

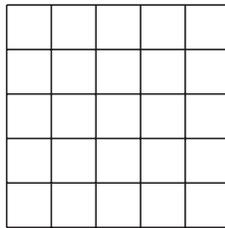
# 1

## THE MAD SCIENTIST

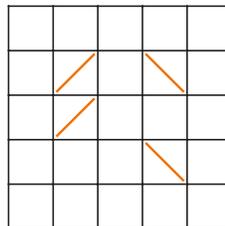
WE'RE GOING to start with two investigations, one in mathematics and one in cooking. On the surface, they have little in common. There are similarities, though, similarities of "spirit," for want of a better word. I'll say more at the end.

### DOODLES

A few years ago, I was doodling, that is, I was sitting with pen and paper, drawing lines with no purpose in mind. I drew a square with grid lines.

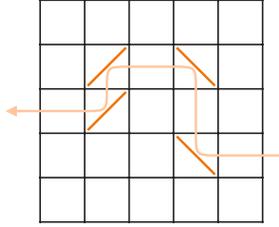


I put diagonals in some of the boxes.

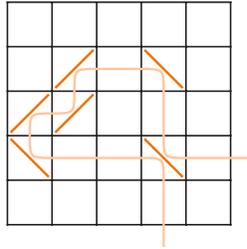


I imagined the lines as mirrors. I wondered what would happen if a ray of light entered the square and started bouncing around.

2 Chapter 1

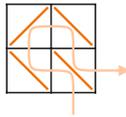


I noticed that it was possible for a ray of light to visit the same box twice, that is, it could bounce twice off the same mirror.

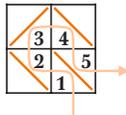


That made me wonder how long I could keep things going. Given a square, how long a path could I make, assuming I could place the mirrors wherever I wanted?

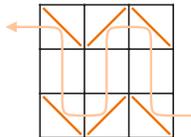
I started small. The  $2 \times 2$  square allowed a path of length 5.



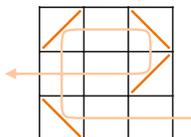
(I count each square I enter. I count a square twice if I enter it twice.)



For the  $3 \times 3$  square, I first got a path of length 9,



then one of length 10,









## NOODLES

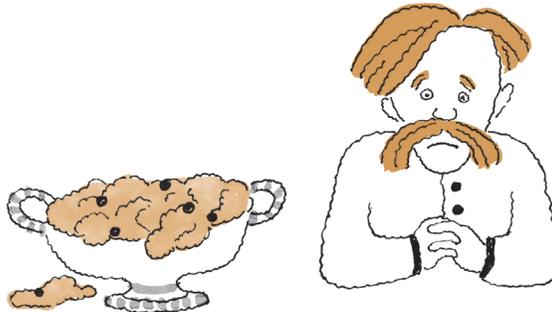
This may seem a *little* abrupt. Noodles and doodles appear to have almost nothing in common. I'll say something at the end of the chapter.

It started a few years ago. I was preparing a dinner for friends. I had planned to cook some sort of spaghetti dish.



But my plans were confounded when I learned that one of the guests had celiac disease, an allergy to wheat gluten. She couldn't eat wheat pasta.

That was bad news. But I was determined to cook that dish. At the grocery store I found corn spaghetti. I bought a box of it. I cooked it—and served my puzzled friends a gooey mess.



I *may* have overcooked it. But I suspect that the only way to undercook corn spaghetti is to leave it at the store.

My guest was embarrassingly grateful. I could have left it there but I saw a challenge that intrigued me. Is there something to take the place of pasta? Could I find a substance that

- is gluten-free, and
- is functionally equivalent to pasta?

No dumplings. No gnocchi. No couscous. All of these contain wheat.

What I wanted was a sort of multipurpose faux pasta, something that could comfortably take the place of macaroni or penne. I tried practically everything. French fries. Brussels sprouts. Corn flakes.

The challenge may seem difficult and maybe even pointless. But it attracted me.

And it entertained me. The reader would be alarmed to know what, over several years, I put on the table in lieu of pasta. I had successes. I had failures. No one outside my immediate family was seriously harmed.

My happiest experiments were with corn-off-the-cob. Here is a reasonable example.

### Corn-as-pasta: Stilton and Pecans

(For four, as a first course)

- a little more than 1/2 cup pecans
- a little more than 1/2 cup good, ripe Stilton cheese
- 4 cups of kernels cut from fresh sweet corn
- 2 Tb peanut oil
- salt to taste

Toast the pecans,<sup>1</sup> then chop them roughly.

Chop the cheese.

Place on high heat a pan large enough to hold all the corn easily. When really hot, add the oil and after waiting for the oil to heat, throw in all the corn and stir to coat the kernels. Continue cooking until the corn is just done (3 minutes or less).

Now turn down the heat and add everything else except the nuts, stirring until the cheese melts. Salt to taste, sprinkle on the nuts, and serve.

<sup>1</sup> My method for toasting nuts: Place the nuts in a moderate oven. When they burn, remove and discard them. Place more nuts in the oven. Watch them carefully. Check every minute or so until they are fragrant and have changed color slightly. Remove the nuts.

Turn off the oven.

One could complain, “Corn isn’t soft like pasta. And corn doesn’t absorb flavors like pasta.” Well, that’s true. But this is a great dish.

If you want a soft faux pasta, rice works. I don’t mean risotto, though. Risotto isn’t faux pasta. The process of cooking real pasta is the same, mostly, no matter what sauce you use. A proper faux pasta should be something you just cook and then mix with sauce. With risotto, different recipes differ at the start.

The type of rice is important. Good jasmine rice can give you a soft but chewy grain that works well with many pasta sauces.

### Rice-as-pasta: Butter and Sage

(For four, as a first course)

- 1 1/3 cups fresh jasmine rice
- 1 1/3 cups water (see below)
- 3 Tb butter
- 1/4 cup chopped fresh sage
- 1/3 cup freshly grated Parmesan cheese
- salt to taste but at least 1/2 tsp



I buy jasmine rice in 25-lb bags from a local Asian grocery store. About half the time the bags are labeled “new crop,” or something like that. This is the best stuff (unless it’s not really new). For this, you use one cup water for each cup of rice. If the rice is not so fresh, an additional tablespoon or two<sup>2</sup> of water per cup of rice seems to work.

Place the rice plus the right amount of water (see above) in a saucepan. Cover the pan and turn the heat up high. When the water starts to boil (but before it boils over) turn the heat down as low as possible, keeping the pot covered. The rice will bubble and steam. Turn off the heat when you no longer see steam when you look under the cover (but before the rice burns); this will be in about 5 or 6 minutes. Let the rice sit covered for another 5 minutes.

Place the butter in a large bowl. When the rice is ready, rake it out of the pan with a fork into the bowl. Toss the rice with the butter to distribute and coat the grains of rice. Now add the sage and cheese and mix. Salt to taste. I like to use sea salt, grinding the crystals if they are big.

<sup>2</sup> Or three or four.

I hope I haven't made cooking rice sound difficult. It's not difficult. You have a few minutes leeway in turning down the heat. And if the rice boils over, that's okay. It just makes a mess.

You also have a few minutes leeway in turning off the rice. And if the rice burns, most of it is still good. And I have a great recipe for the brown stuff at the bottom.

Other ideas? Chickpeas? Zucchini? Scallopini? There's no end to this.

There are more recipes<sup>3</sup> on the website:

[press.princeton.edu/titles/10436.html](http://press.princeton.edu/titles/10436.html).

And if *you* have ideas, I'm interested.



## NOODLES AND DOODLES

Apart from rhyming, noodles and doodles have nothing in common. I chose them to illustrate some shared features of mathematics and gastronomy, features that appear in this book again and again.

First of all, they are *pleasures*. Of course, sometimes we cook because we're hungry. And sometimes we calculate because we have to pay our taxes. But real cooks and real mathematicians play. They play with structures, they play with ingredients, they play with the ideas and the flavors that attract them strongly.

Second, while the attraction is aesthetic, it's also intellectual. We're curious. We want to taste; we want to tinker; we want to explore; we want to find out. We savor the unknown.

Third, and this may be the most important point, we often don't know what we're doing. We stumble around. Mathematics and gastronomy are mysteries. We have to stumble to make progress. We experiment. We try one thing. We try another. We may appear to have no method. But that's not true. Stumbling around *is* a method. It's the go-to method, surprisingly, of the best cooks and the best mathematicians.

<sup>3</sup> Including a recipe for burnt rice pudding.

Stumbling (and making progress) is the focus of the next chapter.

Hundreds of books are devoted to solving math problems. Thousands of books are devoted to cooking techniques. In the next chapter I will convince you (maybe) that the key to one is the key to the other.