# 我猜了三年，它只做了三天

《一次有趣的实验》里有一段，书里那个人想知道种子该埋多深才发芽。这个问题说起来多简单，谁都能猜：一厘米，两厘米，随便说一个数，说完就完了。他没有。他准备了六个杯子，分别埋半厘米、一厘米、两厘米、三厘米、五厘米，每天浇水，每天记录，整整做了三天才有眉目，最后又重复了一遍才敢写进文章。书里有一句话我抄在了文具盒背面：猜十次，不如做一次。

这句话让我坐立不安，因为我这六年，一直在猜。科学书上说根往下长，我猜是；说种子发芽要水，我猜是；说土里有什么，我全凭插图想象。三年级自然老师问，谁挖开过自己种的豆芽的土，全班没几个人举手，我也没举。不是不敢，是从来没想过可以挖。答案在书上印着，我背下来就行了，为什么要自己动手去确认呢？这本书里的人替我确认了：因为背下来的答案是你的，做出来的答案才是长在你身上的。

我做过唯一一次自己的实验，是腌黄瓜，失败了。我按书上的方子，盐水、黄瓜、压石头。三天以后打开，黄瓜烂了一半，臭的。我当时下结论：书上骗人，腌黄瓜根本做不成。读完这本书我重新翻我那次的记录，才发现我盐放少了，石头用的是小区花坛边的花岗岩，压得也不严实。书上写的每一步我都省了，省到最后，实验替我惩罚了我。

上周末我重做了一次腌黄瓜。盐按秤称，石头换成洗净的鹅卵石，每天打开看一次，摸一摸，闻一闻，记一行。第五天，黄瓜变成透亮的黄绿色，咬一口，脆的，咸里带一点酸。我妈尝了没说话，又夹了一根。那种高兴跟考试考好不一样，它很安静，就是心里有个地方稳稳地落下了：这是我做出来的，不是我背出来的。

这本书给我的打算很小，但很具体：以后凡是书上写的结论，能做的我就做一次，做不了的我就记下来，等能做了再做。种子埋多深，腌黄瓜放多少盐，这些事书本答得出来，可只有手知道答案落下来的那一下有多踏实。猜了六年，我想从现在开始做。

# I Guessed for Three Years; He Experimented for Three Days

In the book One Fun Experiment there is a passage where the author wants to know how deep a seed should be buried to sprout. Anyone can guess a number and be done with it. He was not. He prepared six cups, burying seeds at half a centimeter, one, two, three and five centimeters, watered and recorded every day, spent three full days before a pattern appeared, and repeated everything before he dared write it down. One line from the book is copied on the back of my pencil case: guess ten times, or do it once.

That line made me restless, because for six years I have been nothing but guessing. The science book says roots grow downward, and I guessed yes. It says seeds need water, and I guessed yes. In third grade our science teacher asked who had ever

dug up a bean sprout to look at the soil, and almost nobody raised a hand, myself included. It was not that we were afraid; it never occurred to us that we could dig. The printed answer feels enough. The man in this book proved otherwise: an answer you memorize belongs to the book, an answer you make grows into you.

My only experiment of my own was pickling cucumbers, and it failed. I followed the recipe loosely: brine, cucumbers, a stone on top. Three days later half of them were rotten and smelly. I concluded that books lie and pickling does not work. After reading this book I checked my notes from that day and found I had used too little salt, taken a granite stone from the flower bed, and pressed poorly. I skipped every careful step, and the experiment punished me for it.

Last weekend I did it again. Weighed salt, a washed pebble instead of granite, one look, one touch, one smell and one line of notes every day. On the fifth day the cucumbers turned a clear yellow-green, crisp when bitten, salty with an edge of sour. My mother tasted one without a word and took another. The joy was quiet, not like a good exam score: something inside settled firmly. I made this; I did not memorize it.

My plan from this book is small and concrete. For every conclusion in a book, if I can test it, I will test it once; if I cannot, I will write it down and wait. How deep to bury a seed, how much salt for cucumbers: books can answer, but only the hand knows how steady the answer lands. I have guessed for six years. From now on I want to start doing.

# 书里那个失败的对照组

《一次有趣的实验》里最让我难忘的，不是哪一次成功，而是一个失败的对照组。书里作者想知道铁为什么在海边锈得更快。他摆出三个杯子：一个保持干燥，一个倒进自来水，一个倒进盐水，每天记录杯中铁片的样子。做到第五天，他发现两个杯子的标签贴反了，一周的记录全部作废。换谁都想扔掉重来都不一定干，他却把标签重新贴好，从头再做，还在文章里老老实实写了这次失误。他说，失败查清楚了，也是答案。

我以前总觉得实验就该出正确结果，失败了只能说明我不是学科学的料。去年秋天我做过一个自己的实验：往铁钉上涂指甲油，看能不能防锈。我把一根没涂的铁钉和一根涂了指甲油的铁钉分别放进两个盘子，倒上水，等奇迹发生。三天后，涂指甲油的那根反而锈得更凶，橙色的锈顺着指甲油的裂缝往外爬。我失望透了，下结论说指甲油防不了锈，科学也防不了我。

是书里那个失败的对照组让我回头去看我的失败。我想起来，我指甲油涂得太厚，表面干裂了；盘子里的水浑了也没换。裂缝就是通道，水带着空气顺着通道爬到铁面上。我的失败不是在说指甲油没用，它在说：涂得太厚、裂了缝的指甲油，比不涂还糟。这两个结论完全是两回事，一个把门关死，一个留了门缝。

上周我把实验重做了。指甲油只涂薄薄一层，等干透再补第二层，每天换清水。七天过去，涂了指甲油的钉子还是白的，没涂的那根已经锈成褐色。这次的高兴和上次不一样：上次要是碰巧成了，那是运气；这次是失败替我攒下的。

这本书给了我一个打算：准备一本错题一样的本子，专门记实验里出的岔子。做砸一次，先别扔，先问它教了我什么，写下来，再决定怎么重做。书里的人舍得丢掉一周的数据，我总舍得丢一根铁钉。真知是动手做出来的，而动手这件事里，本来就包括做砸。

## The Failed Control Group in the Book

What impressed me most in One Fun Experiment was not a great success but a failed control group. The author wanted to know why iron rusts faster near the sea. He set out three jars: one kept dry, one filled with tap water, one filled with salt water, and he recorded the iron pieces inside every day. On the fifth day he found that two labels had been stuck on the wrong jars, and a whole week of records became useless. He could have thrown everything away. Instead he relabeled the jars, started over, and honestly wrote the mistake into his article. He said that a failure, once examined closely, is also an answer.

I used to believe experiments exist to produce correct results, and that failing only proves you are no good at science. Last autumn I ran my own experiment: coating an iron nail with nail polish to see whether it could stop rust. I put one bare nail and one polished nail into two separate dishes, covered them with water, and waited for a miracle. Three days later the polished nail rusted worse than the bare one, orange rust creeping out along the cracks in the polish. I decided then that nail polish is useless against rust, and that I am useless at science.

The failed control group in the book made me go back and look at my failure. I remembered that I had put the polish on too thick, so its surface cracked while drying, and I never changed the cloudy water in the dishes. The cracks were passages, and the water carried air through them to the surface of the nail. My failure was not saying polish is worthless. It was saying that thick, cracked polish is worse than none at all. Those two conclusions are very different things. One shuts the door; one leaves a crack of light.

Last week I redid the experiment. One thin coat of polish, left to dry fully, then a second thin coat, and fresh water every day. Seven days in, the polished nail is still white while the bare one has turned the color of rust. This success feels different from the last one. If the first attempt had worked by accident, it would have been luck. This one was saved up for me by a failure.

My plan from this book is to keep a notebook, like a mistake notebook, just for

the things that go wrong in experiments. When something breaks down, do not throw it away. First ask what the failure taught me, write it down, then decide how to start again. The man in the book could afford to lose a week of data. I can afford to lose one nail. True knowledge comes from doing with your own hands, and doing has always included failing.

## 把书合上之前，我先去接了一盆水

《一次有趣的实验》里，有一章写声音能不能在水里传播。书里的做法简单得让人意外：找一个能在水里响的小铃铛，先在水面上摇，听；再把铃铛按进水里，贴着盆边再听。就这么两步，书里的人做了七八遍，换了瓷盆、铁桶和玻璃缸，最后才写下一句结论：声音不但能在水里传播，还比在空气里更清楚。我读到这里的时候，书是合不上的，因为我想去接一盆水。

我真的去了。厨房水池里接了半盆温水，把我那串带小铃铛的钥匙放进去摇。声音闷闷的，可是把耳朵贴近盆沿，铃铛的动静一下变得又近又亮，像有人在盆里小声说话。我妈在门口看我趴在盆边，问我干嘛，我说做实验。她说这有什么好做的，书上不是写了吗。我一时答不上来。是啊，书上写了。可书上写的那一行字，和我耳朵贴着瓷盆听到的那一声，是两样东西。

这本书也让我重新想起我失败过一次的东西：盐结晶。科学书上说，浓盐水慢慢蒸发能长出方方的盐晶体。我用热水冲了半杯盐，倒进碟子放在窗台。两周以后去看，碟子里是一层灰白的、湿漉漉的泥状物，一个亮晶晶的角都没长出来。我那时认定自己不适合做实验。现在回头看，我用的盐是粗盐，里面有杂质，水也没过滤，蒸发太快，长出来的当然是一摊糊涂。失败的原因藏在书没写全的地方，只有做过的人才看得见。

所以这本书给我的打算，不是考科学试多少分，而是很实在的一件：我要在窗台上腾出一格，叫厨房实验角。以后每星期挑一件书上说的事，亲手做一遍，做成了拍照贴在格子边上，做砸了把砸的原因写在纸条上也贴上去。声音在水里怎么响，盐怎么长角，这些事从今往后我不但要背，还要在我的窗台上发生过。

合上这本书之前，我在那一页折了个角。不是折给结论的，是折给书里那个把铃铛按进水盆的人。他让我知道，读书读到一半跑去接水，不是分心，是读书读到了最认真的地方。

## Before I Closed the Book, I Went to Fetch a Basin of Water

In One Fun Experiment there is a chapter asking whether sound can travel through water. What the author does is surprisingly simple: find a small bell that can ring underwater, shake it above the water first and listen, then hold it under the water

close to the rim of the basin and listen again. Just these two steps, and he repeats them seven or eight times, switching from a porcelain basin to a metal bucket to a glass tank, before he finally writes down the conclusion: sound travels through water, and even more clearly than through air. When I reached that page, I could not close the book, because I wanted to go fetch a basin of water.

I really went. I filled the kitchen sink halfway with warm water and shook my key ring with its little bell under the surface. The sound came out muffled, but when I pressed my ear against the rim of the basin, the ringing suddenly grew near and bright, as if someone were whispering inside the basin. My mother asked from the doorway what I was doing. I said running an experiment. She said what is the point, it is already written in the book. I had no answer. Yes, the book says it. But the line in the book and the sound my ear heard against the porcelain are two different things.

This book also made me revisit my other failure: salt crystals. The science book says a strong salt solution, left to evaporate slowly, grows into square crystals. I dissolved half a cup of salt in hot water, poured it into a dish, and set it on the windowsill. Two weeks later there was a gray, damp paste in the dish, not one shining corner anywhere. I decided then that experiments were not for me. Looking back now, I had used coarse salt full of impurities, never filtered the water, and let it evaporate too fast. Of course what grew out was a muddy mess. The reasons for a failure hide in the parts the book does not spell out, and only someone who actually did it can see them.

So the plan this book left me with is not about scoring higher on a science test. It is plain and real: I will clear one shelf on the windowsill and call it the kitchen lab. Every week I will pick one thing a book claims and do it with my own hands. If it works, I tape a photo to the edge of the shelf; if it fails, I tape a note about why it failed. How sound travels in water, how salt grows its corners: from now on these things must happen on my windowsill, not only in my memory.

Before I closed the book, I folded down one corner of a page. Not for the conclusion, but for the man who pushed a bell into a basin of water. He taught me that running off to fetch water in the middle of reading is not a distraction. It is reading at its most serious.