your own artisan! Make more than you need, and give it away. People are grateful for real food. They will return the gift, if not directly to you, then to someone else. If we really want artisan bread, we not only have to assert the value of art, of time, of love — we have to guarantee it, with our own art, our own time, our own love. That is what makes real bread.

Bernard Clavel, a French writer whose father was a baker, wrote that the bakeshop was on the way to local saltworks, and that his mother would open up at five in the morning so that the salters could buy bread on their way to work. His father sold bread to the wine-growers, some of whom gave a cask a wine in exchange, and to the wood-cutter (huge eight-pound loaves), who in return would deliver the wood needed to fire the bread-oven.

When the baker ran out of salt, he would drive up to the saltworks to pick up a sack, paid for — in bread. [see Clavel's introduction to *The Book of Bread*, by Jerome Assire, Flammarion, 1996, Cited in "Cooking with Fire in Public Spaces," Friends of Dufferin Grove Park.]



HANNAH & BREAD
M. Chuckovich, photo

WILD FERMENTATION
 & KEEPING FOODS FRESH
 are books that explore
 live, fermented foods
 such as cheese, yogurt,
 beer, wine, vinegar, pickles,
 sauerkraut, tofu, miso,
 and even meats! The
 principle of fermentation
 is not to *preserve* food so
 much as to keep it alive
 (perhaps baked bread is
 the exception that proves
 the rule?) Fermented
 foods have sustained
 people of many cultures,
 for millennia.

INTRODUCTION

Hannah has three rules for bread: “Patience, Wonder, and Nae Stress.” She started making bread at 14, spent several years baking professionally, and now bakes about twenty-five pounds of dough at home, every two weeks. Below, she describes her routine, along with suggested amounts for a smaller batch. If you’re already a baker, you can pick and choose any particular twists you like; if you’re new to baking, read through it all to get a sense of the whole before you start.

The key to sourdough is remembering that it’s alive, like all fermented food: sauerkraut (German for “sour cabbage”), yogurt (soured milk), miso (fermented bean paste) — not to mention beer and wine. The ‘souring,’ or fermentation, is done by wild yeasts and bacteria that are

everywhere — on the grain, the grapes — even on our hands. So when you combine flour and water, those wild organisms bloom and ferment. You provide them with water and food in the form of flour, they produce carbon dioxide as a byproduct, and this is what leavens the bread. All this wild activity also makes the wheat more digestible and nutritious; and makes possible a tasty, long-lasting loaf of good food!

Making sourdough is an experiment that anyone can re-create. A ‘recipe’ just provides basic information but, like dancing, you learn by concentrating on the music and your partner (flour and starter), and by jumping in to find your own rhythms and style. Here’s Hannah:

Good bread takes time, but it does not take time from you. Think of it as gardening, if you are a gardener...plants grow in their own sweet time, and though you can adjust a great many things about their environment you can’t do the growing for them...you have to wait. And while you wait, for your sourdough or your onions, you can do the hundred and one other things you want to do.

The basic process is simple. The directions that follow are for a simple three loaf sourdough recipe (and a bit extra to make a pita bread or two in the initial extreme heat of the oven). I assume some familiarity on the reader's part with making leavened bread. I should also say that when I make our 24 pound batches of dough every other week, I don't weigh the flour or water — just the final dough and the salt. Every batch is a little different and I like it that way. But I have adapted my methods to come up with an easy-to-follow recipe if you're wanting one. When we teach oven and bread workshops, we come across a fair number of people who are confused or intimidated by sourdough (one woman journalist just brushed the matter aside by saying, "it's a guy thing"!)

If you spend hours poring over the many beautiful artisan bread books around, comparing this formula with that, these baker's percentages with those, this starter-schedule with the other one, you could easily feel overwhelmed. So, whilst I admire many of those books, I'm offering something different here. People are stressed out enough without feeling they must control *every* moment of the process. "Staff of life," maybe, but let's not beat ourselves over the back with it. You can have great bread without great stress.



PIZZA FROM A FALCON OVEN built by the author for a housing development in Oregon. Note the bucket under the ash dump slot. For more about the lime-plaster, fresco finish, see the color section. *H. Field, photo*

FOUR STEPS TO BREAD:

WHAT YOU DO

1. Feed starter, twice (3 pm & 11 pm, the day before)
2. Make dough (7 am on bake day)
3. Ferment dough (7 am to 3 pm)
 - a. knock it back (mid-morning)
 - b. divide and mold it into loaves (midday)
 - c. set loaves to rise & heat oven (midday)
4. Bake dough (2-4 hours later) (mid-afternoon)

WHEN YOU DO IT

The timeline is just an idea of how things work — but I seldom make bread on the same schedule twice. How? By recognizing and responding to three things: temperature, time, and starter. I adjust temperature by warming or cooling the flour, water, and dough, as well as the thermostat; I adjust timing by how long I prove or retard the dough, and when I "knock it back"; and finally, I watch the starter and use more or less of it to shift how fast or slow things go.



TRUE WEALTH
is a full bread shelf.
Sourdough generally
keeps very well
(don't refrigerate! It
actually encourages
staling). However, our
wholewheat loaves,
which are quite moist,
would sometimes get
mold spots during
warm or damp
weather. After testing
many strategies, we've
found that we get the
best results if we keep
the bread on this open,
well-ventilated bread
shelf. Our loaves now
keep easily for two
weeks, even in summer.
Even a completely dry
crust still tastes good;
toasted and soaked in
soup its almost as good
as fresh.

THE RECIPE:

1. 10 cups flour (we use mostly fresh ground, hard white spring wheat. Try all wholewheat, half white/half whole, or all-purpose with a bit of rye!...experiment!)
2. 4-4.5 cups water
2. 3-1/2 teaspoons salt
4. 3/4 cup starter (measured right after feeding, as it grows in volume! If you have none, see the end of the chapter.)

STEP 1: ACTIVATE & PREPARE STARTER (1ST & 2ND FEEDINGS)

Active starter has been left to ferment from 4-8 hours after a feed and is full of bubbles — it looks alive. To reach this point you need to begin 16 hours or so before you want to make dough. I keep a small ball of starter in the fridge.

Say at about 3pm the day before I want to bake, I take 1 tablespoon of starter, mix with 2 tablespoons of flour, 1 tablespoon of water and mix it together, let it sit at room temperature for 8 hours or so.

At about 10 or 11 pm, before I go to bed, I feed it again by adding 8 tablespoons of flour and 5 tablespoons of water. I measure out what I need (3/4 cup for this recipe), put the remaining 1 tablespoon into a clean, loosely lidded jar and put it back in the fridge. (If you ever forget this step, you can pinch a lump of dough from a proving loaf and put that in the fridge. Salted starter isn't ideal, but a few feedings will quickly diminish the impact of any salt.)

Next morning, about 8 hours after the 2d feeding, the starter is ready to be incorporated into the dough.

STEP 2: MAKE DOUGH

Kneading is key to good bread. Wheat flour contains gluten and gliadin, proteins that, when hydrated and kneaded, turn into long, elastic, extensible chains, which trap the CO₂ produced by yeast during fermentation.

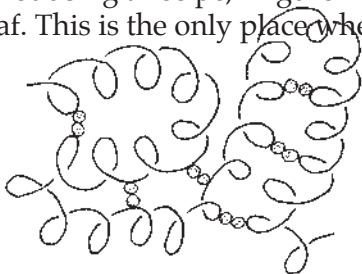
It is not critical exactly how wet or dry the dough is. Since I'm no longer a commercial baker, I don't expect (or want) to make exactly the same loaf every time, so I don't worry. I can vary my 'same recipe' greatly just by changing the amount of water in the dough. Dry dough gives a denser texture or 'crumb;' wet dough a more 'open' and springy one. With this recipe, start by adding 4 cups of water, then the extra half cup in increments 'til you get a dough that doesn't feel too *tight*. Flours vary in how much water they absorb, both according to the type of wheat and daily humidity. Hence it's impossible to give precise amount of water. It's all in the hands — after a few batches you'll be able to *feel* if the dough is too wet, too dry, or just right.

So mix all the ingredients except salt — just enough to incorporate everything. Then let the dough rest — anywhere from 15 to 60 minutes. That gives the flour time to fully absorb the water, the protein chains to lengthen and relax, and fermentation to begin. That 'conditioning' means less kneading!

Time to add salt. (If I'm not using a recipe, I figure 1 tsp of salt for every 1.5 lb loaf. This is the only place where

ABOUT KNEADING

Gluten molecules are long, kinky chains of amino acids. The atoms (small circles) attract each other to make the kinks.



Kneading loosens kinks and aligns the chains.



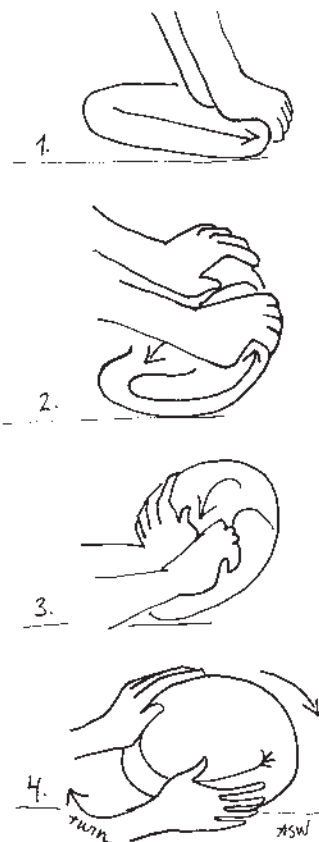
Over-kneading breaks bonds, dissolves the chains, and destroys elasticity.



(After an illustration in *On food & cooking*, by Harold McGee.)



KNEADING
CAN BE EASIER
FROM ABOVE



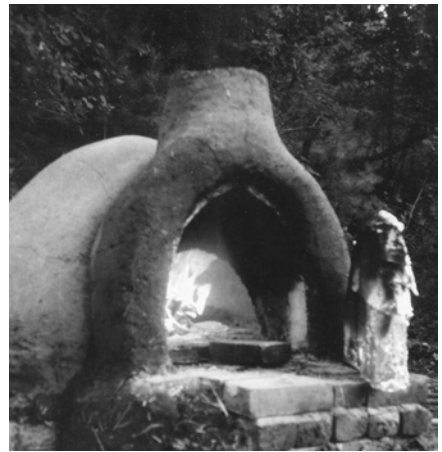
AFTERWORD: EARTH, OVENS, ART

I grew up with my mother, an artist and single parent who always had interesting projects at home, taught me to make bread, let me skip school a day a week in sixth grade to learn ceramics from a professional, and encouraged me to go to Italy at 17 to carve marble. So bread and art have been constants, but I only started to make my living at them in my 30s, after abandoning institutional employment (for the last time, I hope) for better bread, more beauty, and less money. I didn't know exactly how I was going to go about it, but at one point, a friend who teaches anthropology invited me to hear a guest lecturer who "lived on \$3,000 a year in a mud house he'd built for \$500." It sounded useful.

The lecturer was a Welshman named Ianto Evans. He has lived and worked all over the world; his slide lectures illustrate what is sometimes called "permaculture," or "appropriate technology." What I saw, however, was a brilliant and very specific illustration of the practical relationship between beauty and function — in everything from gardens to houses to stacks of brooms packed and loaded onto overloaded buses in Guatemala.

Ianto spent the night at a neighbor's house, so I got to visit and hear more about the "Cob Cottage Company," which he had just set up, with his wife Linda Smiley, and their partner Michael Smith. They offered hands-on courses on earthen building. I spent a week with them and about 15 other students, working on a small house. One afternoon, we built a mud oven similar to ovens made all over the world by all kinds of people. The next day we had fresh bread.

The next few months I spent traveling. When I arrived in Minnesota to visit my father and his wife of 30 years, the highlight of every meal was Mary's bread, an absolutely wonderful, traditional European sourdough the likes of which I hadn't tasted since the summer I spent in France when I was 12. Mary's bread book recommended a "backyard brick oven." I suggested mud instead, and spent several hot, sticky Minnesota summer days digging a deep hole and converting an old section of limestone wall into a deep foundation (protection against the long, hard Minnesota winters — the frost line was three feet down). I dug and hauled sand and dirt by pickup truck and wheelbarrow, and finished the oven in another day or two. A few weeks later, when I got to my



MARY'S OVEN

I started with a plain dome, and added a chimney later, just to see how it would work.



brother's house, I showed him pictures. He wanted one. Neighborhood kids helped, and it came out in the shape of a mythical creature. The three-year old named it "Goona Zoona."

Both ovens had some serious mistakes. My father wanted a cement stucco on his — it failed and the oven is no longer. For the second one, a relative suggested slanting the floor up towards the rear, to improve combustion. That would have worked fine with a chimney in back — but with a chimney in front, the fire couldn't burn all the way back — so my brother had to add a rear chimney. I tried a gypsum plaster on this one (no time to build a roof, and I didn't know about lime plasters). I think it soaked up more water than it shed. But for my brother's wedding the next summer, it baked seventeen loaves of sourdough in three batches: 20 minutes for the first, 45 for the second, and an hour for the third — all on a single firing. When the old maple tree dropped a limb that winter, Goona Zoona took the blow. The next one will be better.

As for bread, I grew up watching my mother bake. She is an artist who rarely uses recipes. In a book she wrote on bread sculpture she said, "there are no mistakes, just new ways to make bread." When I was twelve, she sent me to a farm in Brittany (an experience worth more than most camps). I learned French, worked in the fields, played (and fought) with the owner's grandkids. We ate lots of "pain de campagne." Once or twice a week, "Granmere" bought several two- or three-foot loaves at the local bakery, and stored them in a big wooden box in the kitchen. Afternoon snack, or "goutée," was a thick slab, buttered and sprinkled with sugar. Breakfast was the same buttered slabs dipped in a bowl of hot milk, chocolate, or coffee. It was thick, chewy, and a little tart, with a strong brown crust that felt good between your teeth. Every time I dip toast in coffee, I remember that breakfast, and particularly that bread. But for too long it was a wistful memory, since such bread seemingly wasn't to be found or made on this side of the Atlantic.

Luckily, when I was learning to make ovens, my "other mother" was learning to make authentic French "pain au levain" (bread from starter). She also is an artist, but precise and methodical, which is what production pottery requires in order to make a living at it. Not surprisingly, she makes good use of cookbooks, where she learned to make traditional sourdoughs.

BREAD & FREEDOM

At a panel discussion on the World Trade Organization, I heard of European citizens who refused to buy US beef raised with hormones. The WTO allowed the US to impose trade sanctions until the ban on US beef was lifted. What's "free" about that? I don't want to eat hormone-treated beef either. But the WTO gives such power to corporations. They can impose their will on people with little or no accountability to anyone. America revolted against the English crown for less. Unelected kings are little different than unelected companies. And corporations aren't even people. By law, they have acquired the right of "free speech," but by commerce they have gained so much control over international media that their "message" has become gospel. So I sat there thinking about what to say or do.... What came to my mind was: Grow a garden, buy (or grow my own) organic wheat, and make my own bread.... Such is not protest, it is principle.

Better than the book, however, was watching Mary knead her dough and tend her jars of wild yeast starters. While I had made decent bread for years, it wasn't until I saw Mary at work that I began to understand good bread. And as my own bread improved, I was also making ovens, and noticing how it was consistently better out of a mud oven. It took a little while for my brain to catch up with what my body was doing, but I finally started to see the obvious: "aha!"

While I have made some pretty nice loaves in a modern range, modern baking (and much of modern life) knows very little about that practical, beautiful, and essential phenomenon that transforms earth, water, air, and fire into life. Bread begins with fertile soil, sun, and seed; they have given us grain and flour and loaf and life. It is an impressive debt we accept in return for our bread; one we can repay, in the end, only with our lives and our bodies. Dust we are, and to dust we return. But it's holy dust, and like the phoenix, it must be reborn.

Like all art, oven-building and bread-baking heighten your awareness of essential cycles — things that are, in the end, beyond knowing. Whether or not you understand all the hows and whys doesn't really matter. If you make bread, you can make bread! What is important and valuable is that you do it.

The real value of good bread, I think, may be this: when you are aware of your relationships with the world, you realize they can't be measured in dollars. Only life has value; how can you measure it? It is not earning and spending, but giving and receiving, freely.

Romanian sculptor Constantin Brancusi said that "sculpture must be lovely to touch, friendly to live with, not only well-made." If that doesn't describe bread, I will stop eating. Bread, like art, is an invitation — to sit, to rest, to tell stories; to cook, to share, to make parties, feasts, and festivals. An earthen oven is also such an invitation, and its full, round form is indeed, "lovely to touch, friendly to live with...." And while bread and ovens are rarely immortalized in museums and history books, they are art — they are the shaping of materials to create new forms and thus, new life.

Art is not born in galleries — it is our common heritage, and if you can become completely absorbed, even for a moment, in the creation of something new — be it as simple as a mud oven or a loaf of bread — you know something that no one can teach and that no money can buy.

What's the alternative? If we are what we eat, then what



do we become when we eat bread from factories where human hands never touch the dough? What relationships are we nurturing? Is corporate-sponsored consumerism our ultimate and final purpose?

Life asks us to participate — to watch, to learn, and to create. To be either artist or craftsman is no more and no less than it is to be human:

to engage hands, head, and heart in the genesis of form and relationship; to celebrate and renew self and world; to be whole and wholly involved; to offer communion and to build community; or just to make a mud oven so you can bake your own bread.



CONTACT INFO:

People and organizations mentioned in this book are listed below, either as teachers, builder/masons, or other. This is by no means meant to be a comprehensive list of all the available resources (which are many!), but it might help you begin. Start close to home, whether you're looking for an oven-builder or a course on how to build a cob cottage! Websites seem to change so much that I've only listed a few sure ones.

NATURAL BUILDING TEACHERS

- strawhomes.com is the site of *The Last Straw Journal*, HC 66 Box 119, Hillsboro NM 88042, 505-895-5400.
- Cobcottage.com, Cob Cottage Co. & No. Am. School of Natural Building, 541-396-1825.
- housealive.org, 541-899-3751; cob & natural building, Coenraad Rogmans (OR)
- Pat Henneberry, Vancouver Isl., BC, Cobworks.com

BUILDER/MASONS

- Alan Scott & Ovenscrafters: info@ovenscrafters.net
- Christina Davis and Aaron Blake, Reworks, Inc, Corbett, OR, reworks@cascadeaccess.com
- Hendrik Lepel, oven-builder, ireland, kirdnehl@hotmail.com
- Masonry Heater Association, mha-net.org
- Tara Johnston, design/builder, Gather Studio,

RESOURCES

BREAD, OVENS, FIRE

The Book of Bread, by Jerome Assire, Flammarion, 1996; an overview of the history and culture(s) of bread, from seed to loaf, with beautiful photographs.

The Bread Book: A Natural, Whole-Grain Seed-to-Loaf Approach to Real Bread, by Thom Leonard, East-West books, 1990; how to make Flemish Desem bread and grow and mill your own grain; plus plans and instructions for building an Alan Scott style brick oven. Out of print, but available used.

The Bread Builders: Hearth Loaves and Masonry Ovens, Dan Wing and Alan Scott, 1999, Chelsea Green. In-depth info on bread and ovens; brick oven plans, and sources for everything from modular ovens, to flour and oven tools. Alan Scott also provides consulting, workshops, custom plans, and various related goods through Ovenscrafters; 5600 Marshall-Petaluma Rd, Petaluma, CA 94952, phone/fax: 415-663-9010; info@ovenscrafters.net.

The Bread Ovens of Quebec, by Lise Boily, Jean Francois Blanchette, 1979, Canadian Center for Folk Culture Studies, Ottawa Canada K1A 0M8. Documentary history of traditional Canadian clay ovens, and those who made and used them. Includes oven construction.

Building a Wood-Fired Oven for Bread and Pizza, by Tom Jaine, 1996, Prospect Books, Totnes, Devon, UK. History of ovens, how to build and use a brick oven.

Construire un four à pain, & Les vieux fours à pain, by Pierre Delacrétaiz, 1993, Cabédita (Switz.), classic French texts on traditional masonry ovens and their use.

"Constructing an Earth Kiln," by E. Starnater, *Wilderness Way*, V. 9, no. 4, \$4, POB 621, Bellaire, TX 77402

The Book of Masonry Stoves, by David Lyle, Chelsea Green, 1984. Promotes & explains what may be the most efficient means of heating with wood. Covers wood-burning history, oven mechanics, and technical details of stove building. On the same topic, see also *Finnish Fireplaces: The Heart of the Home*, by Albert Barden & Heikki Hyytiainen, 1993, Helsinki, The Finnish Building Center, and the Masonry Heater Association (mha-net.org).

English Bread and Yeast Cookery, by Elizabeth David. Classic; covers everything from the history of grain and ovens, to a final chapter on "toast."

The Laurel's Kitchen Bread Book, A Guide to Whole Grain Bread Making, by Laurel Robertson, with Carol Flinders and Bronwen Godfrey, Random House, 1984; Flemish Desem recipe, and more.

The Magic of Fire: Hearth Cooking: One Hundred Recipes for the Fireplace or Campfire, by William Rubel. 2002, Ten Speed Press. Celebrates the "rustic spirit of improvisation;" documents methods, tools, and techniques for cooking on open fire which can also be applied to wood fired ovens. williamrubel.com provides info on suppliers, methods, related food traditions (bread, gardens, mushrooms, alcohol, etc.), and chat groups.

EARTH & BUILDING

American Boys Handibook, by D.C. Beard (one of the founders of the Boy Scouts), David Godine. Published in the 1890s as a scouting manual, it still offers modern kids a variety of good things to do and make.

Butabu: Adobe Architecture of West Africa, by James Morris and Suzanne Preston Blier, Princeton U. Press, Sahalian Architecture in Mali, Niger, Nigeria, Togo, Benin, Ghana, and Burkina Faso, where people have been constructing earthen buildings for centuries.

The Cob Builder's Handbook, by Becky Bee, from Groundworks, POB 381, Murphy OR 97533.

Dirt, The Ecstatic Skin of the Earth, by William Bryant Logan, Riverhead Press, 1995. Inspiration and information.

The Hand Sculpted House, by Evans, Smith, and Smiley; *The Cobber's Companion*, by Michael Smith, *Earth Building and the Cob Revival*, a Reader, from: The Cob Cottage Co., Box 942, Coquille, OR, 97423, 541-396-1825.

The Homestead Builder: Practical Hints for Handy-men, by C. P. Dwyer. practical homestead advice using basic materials available on most sites.

The Humanure Handbook: A Guide to Composting Human Manure, by Joseph Jenkins, Jenkins Publishing. If we composted our manure instead of flushing it, we'd solve many problems and safely complete the bread cycle.

In the Deserts of this Earth, by Uwe George, Harcourt, Brace, Jovanovich, 1979; fascinating study of where life may ultimately be headed.

Lime in Building, by Jane Schofield, Black Dog Press; "A Practical Guide" to the use of lime in plastering, including slaking your own lime putty; from Taylor Publishing, which carries a full catalog of natural building books; POB 6985, Eureka CA 95502; 1-888-441-1632; www.northcoast.com/~tms.

Little House on a Small Planet, by Shay Salomon, Gibbs Smith, 2006. The author argues, rightly, that the best thing you can do to be "green" and "efficient" in your home is to keep it small. Essays, interviews with small house-dwellers, floorplans, inspiration. littlehouseonasmallplanet.com.

The Art of Natural Building, Joseph F. Kennedy, Michael G. Smith and Catherine Wanek, editors; New Society Publishers, 2002, Canada.

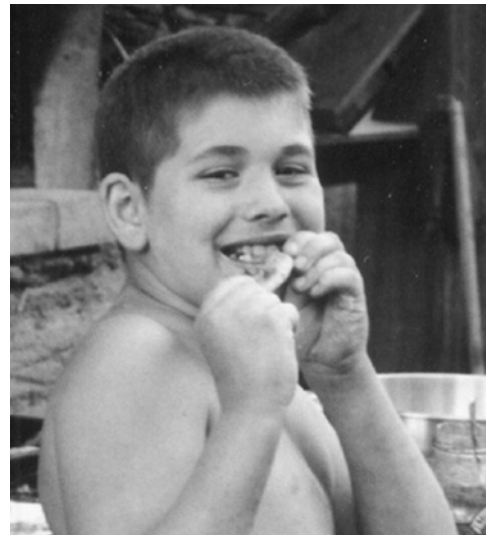
Building with Earth, A Handbook, by John Norton, ITDG, 1997, London.

The Natural Plaster Book: Earth, Lime and Gypsum Plasters for Natural Homes, by Cedar Rose Guelberth & Dan Chiras, New Society Publishers, 2003, Canada. Building for Health Materials Center, POB 113, Carbondale CO 81623, 800-292-4838, buildingforhealth.com

A Pattern Language, by Christopher Alexander et al, Oxford U. Press, 1977; a practical manual for finding and applying good "patterns" for living and building; broken down into small, practical chunks that can be applied to home, neighborhood, city, or nation.

Secrets of the Soil, Tompkins & Bird, Harper & Row, Perennial, 1990; provocative inquiry into unanswered questions about how dirt works.

Spectacular Vernacular: The Adobe Traditions of West Africa, Jean Louis Bourgeois & Carollee Pelos, Aperture, 1996; text & photo survey of an inspirational tradition of earthen building.



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OTHERS OF INTEREST

- Aprovecho.org, for efficient woodstoves and appropriate technology
- barmbaker.com, the website of Alton Spiller, Inc., for scalded doughs and related uses of "barm techniques."
- City Repair Portland (OR), cityrepair.org
- fornobravo.com has free brick oven plans
- Hiram Trust, Tel/Fax 01453 764065; www.anth.org.uk/hiramtrust.
- Oregon's Solwest Renewable Energy Fair, solwest.org
- solarcooking.org
- Wes Jackson's Land Institute, thelandinstitute.org
- [yahoogroups.brick-oven-group](http://yahoogroups.brick-oven-group.groups.yahoo.com): groups.yahoo.com



FOOD & CULTURE

Farmers of Forty Centuries, & other essential titles, downloadable FREE from www.soilandhealth.org, Steve Solomon's public web-library.

On Food and Cooking: The Science and Lore of the Kitchen, by Harold McGee, 1984; NY, Simon & Schuster; answers all the whys and hows of bread, water, yeast, eggs, milk, and (almost) everything else in the kitchen.

Hungry Planet: What The World Eats, by Peter Menzel and Faith D'Aluisio, Ten Speed Press, 2005. Photos of families around the world with all their food for a week. It is one thing to know about material inequality and the destruction of culture; it is another thing to see it inventoried.

Keeping Food Fresh: Old World Techniques and Recipes, by The Gardeners & Farmers of Terre Vivant, Chelsea Green, 1999. Preservation can maintain or enhance life in food, rather than killing it with sterilizing heat or chemicals. Traditional live foods now considered "gourmet" were standard items that nourished long-lived people of many cultures.

Living Water, Viktor Schauberger and the Secrets of Natural Energy, Olof Alexandersson, Gateway/Gill & Macmillan, Dublin; Schauburger's scientific & practical achievements with water remain to be explained; fascinating.

The Lost Language of Plants, by Stephen H. Buhner, Chelsea Green, 2002; arguments & evidence for listening more closely to green growing things.

"The oil we eat: following the food chain back to Iraq," by Richard Manning, *Harper's* magazine, Feb, 2004. Also: *Against the Grain: How Agriculture Has Hijacked Civilization*, North Point Press, 2004.

The Unsettling of America (essays on culture and agriculture); *Jayber Crow* (a novel), by Wendell Berry, whose moral logic is necessary armor against the arrogance of unexamined and undemocratic ("scientific") thinking.

Water Wars, Vandana Shiva, South End Press, 2002. also *Stolen Harvest: the Hijacking of the Global Food Supply*, on genetic engineering and global agriculture. Shiva was a leading physicist before deciding to address the impacts of globalization, not only on India, but the world.

Wild Fermentation: The Flavor, Nutrition, and Craft of Live-Culture Foods, by Sandor Ellix Katz, Chelsea Green, 2003. Make sauerkraut, kimchi, pickles; miso, tempeh, dosas, and idli; yogurt, kefir, cheese, bread, wine, beer, and vinegar; nearly 100 recipes.

An Underground History of America Education, by John Taylor Gatto, 2006, Oxford Village Press, NY, johntaylorgatto.com. He says "public education" is neither. The history he covers suggests that industrial education is much like industrial food — both empty and artificial.

Zuñi Breadstuff, Frank Hamilton Cushing, 1920, New York Museum of the American Indian, Heye Foundation. Describes the braided strands of land, people, history, bread and culture among the Zuñis. The author was adopted, initiated into religious mysteries, and became second chief of the tribe. John Wesley Powell called him a genius of manual arts, intellect, and

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Mixing mud for an oven at Casa Del Sol in New York City's South Bronx, a project initiated by a college intern working with 50 community volunteers. *Photo courtesy of project coordinator Beth Ferguson.*

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*Photo courtesy of
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