

I Can Meet with Dead Scientists

Chapter 151 128 Xiaoli Visits

[890 words]

"What? Looking for Mr. Wang?"

Inside the room.

Upon hearing Mr. Xie's words.

Old Su's expression froze slightly, giving Xu Yun a somewhat peculiar glance:

Although Xu Yun had already separated from his servitude status, entered the guest registry, and belonged to the category of "Guests," it was normal for someone to look for him.

But considering the timeline, this only happened yesterday.

Just a few days ago, when Xu Yun went to the Li Mansion to proofread books, he was still a regular servant.

Under such circumstances, could Xu Yun actually make Xiaoli come knocking personally?

Well, that's quite interesting.

You see.

Though women in the Song Dynasty had a higher social status than in many previous dynasties, and from a later perspective, it could even be considered one of the feudal dynasties with the highest status for women:

Women not only could freely go out on the streets, but they could also initiate divorce and remarry.

Yet even within such a context, the action of an unmarried girl proactively visiting a servant still challenged the traditional views of ordinary people.

Especially considering the visitor was presently renowned in the capital, Xiaoli, which added a bit of nuance to the entire situation.

Seeing Old Su glancing at him continuously, Xu Yun's forehead was immediately adorned with a few black lines.

As someone with a sense of self-awareness.

He knew very well that Xiaoli couldn't possibly fall for him at first sight and come to invite him for an outing or flower viewing—if he had that charm, he wouldn't have been single for so long in the future.

Therefore, without any surprises.

This girl coming to Old Su Mansion must be to understand something about 'science' from him.

Old Su's curious questions haven't been resolved yet, and here comes another Little Doudou.

Moreover, she has that seemingly soft yet actually firm character...

Headache.JPG.

Then Xu Yun took a deep breath and said to Old Su:

"Master, a few days ago when I went to the Lord Chief Steward's mansion, I happened to meet Miss Li.

Miss Li didn't dismiss us servants, but took the initiative to chat about family matters and asked about the mansion's situation.

At the time, I casually mentioned some common phenomena, and it seems she has become somewhat intrigued by them..."

"Oh? Common phenomena?"

Upon hearing this, Old Su raised his eyebrows, looking at him meaningfully:

"Like electric generators and intravenous injections, those kind of common phenomena?"

Xu Yun: "..."

Before he could respond, Old Su made the decision for him:

"At present, Zheng Ru is safe, and there is ample time before the next medication; leaving Zheng Chen here to take care of things will suffice.

In that case, I'll go with you to meet Qingzhao, as it is a matter of courtesy.

The last time I saw this young lady was during the Lantern Festival, some time has passed."

Xu Yun continued:

"..."

Although he felt Old Su had ulterior motives, the other party is the head of the family, and the reasoning isn't entirely unfounded.

So he could only sigh internally, temporarily bid farewell to Wang Bing and Wang Yue, and obediently followed Old Su towards the front courtyard.

The front courtyard, being the face of the Su Mansion, was much more finely furnished compared to the back courtyard.

The timber is superior, a faint woody fragrance pervades the courtyard, with ancient-style carvings, lush plants, red and green interwoven.

Accompanied by the incessant chirping of birds, it naturally evokes a desire to compose poetry or paint.

So when Xu Yun and Old Su reached the guest hall in the front courtyard, Xiaoli was currently...

Oh, holding a piece of paper, blowing into it with a swoosh.

Xu Yun:

"...."

However, Xu Yun's gaze only lingered on Xiaoli for a few seconds before shifting to...

The person beside her.

Yes.

Aside from Xiaoli, another person had come to Old Su Mansion!

This was a young man Xu Yun had never met, wearing a purple straight coat court robe, with a gold-thread spider pattern belt of the same color at his waist.

His black hair was tied up and fixed with an emerald gilt crown.

His slender body stood upright, exuding natural nobility amidst his grace and handsomeness.

Xu Yun's good friend Qiu Sheng was already considered handsome, but against this man, his looks still fell slightly short.

To be honest.

The only ones who could surpass this man's handsomeness were probably the future readers themselves.

Yet, there was something odd about it.

Such a handsome person gave off a bit of a...

Dispirited vibe?

In any case.

Judging from his bearing, attire, and position, it was clear he wasn't Xiaoli's attendant.

Most likely someone from the capital, a young master perhaps.

Wait, young master?

At the thought of the term young master, a name suddenly surfaced in Xu Yun's mind:

Zhao Mingcheng?!

My goodness, could it be this person?

If Xu Yun wasn't mistaken.

The connection between Zhao Mingcheng and Xiaoli dates back to the Lantern Festival in 1100.

Initially, it was Zhao Mingcheng's unrequited love, which blossomed into a mutual affection over about a year, leading to their marriage in 1101.

Which means, at this point in time, Xiaoli and Zhao Mingcheng already had some form of interaction, though how far their relationship had developed was unknown.

Considering the young lady's personality, she might very well bring Zhao Mingcheng to Old Su Mansion?

Oh boy.

Reincarnating into the Northern Song period, would he still get fed with romantic dog food?

Da-da-da—

Perhaps having heard the footsteps of Old Su and Xu Yun.

Xiaoli subconsciously turned her head, her eyes lighting up upon seeing Xu Yun.

Of course.

Though Xiaoli had a flamboyant personality, she didn't lack the necessary courtesy.

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Chapter 152 128: Xiaoli Visits _2

[1,083 words]

Therefore, even though she had a heap of questions for Xu Yun in her heart, she still first walked over to Old Su's side and respectfully made a bow:

"Qingzhao greets Uncle Su."

Old Su nodded politely at her first, then his expression became solemn, and he made a deep bow towards the man beside Xiaoli:

"This old minister, Su Song, pays respects to Prince Jian."

Having said that, he gave Xu Yun a look, signaling him to quickly follow suit in making a bow, and solemnly said:

"Xiaowang, why aren't you coming over to greet Prince Jian?"

Xu Yun blinked, and after coming back to his senses, he quickly stepped forward, slightly leaned forward, and followed Old Su in making a deep bow:

"Commoner Wang Lin, greets Prince Jian."

At the same time.

His heart also shook a little.

Good heavens.

He didn't expect that the handsome man accompanying Xiaoli was not Zhao Mingcheng, but rather the rather miserable Prince Jian?

Speaking of the most handsome Emperor in history, many people might think of Li Shimin or Yang Guang, while others might think of Liu Xiu or Guangxu.

But if we look only at the portraits preserved in history, the most handsome Emperor in the history of Huaxia unquestionably belongs to Emperor Zhezong of Song, Zhao Xu.

Elegant and amiable, handsome and bright, these eight characters were practically made for Zhao Xu.

Zhao Xu was the seventh Emperor of the Northern Song regime, reigning for only 15 years, with actual control for just 7 years, a quintessential young Emperor.

By virtue of his outstanding governance skills, he created the last glory of the Northern Song by sheer force.

He was also the only Emperor in the Two Songs who intended to address the root causes of the Northern Song's military conscription gaps and the exploitation of soldiers.

It is widely acknowledged by later generations that:

If he could have lived to fifty, the Northern Song probably would not have perished—at least not have died so suddenly.

Some extreme fans even believe that if Zhao Xu hadn't died so young, he might have become the Emperor Wu of Han of the Song Dynasty.

Unfortunately, there are no "if"s in the world; Emperor Zhezong of Song passed away due to illness this February at the age of only twenty-five.

Before Zhao Xu died, he had a total of five brothers behind him, among which three candidates were the most likely to inherit the imperial throne:

Prince Shen, Zhao Bi, Prince Duan, Zhao Ji, and.....

Prince Jian, Zhao Si.

Since Zhao Bi had issues with his eyes, realistically only Zhao Ji and Zhao Si were the most likely to inherit the throne.

Prince Jian, Zhao Si, and Emperor Zhezong were born to the same mother, the Zhu Family, hence his appearance was also quite handsome, and his abilities were exceptional, having proposed many useful suggestions on the Qingtang issue.

Thus at that time, a group of ministers led by Prime Minister Zhang Dun was more inclined to enthrone him as the Emperor.

However, at that time, Empress Dowager Xiang feared that the Zhu Family might threaten her position in the future, so she vetoed this proposal and chose to support Zhao Ji in ascending to the throne.

It was also at that point in time that Zhang Dun said a phrase that was widely circulated later — or rather a prophecy:

"Prince Duan is frivolous, unfit to rule the world."

However, Empress Dowager Xiang was determined, and Zeng Bu, Cai Bian, Xu Jiang, and others saw the opportunity to make suggestions, so in the end, the imperial throne still fell into Zhao Ji's hands.

Zhang Dun, due to his identity as a prophet being exposed, was executed in the fourth year of Chongning, becoming the first hapless victim in history to be choked to death by eating a bayberry. (Note: Another view is that the bayberry caused excessive gastric acid and gastric bleeding leading to death)

And with Zhao Ji's accession to the throne, Zhao Si was severely troubled.

After all, the royal family has always been unfeeling, and there is simply too much blood and evil concerning the imperial family in history.

To avoid suspicion.

Zhao Si had no choice but to sully himself like Xiao He, undergoing a drastic change in personality.

First, he resolutely distanced himself from the court, began to enjoy life, and indulged in wine and women.

He often took his confidants through the back gate of the Prince's Mansion, dressed casually, even sloppily.

Lingering in the marketplaces, wandering in the entertainments.

Not only that.

He also often mingled with children of the imperial family, and even forcibly bought daughters of the imperial family as concubines.

However, regarding this, Emperor Huizong appeared quite magnanimous, not only not pursuing it but also decreeing to the relevant departments and the Minister of Rites not to bother Zhao Si, and even gave him the title of King Cai.

But with the successive deaths of Empress Dowager Xiang and Grand Consort Zhu, Emperor Huizong started to take revenge on Zhao Si, who competed for the throne, initiating the Cai Manor case:

At the time, someone accused a junior official of the Cai Manor, Deng Duo, of rebellious remarks, and Emperor Huizong imprisoned Deng Duo and arrested a large batch of Zhao Si's loyalists.

The next day, on the court, the Left Imperial Censor Jiang Gongwang petitioned Emperor Huizong not to harm brothers, not to doubt Zhao Si.

As a result, Jiang Gongwang was dismissed, Deng Duo was executed, and the minister Liu Zhengfu continued to plead for Zhao Si, even citing the Western Han Emperor Wen and King of Huainan brotherly conflict incident.

The official records state that Emperor Huizong was moved and reconciled with Zhao Si.

But surprisingly, five years later, Zhao Si died.

At the youthful age of 23, with the cause of death hastily glossed over, merely two words "passed away," which is quite suspicious.

Many experts of later ages, though regretting Zhao Si's death, also believe this indirectly proved Zhao Si's capabilities:

Emperor Huizong is known in history as a muddle-headed monarch, yet he wasn't a tyrant, his character can even be described as mild.

He liked to pardon all under heaven whenever possible, with exile being the highest punishment.

After all, as a Flower and Bird Emperor, someone who enjoyed growing flowers and fighting birds generally wouldn't be too violent.

But precisely such a person, when facing Zhao Si's clique, his attitude changed drastically.

Using the Cai Manor case, he executed no fewer than twenty core aides of Zhao Si, and even allegedly dealt a ruthless hand to Zhao Si.

You must know.

Besides Zhao Si, the remaining Prince Shen, Zhao Bi, Prince Xin, Zhao Yu, and Prince Mu, Zhao Cai, these individuals lived quite happily.

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Chapter 153 128 Xiaoli Visits_3

[705 words]

Even Zhao Cai once traded weapons, yet Emperor Huizong forgave him with a smile.

And now, this historical figure appears at the Old Su Mansion with Xiaoli, how could Xu Yun not be surprised?

No wonder his appearance is so handsome.

No wonder he has interactions with Xiaoli.

No wonder there's an air of decadence about him.

All of this is because he is...

Prince Jian, Zhao Si!

Just as thoughts swirled in Xu Yun's mind, Xiaoli had already walked up to him and asked:

"Wang Lin, it's been days since we last met, is everything fine?"

Xu Yun quickly regained his composure, gave her a salute, and said:

"Thanks to the lady's grace, I am well in all matters."

Xiaoli softly uttered a hmm, about to speak, when she suddenly noticed something odd about Xu Yun's attire:

"Huh? I remember seeing you a few days ago, you seemed to be wearing a servant's garb, but today..."

Old Su, seeing this, voluntarily explained:

"Qingzhao, Xiaowang was a distressed person I rescued days ago, so I only arranged for him to be a servant earlier.

Now he has achieved new merits and has been added to the mansion's guest register, naturally, he can't wear those assorted clothes anymore."

Xiaoli then nodded in realization, and then waved a piece of paper towards Xu Yun:

"Wang Lin, do you remember this item?"

"..."

Xu Yun's eyes revealed a hint of helplessness:

"Of course I remember."

Xiaoli looked at him gloomily, saying with a face full of grievances:

"Wang Lin, you know, after hearing about scientific matters from you a few days ago, I've been unable to sleep for days and nights.

Upon contemplating various aspects of life, I found numerous common yet wondrous things like tea stains and paper pieces.

Yesterday I went to the tavern to drink... ahem, to purchase wine for my father, unexpectedly meeting Prince Jian.

After conversing, Prince Jian also has high hopes for the scientific ways.

Thus, today we specifically came to Uncle Su's mansion to seek you, hoping you can enlighten me and Prince Jian."

Actually, according to Zhao Si's hypothesis, Xu Yun might not be the source of knowledge, considering Old Su is a revered master of the era.

At first, Xiaoli also had some doubts about this, but upon hearing that Xu Yun had only entered the mansion a few days ago, she immediately ruled out Old Su's possibility.

As expected.

Upon hearing the word science, Old Su also showed visible surprise, along with a hint of expected expressions.

He remarked meaningfully:

"Indeed, it's a common phenomenon..."

Xu Yun:

"..."

Then Old Su glanced at Xu Yun again, couldn't help but say:

"Is it also a secret of Wind Spirit Moon Shadow sect?"

Xu Yun nodded stiffly:

"That's right."

Truth be told.

Before showing off to Xiaoli on that day, he had actually considered the consequences of doing so.

However, in Xu Yun's view, Xiaoli is an avid literature enthusiast, and her status is far different from his.

Thus, even if this lady became interested, she most likely wouldn't have further interactions with him.

Yet unexpectedly.

This Little Doudou didn't follow the usual path, and came seeking him openly today.

It seems that some common physical phenomena in later times have a far greater impact on people of this era than Xu Yun anticipated.

Moreover, this lady coming personally is one thing, but she even brought Zhao Si, Emperor Huizong's own brother along.

Women are truly bothersome .JPG.

But as the saying goes.

When you have many lice, you don't itch, when you owe more, you don't worry.

When the curiosity grew from Old Su alone to three people, Xu Yun found himself somewhat resigned.

Then he thought for a moment, said:

"Since Miss Li and Prince Jian came personally, I naturally have no reason to refuse.

Master, could you kindly prepare some things for me?"

Old Su had already grown a significant trust in Xu Yun over these days, so he didn't ask much and agreed immediately:

"What do you need?"

Xu Yun thought for a moment, said:

"A room, some lime, molds for making needles, and a board painted black will suffice."

"That's not difficult, it can be prepared in half an hour."

Old Su confidently gave a timeline, then asked curiously:

"Xiaowang, are you preparing to impart scientific ways?"

Xu Yun shook his head modestly:

"Imparting is too much, just sharing and exchanging, besides, there are many kinds of science, today we'll discuss just one type..."

"Which type?"

Xu Yun was silent for a moment, his gaze deep:

"The study of matter!"

.....

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Chapter 154 129: Old Su's Reasonable Conjectures

[1,677 words]

More than an hour later.

In a relatively secluded courtyard.

At this very moment.

Old Su was holding a short stick in his hand, writing the "Hundred Family Surnames" with great interest on a black oiled wooden board:

Zhao Qian Sun Li, Zhou Wu Zheng Wang....

After a while.

Snap—

Perhaps due to writing too hastily, the short stick broke with a sound.

Only then did Old Su stop, turning his head, looking at Xu Yun with bright eyes, and asked somewhat eagerly:

"Xiaowang, what is this thing called?"

Xu Yun glanced at the half-used short stick by Old Su and was glad that he had made a few extra. At the same time, he couldn't help but say:

"This thing is called... chalk."

More than an hour earlier.

After Mr. Xie had gathered all the materials, Xu Yun officially began handcrafting what was the simplest thing he had made since his travels:

Chalk.

Chalk is a very common teaching tool in later generations, and it's very easy to make.

In the 21st century.

Just knead clay and talcum powder with water into a dough-like form, then leave it in any tube for a few hours, and a simple white chalk is ready.

Although the Song Dynasty didn't have talcum powder, there was pig fat.

Once Mr. Xie had gathered the materials, Xu Yun mixed pig fat and lime, adding water to knead it into a paste.

Then he stuffed them into molds initially prepared for syringes, using saltpeter crystals bought from the Sour Plum Shop for cooling.

In less than an hour.

A few simple chinks were made.

However, facing such a simple object, Old Su burst with unprecedented enthusiasm.

From a quarter of an hour ago, he had been incessantly writing and drawing with chalk on a black-painted wooden board.

Sometimes writing poems, sometimes drawing circles and triangles.

Judging by his emotions, he was even more excited than when he saw garlic sprouts and generators.

The reason for Old Su's excitement was simple:

Although he was a renowned contemporary physicist and medical expert, fundamentally, he was a thorough scholar.

He had taught at an academy and, after retiring, set up a family school in his hometown in Jingkou, personally becoming a teacher.

Thus, upon seeing the effect of chalk, Old Su immediately realized the combined value of this little invention with the blackboard:

This was a divine teaching tool!

Although the Great Song's economy was quite prosperous and the court prioritized culture over military, its teaching methods were not much more advanced than other dynasties.

Basically, it involved the teacher reading aloud while students repeated after—a rote memorization method.

In terms of literacy, many primary educators would only tell you how to pronounce a character but not how to write it—because there was no tool like a blackboard.

The closest combination to chalk and blackboard at the time was something called an iron stylus.

Made from ground iron rods, its tip was sharp.

In daily life, it was mostly used for imprinting seals and carving on metal; in the classroom, it was combined with stone walls or wooden boards, where teachers carved for instruction.

This mode did not comment on the reading experience for students but was considerably taxing on the teacher's physical strength.

Not to mention that the sharp sound produced when this sharp object met the wooden board was akin to the sound of fingernails on a chalkboard—enough to make anyone curl their toes tightly.

The iron stylus had limited widespread use, meaning there were virtually no blackboard-like tools in general education.

Only some particularly responsible teachers would sometimes gather students around to demonstrate the stroke order.

In such a situation.

If you stood at the back, you might miss the stroke order demonstration.

After lessons, students who could afford it could purchase copybooks for practicing, which clearly indicated the stroke order.

But for those who couldn't afford it, the situation was grim:

They might rely on asking classmates for guidance, but if their relationships were average or they didn't ask during primary school—due to a lack of awareness at a young age—they might reach the imperial examination stage without knowing how to properly write some characters. (Referenced from a scholarly paper doi:10.16346/j.cnki.37-1101/c.2002.06.022 by a renowned professor at He University)

For example, the character for fennel had at least a dozen different written forms in the Song Dynasty.

The aesthetics of character formation are intricately connected to stroke order.

Yet handwriting was an extra credit in the ancient imperial exams, so some unfortunate scholars, despite years of diligent study, would fail due to handwriting issues.

Such situations were not rare in later generations either, where poor writing practice in primary school led to indecipherable handwriting in college entrance exams, costing marks.

Therefore, with the introduction of chalk, classroom teaching quality had the potential to significantly improve and become widespread.

After all, based on Xu Yunxian's earlier demonstration, the chalk-making process is extremely simple and cheap.

"Currently, the nation is divided into twenty-six circuits, four capital districts, thirty prefectures, two hundred fifty-four zhou, and one thousand two hundred thirty-four counties. Each county has two academies..."

Looking at the chalk in his hand, Old Su's hands trembled slightly:

"With just this piece of chalk, if each county produces three more scholars a year, that would be more than three thousand seven hundred people. Cultural education will flourish..."

Then he glanced deeply at Xu Yun, who was preparing lecture notes, and couldn't help but hesitate:

Could such a young man, capable of casually producing various marvels, truly just be an ordinary male actor?

Not to mention.

If he only sold garlic extract, he could surely be the wealthiest man in at least one city or county, right?

Although being a male actor imposed many restrictions, it was not impossible to atone and free oneself.

For instance, Chen Ling, a current Traveling Bureau position-holder in the court, was once a male actor who bought his freedom and even became an official.

Unless...

He carried a hidden story, making it impossible for him to redeem himself.

This wasn't Old Su's baseless imagination, after all, Xu Yun's circumstances were too peculiar:

Appearing at his mansion in the dead of night, without any identification or household registration documents, carrying a lot of gold and silver treasures, and having delicate skin.

At the same time, he possessed considerable cultural literacy and knowledge, including magical prescriptions unknown to even the finest physicians in the capital.....

Looking at the entire Great Song now, there seems to be only one place that can store such esoteric knowledge...

And that is...

The palace!

Hiss...

Thinking of this, Old Su's expression became quite strange.

Is it Empress Dowager Xiang?

Or Zhao Ji?

Or perhaps....

Both?

From a realistic perspective, it seems that Zhao Ji is more likely.

After all, he was a well-known playboy, and along with Wu Zetian, one of the only two emperors in history to establish institutions related to indulgences, such as the Konghe Bureau and Traveling Bureau.

Thinking of this level, Old Su couldn't help but hesitate:

If the emperor really sent someone to his mansion to capture Xu Yun, what should he do?

To hand over or not, neither seems like a good solution...

As Old Su's thoughts diverged.

On the other side.

Xu Yun finally decided on the direction of his lecture:

The force in physics.

In future Huaxia, what people referred to as science generally meant natural science.

The essence of natural science is generally a description of the rules governing natural phenomena.

For example, observing a particular phenomenon, deducing the underlying rule through logical reasoning, and expressing it using the language of mathematics, then verifying its accuracy through experiments.

This way we can say that, within a tolerable margin of error, we have obtained the rules or principles of natural phenomena.

As for the foundation of science...

From an objective standpoint, mathematics actually ranks a bit ahead of physics.

It can be said that behind every major human advancement, mathematics has been a powerful supporter.

However, considering the knowledge reserves of Xiaoli and Zhao Si, Xu Yun finally decided to start with physics.

After all, physical phenomena are more intuitive than mathematics, and the mathematical foundation needed for basic physics knowledge is not particularly profound in ancient Huaxia.

Especially during the Song and Yuan Period, ancient mathematics had developed to a quite advanced level.

Not to mention, just speaking of someone very close to our time and known to everyone:

Yang Hui.

Yang Hui's Triangle involves the binomial theorem, and even now, some fields remain unexplored.

Although Yang Hui did not achieve the simplification of binomials while alive, it at least indicates that the ceiling explored by ancient mathematics in this era was not low.

Even Xiaoli, with her literary inclination, had some understanding of basic mathematics.

Thus, starting from the concept of static knowledge in physics was undoubtedly a relatively good entry point.

Then he glanced at Old Su, who was pondering the value of chalk, and lightly coughed to remind him:

"Sir, can we begin?"

"Oh oh..."

Old Su came back to his senses, temporarily setting aside the questions in his mind.

Currently, Zhao Ji had just ascended the throne, and was in a period of testing and adjusting with Empress Dowager Xiang and all the civil and military officials.

Therefore, even if he discovered Xu Yun's whereabouts, it was unlikely he would take any action shortly, since everyone was keeping an eye on him.

At least before this year's Spring Festival, Xu Yun should be safe.

Thinking of this.

He couldn't help but breathe a slight sigh of relief, and said to Xu Yun:

"Xiaowang, since you're ready, let's begin."

After speaking.

He placed the chalk back on the table and went to sit on a small chair in front of a blackboard.

As soon as he sat down.

A very subtle feeling arose within Old Su:

He used to always be the one teaching others, and this kind of situation where he listened to someone else's lecture hadn't happened much in sixty years...

Of course.

As someone who had soaked in the library for nine years, Old Su had a high thirst for knowledge, far from being as arrogant as the scholastic tyrants of later ages.

So this emotion came and went quickly, not overly affecting Old Su's attention.

Just like that, a moment later.

Old Su, Xiaoli, and Xiaozhao, the three curious little ones, all obediently sat on their chairs.

Looking forward to listening to Teacher Xu's class.

Xu Yun then went to the blackboard and picked up the chalk.

After pondering for a moment, he asked Xiaoli:

"Miss Li, I heard you recently wrote a piece, titled 'Rumeng Ling: Last Night's Light Rain and Strong Wind'?"

....

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Chapter 155 130: The Door to Physics Opened by "As if in a Dream

[1,920 words]

"Miss Li, I heard that you recently wrote a poem called 'Rumeng Ling: Last Night's Light Rain and Strong Wind'?"

In front of the blackboard.

Upon hearing Xu Yun's words.

Xiaoli's face immediately displayed a trace of visible pride, though she still modestly replied:

"It's just a humble work, not worth mentioning on the stage. Uncle Su's literary talent is truly outstanding."

A few months ago, within a week's time, she wrote two pieces of As if in a Dream.

They are the later famous 'Rumeng Ling: Always Remember the Stream Pavilion at Dusk' and 'Rumeng Ling: Last Night's Light Rain and Strong Wind.'

It was precisely these two poems that suddenly brought Xiaoli great fame, somewhat exemplifying the saying 'one piece to fame.'

The lyrics of the Song Dynasty are different from the poetry of the Tang Dynasty. While Tang poetry can be recited directly, Song lyrics were meant to be sung, with the title indicating the melody.

However, since Xu Yun's intention was to give an example, he began to recite softly:

"Last night, light rain and strong wind,

A heavy sleep couldn't dispel the lingering wine.

I asked the one who rolled up the blinds,

She said, 'Haitang remains as before.'

Do you know,

Do you know?

It should be the green lush, red lean!"

After reciting, he clapped and praised:

"No need for modest words, Miss Li's literary talent is truly admirable. I consider myself inferior.

Especially this last line, Miss Li, I heard that this was a question to your maid?"

Xiaoli nodded slightly, seeming to recall her somewhat careless maid, and her lips curved into a smile:

"Indeed, that day I drank and got drunk, vaguely remembering the rain was light and the wind was strong outside, with calls resounding like tiger roars and dragon groans before falling asleep.

After waking up, I thought about the unprotected Haitang in the courtyard, so I asked Huan'Er about the situation outside.

Unexpectedly, that clumsy girl was rolling up the blinds, yet without looking outside once, she told me, 'Miss, the Haitang is just like yesterday.'

I couldn't help but lightly scold her once.

After all, after a storm, flowers would definitely have been blown to the ground, and there would mostly be only some leaves left on the tree."

Xu Yun glanced at her, his expression a bit wry.

In this era, being in the service of a lady like Xiaoli was indeed a blessing for a maid, wasn't it?

But soon.

He shifted the topic and said:

"Then Miss Li, may I ask another question?"

Xiaoli glanced at him seriously and said:

"Wang Lin, you are now a guest in Uncle Su's house, having left the servant status, so don't refer to yourself as a mere person. Please speak directly."

Xu Yun gave her a slight bow to express his gratitude, then asked:

"Miss Li, since you know that the Haitang outside is lushly green and leanly red, have you ever thought about why this scene occurs?"

A question mark floated onto Xiaoli's face:

"?"

Seeing the somewhat bewildered Xiaoli, Xu Yun continued to ask:

"Miss Li, let me ask you, where did the blown-off Haitang flowers go?"

Xiaoli blinked and the answer slipped out:

"Of course, they fell to the ground."

Xu Yun nodded slightly, then pointed to the sky, then the ground, and said:

"Then Miss Li, let me ask you, why don't these Haitang fly up to the sky but rather fall to the ground?"

Xiaoli was stunned and subconsciously wanted to answer:

"Because... because... "

But after 'because' for quite a while, this young lady was suddenly surprised to find that she couldn't answer this seemingly common question!

Objects at a certain height fall when support is lost, a common knowledge even for a three-year-old child.

Yet, it seemed no one had ever told her why this phenomenon occurred, as if it was a given.

As Xiaoli fell into contemplation.

Old Su and Xiaozhao, who were beside her, also showed different expressions.

Like Xiaoli, Xiaozhao had a slightly open mouth, looking bewildered, as if slightly challenged.

But Old Su was different.

His face, though slightly surprised, was more filled with a thoughtful expression.

After a while, he slowly said:

"Xiaowang, over forty years ago, I had the fortune of meeting Mr. Hengqu.

We hit it off immediately, often talking by candlelight, discussing astronomy, geography, ancient and modern civilization, leaving no stone unturned.

During one conversation about the geographical features, we casually discussed from the phrase 'water flows to lower places' the reason why objects fall.

At that time, Mr. Hengqu believed that the earth's soil possessed a certain magnetic force that actively attracts objects to our feet.

However, such magnetic force is invisible to the naked eye, and since it was a casually mentioned topic back then, it wasn't explored further."

Upon hearing Old Su's words, Xu Yun was slightly taken aback.

Soon, a question in his heart was silently unraveled:

Previously, when Old Su was studying the operation of the generator, upon seeing Xu Yun the next day, he had proposed a principle about 'force.'

That principle, in some sense, was infinitely close to the truth of magnetic-generated electricity.

At that time, while astonished, Xu Yun had a vague doubt in his heart:

That Old Su's angle of approach seemed a bit too precise, directly pinpointing the core of magnetic force application.

However, considering that Old Su is now in a fully mature state, unlike Little Niu in the 1665 dungeon who was still in his youthful version.

Thus Xu Yun once believed that it was by relying on experience that he thought of this aspect, after all, there are too many precedents of sudden insights in scientific history.

But now it seems.

Old Su's exploration of 'force'—or rather the rudimentary recognition—should have begun more than forty years ago.

Mr. Hengqu.

Refers to Zhang Zai.

Zhang Zai is one of the most famous thinkers, educators, and founders of Neo-Confucianism in the Northern Song Dynasty, and the most renowned among the Five Scholarly Masters of the Northern Song.

He developed the thought of "Qi Monism," becoming the master of the ancient Chinese dialectical "Two-One" theory.

Of course.

Compared to Zhang Zai's name, a sentence he said might be more famous:

"To establish the heart for Heaven and Earth, to set the destiny for the people, to continue the lost teachings of past sages, and to open peace for all generations."

That's right.

This quote, which appears in 90% of pre-Song Dynasty transmigration literature, is from Zhang Zai's mouth.

At the same time, Zhang Zai was also a relatively rare supporter of the round Earth theory in ancient times.

Speaking of the round Earth theory, later generations generally believe that in the 6th century BC, the Ancient Greek mathematician Pythagoras first proposed the concept of Earth.

By the 3rd century BC.

The scientist Eratosthenes, living in Alexandria, established the concept of Earth using geometric methods, and calculated Earth's diameter.

In ancient Huaxia, there were quite a few supporters of the round Earth theory as well.

The most famous probably belongs to the Eastern Han Zhang Heng in his "Commentary on the Celestial Sphere" and the phrase:

"The whole sky is like an egg. The celestial body is round like a pellet, the Earth is like the yolk inside, isolated within the sky. The sky is large, the Earth is small. The inside of

the sky contains water. The sky encases the Earth, like a shell covering the yolk. Heaven and Earth are both held up by Qi, floating on the water."

Also, in the "Inner Canon of the Yellow Emperor - Su Wen" Five Elemental Movements and Great Theory, it is recorded:

"The Emperor asked, is the ground then underneath? Qi Bo said, the Earth is underneath man, while at the center of the Grand Void. The Emperor asked, and yet? Qi Bo said, it is lifted by the great Qi."

Which means the Yellow Emperor asked what is beneath Heaven and Earth?

Qi Bo said there is nothing beneath Heaven and Earth, it is a vast void.

Then the Yellow Emperor asked what the vast void is?

Qi Bo said, Heaven and Earth float within that space.

Unfortunately.

Due to various reasons, ancient Huaxia never developed a complete theoretical system of the round Earth theory, with each dynasty having scattered supporters, only starting to truly improve during the Ming Dynasty.

Of course.

Given the current timeline of 1100, it's relatively not too far from the Ming Dynasty (compared to the Han and Tang), so supporters of the round Earth theory were not particularly rare and certainly not considered heretical.

The Zhang Zai mentioned by Old Su was the most famous scholar of the round Earth theory during the Song Dynasty.

In his most important work "Zheng Meng," Zhang Zai once said a few sentences:

"The Earth is pure yin condensed in the center, the sky is floating yang moving on the outside, this is the regular form of Heaven and Earth."

"The stars do not move, purely aligned with the sky, and do not end with the floating yang in motion. The sun, moon, and five planets move against the sky, encompassing the Earth."

"The Earth is within Qi, even if it spins left in harmony with the sky, the stars attached will follow."

Of course.

The "stars" in the second sentence don't refer to stars as we know them but to fixed celestial bodies.

Apart from this.

Zhang Zai also believed that objects fall because 'all things have magnetism':

There is a space deep below the ground where the soil has a special magnetic force, which attracts objects to fall.

And humans aren't completely absorbed into the Earth's core because they are blocked by surface soil.

So he warned later people not to dig too deep into the ground, lest they dig away all the surface soil and cause everyone to be pulled into the center of the Earth.

Frankly speaking.

From the perspective of later generations, many points of Zhang Zai's arguments were actually quite incorrect.

For instance, the force that attracts objects to fall is not magnetism, and the 'surface' beneath our feet is extremely deep, over six thousand kilometers.

Even the future Mao Xiong's Kola Superdeep Borehole reached only 12,262 meters deep.

If we imagine the Earth as a building with thirty floors, each floor separated by 20 steps.

Then future people would only just be standing at the entrance of the top floor, having descended...

A single step.

So, don't worry about collapsing the ground, even if the Earth did nothing and let you dig, humanity could never hollow out the Earth.

But still, the point is.

Judging a viewpoint from a thousand years ago with the relatively formed knowledge system of later generations is meaningless in itself.

The viewpoints of Zhang Zai can be said to have already reached the pinnacle of the time, and in nature, have touched upon the realm of gravity.

Regrettably, Zhang Zai was not a professional physicist and had not gone through much education in physics knowledge.

So after proposing his viewpoints, he didn't have the capability to prove his reasoning, instead turning to speculate on Neo-Confucianism.

However, influenced by Zhang Zai, Old Su clearly possessed some related understanding, which is evidently a good thing.

Therefore, upon hearing Old Su's words, Xu Yun nodded slightly to him, admiringly saying:

"Mr. Hengqu's knowledge is profound, though his notion of magnetism isn't entirely accurate, it's very close to the truth."

Then he stomped the ground, his cloth shoes making a solid and dull contact sound with the surface:

"According to the notes from Wind Spirit Moon Shadow Sect, the land under our feet is called Earth, a nearly spherical body.

And the force that attracts objects downward is what we call gravity."

.....

Note:

Afraid of being accused of padding content, an explanation: these two chapters set up a very long-term foreshadowing, one of the top three in importance in this book, everyone might consider keeping an eye here.

By the way, there should be ten fan titles this month, everyone can pay attention to the comment section, there are four alliance leader bosses, probably only available to helmsmen and above.

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Tip: You can use left, right keyboard keys to browse between chapters.

Chapter 156 131 Newton: So love will disappear, right?

[1,304 words]

In front of the blackboard.

After listening to Xu Yun's speech.

Old Su slightly bent down, picked up a small pebble from beside him, and released it after picking it up.

A soft plop was heard.

The pebble naturally fell back to the ground.

"Gravity..."

Then Old Su repeated the word, with a thoughtful expression:

"The name is quite interesting, but Xiaowang, how should the 'heavy' in gravity be explained?"

Xu Yun thought for a moment and then said the answer he had prepared long ago:

"The 'heavy' in gravity refers to the weight of an object.

That is to say, any object with mass, no matter how small, will generate gravity along with it."

Old Su squinted his eyes slightly, simulating in his mind by replacing the stone with sand grains.

After accepting the concept, he continued to ask:

"So, Xiaowang, where does gravity come from?"

Upon hearing this question, Xu Yun's expression became slightly solemn, and he said:

"It is said that a long time ago, a sage named Shi Hao from the Wind Spirit Moon Shadow sect was extraordinarily wise from a young age.

He discovered that in all things in the world, every object with mass exerts a force on other objects with mass.

He named this force universal gravitation, and gravity is a component of this gravitational force on Earth.

Gravity acts vertically downward, causing all objects to freely fall once they are unsupported."

After saying all this.

Xu Yun looked at Old Su, fearing that this master would ask, "What is the essence of universal gravitation?"

After all, the essence of universal gravitation is a concept that even future generations have never had a definitive conclusion on.

As is well known.

Although Little Niu discovered universal gravitation, what he actually found was the mathematical definition of it, rather than the physical concept of universal gravitation.

The physical concept's understanding had to wait until Einstein proposed the theory of relativity, only then did the world gain a further understanding of universal gravitation:

The essence of universal gravitation is the curvature of space—or rather, it is not only space but the four-dimensional spacetime that is curved.

According to the theory of relativity.

Spacetime is a whole, and using physics terminology, flat spacetime is called "Minkowski space."

Curvature means the metric of the flat Minkowski space has changed.

At the same time.

General relativity posits that it is the mass of materials that causes spacetime to curve.

And objects move along the shortest path in four-dimensional spacetime (geodesic motion), their movement form appearing as universal gravitation.

Let's take Xu Yun's previous example.

Xu Yun lands.

Little Niu says:

Oh, that's because Earth's gravity pulls Xu Yun to the ground.

Einstein says:

No, it's because Earth's mass causes the surrounding four-dimensional spacetime to curve, so Xu Yun falls down.

Xu Yun (in physics terms, called a test particle) falls from a tree, and from the perspective of four-dimensional spacetime, Xu Yun travels the shortest distance from the tree at a certain time to the ground at a certain time.

This means Xu Yun is moving along the four-dimensional geodesic.

The projection of this four-dimensional geodesic movement in three-dimensional space is Xu Yun's falling trajectory from the tree.

Therefore, in later generations, the explanation of universal gravitation in the three theoretical mechanics is completely different.

In Little Niu's classical mechanics, gravity is considered a basic force generated by mass.

Einstein's general theory of relativity attributes gravity to spacetime curvature.

Quantum mechanics suggests gravity arises from the exchange of gravitons between substances.

Which viewpoint is right or wrong is unknown, and debates continue to this day—Science magazine, on its 125th anniversary in 2018, still listed this issue as one of the 125 most challenging scientific questions.

Indeed.

Just like bicycles, it's a topic mentioned in middle school physics that still lacks a conclusive answer in modern science.

Among the three points above, classical mechanics' qualitative range of gravity is relatively limited, and it often can't even be applied.

So, some people always claim that general relativity has negated classical mechanics, which is quite an unreasonable statement.

Even in a novel written by Xu Yun in a previous life, where the protagonist time travels and meets Little Niu, there are comments like 'Why look for Newton, classical mechanics is nonsense.'

In reality.

The way to judge whether classical mechanics is correct is actually very simple—just see if it has real-world applications.

It allows you to build planes, drive tanks, construct buildings tens or even hundreds of meters tall, and dive very deep underwater.

It can be applied in various fields of our macroscopic world, so it is very successful.

At least in the macroscopic world we can currently observe, you can absolutely trust it.

Remember the pendulum experiment:

Replace the pendulum with a beheading knife, then release it.

Put your neck 0.01 cm higher than the original position; would you dare to do it?

Anyway, Xu Yun dared and actually did it, using an iron ball the size of a human head.

Compared to classical mechanics, relativity and quantum mechanics discuss a broader scope.

That is the high-speed micro world, often involving powers of ten to the eight or nine, so classical mechanics doesn't work well.

In summary.

Each of the three has its adaptation fields, and classical physics remains strong and necessary in life.

Considering the Northern Song Dynasty period, it might still be possible to understand the micro world, but to understand relativity and quantum mechanics... well...

Unless Old Su can survive poetically to 130 years old, otherwise it's simply impossible.

Therefore, Xu Yun's idea was to discuss gravity within the domain of classical mechanics, conveying knowledge based on classical mechanics as the foundational framework.

Returning to reality.

Perhaps because he didn't have a direct concept of gravity.

After listening to Xu Yun's explanation, Old Su didn't further explore the origin of this 'force.'

Instead, he was filled with a new sense of wonder.

He opened his palm, waved it beside Xiaozhao, then looked at Xu Yun:

"Xiaowang, according to you, there is a gravitational force between objects.

Then why do I not feel any attraction even though Xiao Zhao and Xiaoli are so close?"

Xu Yun looked up at Xiaoli and Xiaozhao, who appeared a bit confused, and smiled as he explained:

"Master, according to Shi Hao, universal gravitation is the weakest class of force in the world.

This force is hard to detect, even less perceptible than a summer mosquito bite, so it's normal for you not to feel it."

Hearing Xu Yun's explanation, Old Su hadn't reacted yet, but Xiaozhao, who hadn't spoken much, couldn't help but say:

"Mr. Wang, since this so-called 'gravity' is too small to detect, how do you know it truly exists?"

Xu Yun immediately gave an approving look to this backup singer and then pointed to a simple device assembled beside him:

"Of course, it's through this."

This set of equipment is about forty or fifty centimeters high, made from tools found by Mr. Xie.

Earlier, when Old Su was trying out chalk, Xu Yun was tinkering with this thing.

And it was quickly assembled because its materials weren't too complicated:

The main part of the equipment is a torsion balance that is not exactly like the ones from the later era, but serves a similar function—yes, a torsion balance:

The prototype of the modern torsion balance was created by Father Michel of the Royal Society of the United Kingdom in the 16th century, optimized in the 18th century, and finalized as the modern torsion balance.

But before that, various ancient civilizations had relatively primitive torsion balances.

For example, the torsion balance invented by Old Su during the Song Dynasty.

At the time, Old Su, while supervising the Water Transporting Celestial Observation Platform, designed a classical torsion balance for calculating torque.

His tool diagram was also included in the "Shao Sheng Astronomical Instrument Manual."

And at this moment.

This torsion balance was attached to a stand by a strong steel wire, with two iron balls, one large and one small, placed at its ends.

There was a small mirror on the steel wire, not very precise but capable of normal reflection.

Indeed.

Seeing up to this point.

Students whose physics teachers hadn't fainted might have already guessed.

The experiment Xu Yun was about to conduct is the famous...

Cavendish torsion balance experiment.

....

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Chapter 157 132: "Regarding Matters Containing a Large Amount of Popular Science in This Chapter, Thus Suggesting Cautious Subscription"

[826 words]

Speaking of scientists whose contributions don't match their fame, many people might immediately think of one name:

Tesla.

But in reality,

although Tesla was highly capable, he was nowhere near as absurdly divine as the rumors suggest.

For instance, the saying "Einstein represents the upper limit of humanity, while Tesla is the lower limit of divinity" is completely unfounded.

Today's Tesla has actually been heavily embellished, mythologized, and even demonized.

To put it simply, he has been deified.

Tesla first appeared in the public eye, probably due to a 2009 documentary on the Science Channel:

"Scientific Superman: Nikola Tesla."

This documentary could be called the source of all evil, backing various rumors about Tesla in a serious tone, leaving many with a fixed stereotype.

Then, in 2015, the director, writer, and producer of this film all emigrated.

Up to now,

these rumors have become so numerous that we can no longer debunk them all.

Such a situation has far exceeded what the term 'ignorance tax' can describe. Some—note, just some—descriptions of Tesla can even be considered anti-intellectual.

Let's put it this way.

More than half of the Baidu entries related to Tesla are rumors.

For example, the rumor that in 1912 (or 1915 in other versions), due to their contributions in electricity, Tesla and Edison were both awarded the Nobel Prize in Physics.

But both refused to accept it.

The reason being they couldn't stand sharing the honor with the other.

Some marketing accounts use this rumor as a template, claiming that in the first thirty years since the establishment of the Nobel Prize in Physics, Tesla alone was selected as a winner nine times, and twice together with Edison.

And he gave up all eleven Nobel Prizes, as divinity scorns mortal honors.

But in fact, it's not just the last eleven times; even the initial one is fabricated:

The Nobel Prize in Physics in 1912 was awarded to Niels Gustav Dalén, and in 1915 to William Henry Bragg and William Lawrence Bragg.

Throughout Tesla's life,

he was only nominated for the Nobel Prize in Physics once in 1937.

This was his only nomination in his life, and he did not win the prize, let alone reject it.

Similar rumors are as numerous as cattle, too many to count clearly.

They are completely fabricated falsehoods or attributing others' contributions to Tesla.

Due to the problem of information barriers, these stitched-together sayings have been believed by many who don't know the truth and continue to this day.

Another reason for Tesla's deification is Edison, because this great inventor once did two very unscrupulous things:

First, he electrocuted an elephant with alternating current and filmed it with his own invention of the camera, flaunting it everywhere. This video can still be found online today.

Second, he specifically invented the electric chair powered by alternating current and persuaded the government to use it as a tool for executions.

The killing process with this thing is extremely brutal, basically tying people up with coils and electrocuting them alive.

With these two indelible stains, the reverse promotional effect for Tesla is particularly good.

Objectively speaking,

Tesla cannot be considered a top-tier basic scientist, but he can be considered a top-tier applied scientist or engineer.

The biggest difference between basic scientists and applied scientists is that basic scientists discover the natural laws of the universe, which are the most original discoveries and research results.

They are the foundation of all inventions and creations, like Little Niu, Einstein, and today's Elder Yang.

Applied scientists or engineers, on the other hand, turn basic scientific theories into practical technologies.

Their goal is to invent new tools or enhance production levels for social production and life.

In short.

Tesla's position in the history of human physics cannot be ignored, and it's not necessary to demean him as worthless; in today's context, winning one or two Nobel Prizes would certainly be achievable.

But he should never be made into a deity, as this is unfair to many truly contributing predecessors and harmful to the scientific community.

And compared to Tesla,

there's someone who better fits the definition of 'being overlooked.'

This person is...

Cavendish.

Cavendish, a name that's familiar, yet somewhat unfamiliar to people.

Often,

the popularity of the character of the same name in the anime "One Piece" is much higher than this real-life figure.

Most people's impression of him is usually limited to his measurement of the gravitational constant using a torsion balance, and even some classmates like Xian Weiren have long forgotten about it.

But in fact,

this outstanding person hides far deeper than anyone can imagine.

And here's a question:

If you had the chance to discover Ohm's Law, Coulomb's Law, and other achievements worthy of being recorded in history, what would you do?

Presumably, most people would choose to publish them and enjoy this fame until their death, right?

But Cavendish was different, his approach was...

to let these theories rot in his manuscripts, never publishing them till death, can you believe it?

Honestly speaking,

even when Xu Yun himself learned about this during his doctoral studies, a trace of doubt arose in his heart.

However, the people testifying to this matter are extremely influential, so much so that they can be called one of the most top-tier bosses in human history:

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Chapter 158 158: 132 Zhang "About This Zhang Containing a Large Amount of Popular Science, Therefore It's Recommended to Subscribe Carefully"_2

[857 words]

His name is Maxwell.

The very same Maxwell who wrote Maxwell's Equations, laying the foundation for the modern electromagnetic field theory, without whom there might not even be mobile phones, and whose personal ethics are considered exemplary, the ultimate boss.

Late 19th century.

When Maxwell was invited to establish the Cavendish Laboratory, he personally discovered twenty bundles of mysterious manuscripts in a box left by Cavendish.

Of course.

Some people later added a mysterious touch by describing the box as if it was a puzzle box that required solving certain problems to open.

For decades after Cavendish's death, only Maxwell could solve this mystery.

However, it's a pity.

Maxwell's method of opening it wasn't so mystical; he just used some physical means:

He broke the lock with an axe.

These manuscripts are currently housed in Room 6 of the Percival David Collection at the British Museum, and years ago, the Louvre even argued over it with the British Museum.

At that time, the Louvre believed these manuscripts were discovered by Maxwell and should therefore be collected by the Louvre.

The British Museum retorted that an artsy museum like them couldn't understand a single thing about physics manuscripts, rejecting the request.

According to the manuscript records.

Between 1772 and 1773.

Cavendish conducted an experiment called the concentric spheres experiment.

This experiment was the first to accurately measure the relationship between electrical force and distance, with an index deviation of no more than 0.02.

Later, the French Coulomb verified his discovery through experiments, thus the law of interaction between charges was named Coulomb's law.

Compared to Coulomb's torsion balance experiment, Cavendish's concentric sphere experiment was not only earlier but more accurate.

Although later measurement accuracy reached the magnitude of 10^{-16} , Cavendish's experimental principles were still used.

If he had published these findings, what we know today as Coulomb's law might have had a different name.

Additionally.

Cavendish was the first to propose the concept of electric potential, noting the proportional relationship between electric potential and current.

Since there were no instruments at the time to measure current, Cavendish used his body as an experimental instrument.

He estimated the strength of the current based on the numb feeling in his body, discovering that the electric potential (difference) across the conductor is proportional to the current passing through it.

This is also what we know as Ohm's law in our physics textbooks.

Meanwhile, Cavendish, along with Faraday, advocated that:

The capacitance of a capacitor changes with its medium and is affected by the material inserted between its plates.

Based on this, he proposed the concept of dielectric constant.

And because he conducted so many electrical experiments, he also proposed that around every charged object there exists "electricity," which is very close to the concept of electric field theory.

Impressive, right?

But that's not all:

In one accidental experiment, Cavendish unexpectedly discovered a situation:

Some metals, when reacting with acid, produce a "flammable air."

This "flammable air" is hydrogen.

But at that time, there was no common understanding of this gas produced by the reaction, and Robert Boyle referred to all produced gases collectively as "artificial air."

However, Cavendish disagreed.

He insisted it was a new substance.

So he used the now common method of water displacement to collect some hydrogen.

After drying and purification processes, he successfully determined the density of hydrogen.

Of course.

The most important part of this experiment wasn't determining the density of hydrogen, but discovering that mixing two gases surprisingly produced water.

This caused quite a stir at the time because the chemical community widely believed that water was one of the elements that composed all things:

The then "four elements" theory included water, earth, air, fire, believing water couldn't be decomposed further.

Because of this, Cavendish was even stripped of some knighthood honors, and his annual income suddenly dropped to the equivalent of fifty or sixty million today.

Yes, fifty or sixty million.

Quite a sad story—Cavendish was born into a large family and, due to choosing the right side, was virtually a financial giant, which allowed Cavendish to conduct so many experiments.

What was even more unexpected was this:

Cavendish also found that about 1/120 of the air consists of a gas that almost doesn't react, which are the rare noble gases.

When were noble gases truly discovered?

The answer is more than a hundred years after Cavendish's passing:

In 1895, Ramsey discovered argon using yttrium uranium ore, confirming Cavendish's genius conjecture from back then.

Aside from the numerous contributions above.

Cavendish was most famous for the torsion balance experiment.

But interestingly enough.

It's precisely this most famous torsion balance experiment of Cavendish's that has been misunderstood by the world.

The torsion balance he used was actually designed by Michel, that previously mentioned Father Michel, and Cavendish was not the true inventor.

After Michel's death, the device changed hands several times before it finally reached Cavendish.

Then Cavendish made several meticulous modifications to the device and began a lengthy measurement that lasted 25 years.

Also worth mentioning:

What he measured with the torsion balance was not any gravitational constant.

He actually intended to measure the Earth's density and mass to assist the popular astronomical research at the time and, in doing so, verify the existence of gravity.

The operation of this experiment wasn't complicated:

First, in a stationary state, light was shone on a small mirror, and the light would be reflected to a faraway place.

Then immediately mark the position where the light spot appeared after being reflected.

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Chapter 159 132: "Regarding Matters Containing a Large Amount of Popular Science in This Chapter, Thus Suggesting Cautious Subscription"_3

[944 words]

Subsequently, there is gravitational force between objects, so just place two iron balls C and D of the same mass near the two iron balls A and B on the torsion balance.

Then gravitational force F_1 will be generated between A and C, and gravitational force F_2 will be generated between B and D.

The magnitudes of the two gravitational forces are different, somewhat resembling a tug of war in later generations.

So at this time, the torsion balance will slightly deflect, and the reflected far point will also move a greater distance.

According to Cavendish's experiment records.

He calculated the density of the Earth to be 5.481 times that of water, which is 5.481 grams per cubic centimeter.

Compared with the data of the 21st century, this is only a 0.65% error.

As for the gravitational constant G , Cavendish actually did not calculate it, after all, the cognitive system at that time was still not fully developed.

But in his experimental records, the data for calculating G is already quite complete, yet it is just a conceptual understanding.

Even today's high school students can easily calculate the gravitational constant, and quite accurately.

So people later decided to award the title of measuring the gravitational constant G to Cavendish in honor of this great experimental physicist.

In fact, given Cavendish's learning, if he chose to publish his results, his fame would certainly be much greater than it is now.

If we have to look for a reason.

It's probably because God spent too much ink depicting his wisdom, that He could not draw a better personality for him.

For example, although he was exceedingly wealthy, he wore nothing but a faded velvet coat and an outdated tricorne hat for years.

His character was reclusive and reticent; he hardly dared to converse with strangers and the opposite sex.

Even when communicating with his hired steward, he only used note-passing methods to avoid awkwardness.

He was the largest depositor in London Bank, but he was completely indifferent to his wealth.

For decades, he instructed his investment advisor to only buy one kind of stock, unchanged until his death.

When a servant's parents had a fever, he directly gave a medical fee equivalent to three hundred thousand in later generations.

Moreover, he complained more than once in letters to friends about having too much money and not knowing how to spend it.

In fact, big figures like Cavendish are not uncommon in history, for instance, Gauss was a very typical example.

After Gauss died, he left a bunch of unpublished manuscripts, and whoever could interpret them in the next 50 years was considered a big shot.

The sight returns to the original place.

The core of Cavendish's torsion balance experiment, simply put, is two words:

Amplification.

Cavendish used three amplifications in his experiment:

Firstly, converting force into torque, amplifying the force.

Secondly, using the law in geometric optics, that when a plane mirror rotates θ , the reflected light rotates twice θ , amplifying the angle.

Thirdly, converting angular displacement into linear displacement, using a ruler to measure the displacement of the reflected light spot, calculating the rotation angle, amplifying the macroscopic displacement.

These three amplifications are the innovative points of this experiment.

Certainly.

Considering the tools Xu Yun can currently find, conducting a torsion balance experiment in the Northern Song might have significant errors.

But do not forget.

The goals of him and Cavendish also differed:

Cavendish conducted the torsion balance experiment firstly to verify universal gravitation, and secondly to calculate the Earth's density and mass through data, and the information collected also deduced the gravitational constant.

Whereas Xu Yun right now only needs to reproduce the phenomenon and prove that there is gravitational force between objects, without needing to calculate specific values.

As for the slender light beam needed for the experiment, it's not difficult:

Some marketing accounts in later generations introduced Cavendish's experiment saying he used lasers, and it didn't seem to be a problem.

But as long as you understand the history of technology, you will know:

The principle of lasers was invented by Einstein in 1916.

Therefore, Cavendish's real operation was to first move the equipment into a dim room and fix the position.

Then, using the inverse relation between the divergence angle and the radius of the light spot, $w_0 \times 2\theta_0 = w_0' \times 2\theta_0' = 2\lambda/\pi$ as the design basis, simply making a glass lens would do.

A quarter of an hour later.

The entire set of equipment was debugged to completion.

Xu Yun asked Mr. Xie to stand outside the room, with a tool similar to a selfie stick stuck into the ground beside him.

The lens was fixed to the top of the tool, which could be rotated simply.

A few minutes later, Xu Yun said:

"Old Chief Steward, you can start now."

Mr. Xie nodded and had no objections to Xu Yun's instructions:

"Understood."

Then he slowly rotated the lens according to Xu Yun's previous instructions, beginning to calibrate the light.

Xu Yun's gaze remained fixed on the mirror, closely watching the changes in the light.

After a while, he suddenly said:

"Stop! Right at this position!"

Mr. Xie hurriedly stopped the rotation.

Then Xu Yun turned around and said to Xiaozhao:

"Prince Jian, could you please mark the position of the light spot on the wall with chalk?"

Xiaozhao obediently took a piece of chalk and walked to the wall.

He drew a thumb-sized white dot at the position of the reflected light spot:

"Mr. Wang, is this okay?"

Xu Yun nodded at him and then said to Old Su:

"Elder, it's our turn."

Old Su, upon hearing this, rolled up his sleeves and picked up an iron ball from the table, approaching the small iron ball on the left side of the torsion balance.

Xu Yun picked up another iron ball and approached the large iron ball on the right.

As the iron balls approached, some imperceptible changes occurred.

In less than a moment.

Xiaozhao at the wall suddenly narrowed his eyes and exclaimed in surprise:

"Junior Master, the light spot... moved!"

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Chapter 160 132: "Regarding Matters Containing a Large Amount of Popular Science in This Chapter, Thus Suggesting Cautious Subscription"_4

[678 words]

Old Su was taken aback by the words and turned to Xiaoli beside him, beckoning:

"Qingzhao, hold this ball for me."

After simply handing the ball over to Xiaoli, Old Su quickly rushed to the wall and began to carefully examine the light spot.

At this moment.

The light spot had already disappeared from the place marked by the chalk and moved to.....

Another side, approximately one foot long!

Old Su's heart suddenly skipped a beat.

Before the experiment began, he had personally checked those four iron balls.

He could guarantee that there was no magnetic attraction between the iron balls, and there wasn't the slightest bit of wind in the room.

Also during the experiment, Xu Yun and he did not touch the torsion balance.

Therefore, theoretically speaking.

The entire torsion balance combination should always be in a balanced static state, it should not deform due to the proximity of the iron balls.

That is to say...

After being amplified by some technical means, they indeed witnessed the existence between objects of...

Gravity!

The impact of this concept on Old Su was far greater than the explanation of gravity—after all, Old Su... or rather many sages had long been curious about why objects fall and had made hypotheses.

Although the guesses differed somewhat from gravitational theories, the nature of such force is still similar.

It's just that in the deepest part of Earth, there is no kind of real special soil attracting objects using magnetic force.

Thus, while the definition of gravity somewhat conflicted with Old Su's understanding, it wasn't to the extent of a worldview collapse.

However, the experiment at hand proves that between any two objects on the ground—be it between people, objects, or people and objects, there's a faint but tangible attractive force!

This is a notion that no one has ever mentioned from ancient times to present!

The concept of gravity is almost like in later times, you finally meet your online lover on Valentine's Day and plan to flaunt your relationship in your social circle.

Then you find out upon meeting that the other party is a fake, with looks drastically different from their photos, proportions completely off, with three measurements all being 120, height 160, and weight 160.

Such mental shock, although significant, is not enough to drive you insane.

But the concept of gravity is different.

It's not within the range of a fake. It's like finding your wife is a 6-meter tall skeleton after meeting in person!

Such a level of mental shock could likely lead to most people having a collapse of worldview or even being frightened to death alive.

But on the other hand.

This is also a clear fact before everyone's eyes. Even if you were really scared to death, it couldn't change its existing nature.

Thinking of this.

Old Su couldn't help but raise his head and look towards the light source outside the house.

At this moment.

This tiny light source was like a portal, slightly unveiling a corner of the world's truth...

It was a field he had never thought of or touched in the past decades...

Then he forced himself to calm down, paid no attention to the equally shocked Xiaoli and Xiaozhao, and turned to Xu Yun asking:

"Xiaowang, if my memory serves me right, you mentioned before...

The earth beneath our feet and the stars of the world are all round?"

Xu Yun nodded and answered:

"That's right."

Upon hearing these words, a light immediately flashed in Old Su's eyes.

His tone even carried a hint of anticipation:

"Since gravity can be reliably proven by physical objects, then Xiaowang, do you have concrete evidence for the claim that stars are round?"

Xu Yun was silent for a moment and still nodded:

"Yes."

.....

Note:

It's been a long time since I've written such a serious science popularization chapter. Actually, it was quite tiring to write, after all, I have to be responsible for what I say, and can't fabricate things or make false claims....

I've written a few science popularization chapters in the previous book, and the response has been quite good, new readers can rest assured that these large-scale

popular science chapters will not appear often, probably only once every hundreds of thousands of words.

This is a super long chapter, please give me some monthly votes....

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Tip: You can use left, right keyboard keys to browse between chapters.

Chapter 161 133: Cramming Education is Unacceptable (6,400-word Long Chapter)

[917 words]

Throughout the long history of mankind.

The debate over the correctness of the round Earth theory and the flat Earth theory has always been a highly controversial topic.

Previously, when introducing Zhang Zai, the origin of the round Earth theory was mentioned:

It is generally believed that the round Earth theory officially appeared in the 6th century BC.

That is when the Ancient Greek mathematician Pythagoras first proposed the concept of the Earth.

Then by the 3rd century BC.

The scientist Eratosthenes, living in Alexandria, established the concept of the Earth using geometric methods and calculated the Earth's diameter.

However, what was not mentioned at the time is that Eratosthenes's method was actually quite clumsy:

He accidentally learned that on the summer solstice every year, the Sun's rays would directly hit the bottom of a deep well in Sai, which is in Aswan, Egypt.

At the same time.

In Alexandria, about 5000 Greek miles directly north of Sai, there was an angle of $2\pi/50$ radians, or 7.2° , between the Sun's rays and the perpendicular line to the ground.

Assuming the Sun's rays are parallel.

Then, based on the formula for circumference, a value could be derived:

The Earth's circumference along the meridian passing through the north and south poles = $5000 \times 2\pi \div 2\pi/50 = 250000$ Greek miles.

This is just a theoretical deduction that only unified some people's understanding.

In reality, the round Earth theory did not KO the flat Earth theory with one punch as soon as data or formulas were solved.

Throughout human history.

Almost every dynasty has had people who did not believe in the round Earth theory.

Even in the later 21st century, supporters of the flat Earth theory are not uncommon.

For example, now every year there is a flat Earth conference held across the sea — the recent one had over 600 people attending in person.

The online attendees reached 124,000 real people, and the domestic live streaming platforms easily had millions of viewers.

YouTube is also filled with various videos claiming to prove the Earth is flat.

Nowadays, local amateur scientists are considered a pejorative term, like seeing all sorts of designs resembling the Eight Trigrams in architectural drawings, or scribbles akin to Xu Yun's calligraphy.

But in front of flat Earth supporters, these amateur scientists hardly hold up.

Flat Earth supporters believe the round Earth theory is a complete hoax:

The photos of the Earth from outer space are fake images taken by rulers to confuse us, a pseudo-truth to enslave humanity.

Among them, NBA star Owen is a well-known flat Earth supporter.

To be precise.

He is a 'believer' of the "Pacman Sect":

This sect believes the Earth is flat, and if you reach the edge of the Earth, you will instantly appear on the other side, preventing you from discovering the Earth is flat...

Kangaroo Country is the opposite nation, there was even a time when a singer with minor brain atrophy was revered by them as a defective product of stopped time.

By the way.

Another star, Curry, believes the moon landing is fake, a complete hoax.

Without exaggeration.

In the Flat Earth Sect, various bizarre statements are almost innumerable.

They fly the banner of not blindly trusting authority (which in itself is not incorrect), but engage in all sorts of anti-intellectual and even terrifying activities.

In reality.

The Flat Earth is a key point in the Communist Party's layout, as well as the core basis of conspiracy theories.

The details are too sensitive, so they will not be elaborated here.

In conclusion.

This world is far crazier than we imagine.

For posterity, it's already like this, not to mention the ancient times when the round Earth theory was not an axiom.

Let's talk about the three people in the room now:

Old Su, having drawn star maps as a professional astronomer, is more inclined to accept the round Earth theory compared to others.

He even inherently has some tendency to believe the Earth is round.

But Xiaoli and Xiaozhao are different.

Although these two young people are very interested in science.

They have never undergone any systemic and correct scientific education.

So when Xu Yun earlier mentioned that the Earth is round, they naturally developed some doubts in their hearts.

If it weren't for noticing Old Su listening with great interest.

Xiaoli might have already interrupted Xu Yun, angrily expressing skepticism.

In the room.

Looking at the excited Old Su and the confused Xiaoli, Xu Yun pondered for a moment and said:

"Master, have you been to the seaside? — I mean an ocean as vast as the eye can see."

Old Su nodded upon hearing this and recalled:

"Nine years ago, I was ordered to Deng Prefecture to investigate naval provisions, and I indeed saw the ocean.

Truly an endless water connecting to the sky, which left me almost speechless with awe."

Deng Prefecture.

Which is today's Penglai City in Ludong Province.

This place has the renowned Dengzhou Port, also the core stationing place for the Song Dynasty navy.

Penglai, adjacent to the Bohai and Yellow Seas, truly deserves to be called vast and boundless.

Then Xu Yun turned his head and looked at Xiaoli and Xiaozhao.

Xiaoli, after pondering for a moment, shook his head:

"My father once served as an official in Huang Prefecture, only having seen the river, not the sea."

Beside him, Xiaozhao glanced at Xiaoli and slowly said:

"Unlike Miss Li, I went to Changguo County two years ago to purchase medicinal herbs for Brother Wang.

Changguo is adjacent to the East Sea, so I was fortunate enough to witness the ocean's majesty."

Changguo during the Song Dynasty is today's Zhoushan in Zhejiang Province.

It is connected to the East Sea, also serving as an entry point to a vast world.

Two out of three people have seen the sea.

Though not a perfect ratio, it far exceeds Xu Yun's expectations.

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Tip: You can use left, right keyboard keys to browse between chapters.

Chapter 162 133: Cramming Education Is Not Advisable (6400 Words Mega Chapter)_2

[942 words]

Subsequently, Xu Yun pondered for a moment and asked Old Su and Xiaozhao:

"Gentlemen, Prince Jian, while you were admiring the sea view, did either of you happen to see a sailing ship approaching from afar?"

The appearance of sailing ships in ancient Huaxia has always been a topic of debate among later generations, mainly divided into two perspectives: the Spring and Autumn theory and the Han Dynasties theory.

However, regardless of which of these scenarios, the timeline is far earlier than the current Song Dynasty.

Therefore, at this time, sailing ships are quite common, especially by the seaside.

Hence Xiaoli and Old Su just glanced at each other and nodded in unison, saying:

"Of course, we have seen them."

Xu Yun nodded slightly to the two of them, took a deep breath, and presented his trump card:

"In that case, when you saw those ships, did you notice one particular thing?"

"What thing?"

"Which part of the ship first appeared in your view?"

Upon hearing Xu Yun's words, Old Su and Xiaozhao were momentarily stunned.

"Which part?"

Xiaozhao, having seen the sea only two years ago, had relatively fresh impressions and spoke first:

"If I'm not mistaken... on that day, when I climbed high to observe the sea, I first saw the white sails, and then the hull..."

Hearing Xiaozhao say this, Old Su recalled some images as well.

He couldn't help but nod in agreement.

However, as he continued to think, he suddenly realized something.

He abruptly widened his eyes, looked at Xu Yun, and his mouth began to tremble slightly:

"Xiaowang, are you saying we first saw the sails because the Earth is round, and the sea blocked the hull behind?"

Xu Yun paused for a moment and then nodded solemnly and firmly:

"That's correct."

From a ship at sea, the sails are seen first, then the hull.

This was a crucial piece of evidence Aristotle once cited to demonstrate the shape of the Earth.

Of course.

In real life, relying solely on the naked eye to verify this claim is actually quite troublesome.

Because, according to the calculation $R^2 + d^2 = (R+h)^2$, a person with a sightline height of 1.75 meters can see the horizon up to 4.65 kilometers away.

If you stand on a mountain or a tall building, the range you see expands even further.

In this visual range that spans several kilometers, most people actually find it difficult to distinguish between sails, masts, and hulls.

In such cases, the so-called first sighting of the sails is largely due to the conspicuousness of the sails, having little to do with the sea level.

But it's worth mentioning.

The places like Deng Prefecture and Changguo are quite special, different from the usual coasts:

They are significant naval bases of the Song Dynasty, and also renowned sites for maritime trade.

Currently, it is the most prosperous period for maritime markets in the Song Dynasty, with trade connecting not the inland, but various surrounding countries.

Moreover, ships engaged in transoceanic trade are often atypically large.

For instance, the well-known ancient Song ship, Huaguang Reef No.1, which was excavated and restored.

The entire remains of the ship are 20 meters long, about 6 meters wide, with an average depth of 3 to 4 meters, which in the Song Dynasty is merely a medium-sized ship.

In Deng Prefecture and Changguo, both being maritime and military hubs.

If you are lucky, you might even see two-thousand-ton-class hybrid sailing and oared vessels.

As for the so-called two-thousand tons...

It is approximately 45 meters long, 11 meters wide, and 5 meters deep.

This equates to a thousand-ton displacement, about 40% of the largest treasure ships in Zheng He's Fleet.

This scale of large ships, as long as the weather permits, makes it still possible to distinguish the sails and hull from a great distance.

Old Su and Xiaozhao, one a former prime minister, the other the younger brother of Emperor Zhezong of Song, belong to the top echelon of the Great Song.

When they go to maritime markets, seeing such ships is as easy as drinking water.

Of course.

From a later perspective, seeing the sails first doesn't necessarily mean the Earth is round.

Because, from a hypothetical angle, there is also a possibility of a donut model.

But at this time, Old Su clearly had not thought so far, almost entirely focused on what Xu Yun said.

As the foremost astronomer not just in Huaxia, but globally at the time, without any peers.

Old Su's obsession with the stars reached a near-madness level.

It was mentioned before.

Old Su once made a telescope that could only magnify five or six times, and its observational effect was just slightly better than pure naked eye observation.

And in the year 1084.

Old Su even took this useless telescope to Tubo to observe a star in the west!

Indeed.

Tubo!

It must be noted.

Tubo under the Song Dynasty was not like the later times; at this time, Weizang and the Central Plains could be considered two different regimes, with some minor conflicts between them.

The journey from Bianjing to Tubo was not only long but also incredibly risky.

Yet, in pursuit of truth, Old Su did it unhesitatingly—the result being the 17 stars on the Su Song Star Map.

This is Old Su, a pioneering figure of the era, unafraid of life and death.

Otherwise, under the same technological level, how could Old Su draw a star map with hundreds of stars, more than Europeans, really think it's all luck?

And as a seeker who spent much effort on star charts.

While looking up at the stars, Old Su naturally contemplated another question:

What exactly do those celestial stars and the land beneath him look like?

Unfortunately.

Old Su's telescope, though called 'telescopic,' was practically useless when faced with the starry sky.

The true breakthrough in telescopes wouldn't occur until 1608, when they were invented by Hans Lippershey, and Galileo later turned them into an astronomical telescope, allowing humanity to truly see the stars overhead.

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Tip: You can use left, right keyboard keys to browse between chapters.

Chapter 163 133: Force-Feeding Education is Undesirable (6400-word large chapter)_3

[753 words]

Before that.

Even a genius like Old Su, all he could see with the naked eye were the moon and the sun as round celestial bodies.

After all, what was special about him was his mind, not some physical mutation.

But now with Xu Yun's example of the sailing ship, Old Su suddenly realized...

The truth was once so close to him!

At the same time.

Perhaps inspired by Xu Yun's words.

A memory fragment came to Old Su's mind:

More than a decade ago, he had visited Phoenix City in Ancient Feng Prefecture, the capital of the most beloved ingredients of future Guangdong Province.

On one of the nights during his stay, he relaxed in a courtyard, as usual, looking up at the starry sky.

Before long.

By habit and experience, he identified that ancient, unmoving Ziwei Star in the north.

But as he kept watching.

Old Su suddenly felt a strange sensation in his heart:

The Ziwei Star he saw in Phoenix City seemed to be a bit lower in height compared to what he saw in Bianjing...

But at that time, Old Su didn't think too much of it:

He just thought he was fatigued from the journey, and his judgment was somewhat off, so he went back inside to sleep.

After all, the decrease in distance wasn't very apparent, it was faint and almost negligible.

If he hadn't been used to stargazing, he probably wouldn't have even felt that strangeness.

But now, if it's as Xu Yun explained, that the entire land is round...

Then the issue of height can be explained:

Because the Earth is round, with the Ziwei Star at the extreme north.

The further north you go, the higher the Ziwei Star appears, and the further south you go, the Ziwei Star would...

Be lower!

That's right.

Seeing this,

many students might have guessed the identity of the Ziwei Star.

It is the future Polaris, Gouchen One!

But what Old Su didn't know was.

The so-called eternal Arctic Star he saw was not a fixed star, just a fixed title.

Just like the Emperor's throne, different people can take turns to sit on it, today's you, tomorrow's him, laughing heartily under the Chongzhen tree.

The Polaris, so romantically cherished by Huaxia, is known internationally as Ursa Minor Alpha.

In reality, it is about 30 arcminutes from the North Celestial Pole, roughly the distance of one moon.

As we all know.

Due to precession, the Earth's rotational axis constantly changes its direction in the celestial sphere.

Therefore, after some time, there will always be a star in that position.

For example, anyone who has survived from 12,000 BC to now would know, that the Polaris then wasn't Gouchen One, but Vega.

The Polaris of 3000 BC was Alpha Draconis, also known as Right Pivot.

It is a dim fourth-magnitude star, very inconspicuous in the sky—as a comparison, Gouchen One is a second-magnitude star, while Vega is zero-magnitude.

By 4000 AD, Polaris will become Gamma Cephei.

Theoretically, only three long-distance runners on Earth today might live to see that time.

By the way.

The South Pole in the celestial sphere also changes.

For instance, currently, there are no bright stars near our South Pole.

But by 8000 AD, a bright Southern Star will appear—Carina Iota, or Hai Shi Er, this one too is a second-magnitude star.

By 9000 AD, the Southern Star will be an even brighter Vela Delta, or Tianshe Three.

But Old Su did not know this mystery at the time, he only had another question in his heart.

"Xiaowang, although the example you give seems to explain the round Earth theory, it... is still not as convincing as seeing it with one's own eyes..."

He stared intently at Xu Yun, clenching his fists tightly:

"So... do you have a way... for us to see the stars with our own eyes?"

Xu Yun glanced at him and nodded:

"Yes."

Thud—

Old Su's heart gave a heavy throb, his eyes opened wide, instinctively blurting out:

"What way?"

"Astronomical Telescope."

"Astronomical Telescope? How is it to be made?"

Upon hearing Old Su's question, Xu Yun spread his hands innocently towards him:

"I do not know."

"You don't know?"

Old Su's voice suddenly rose a few notches, with an expression of intense confusion:

"How could you not know?"

Xu Yun, hearing this, gave Old Su a puzzled look and innocently spread his hands:

"Master, you don't think I'm omniscient, do you?"

Old Su was stunned.

Seeing his words seemed to have some effect, Xu Yun continued:

"Master, I have only read about such tools in the books of the Wind Spirit Moon Shadow sect, though the principles I can barely recall.

But to make an astronomical telescope capable of seeing the stars, as well as the previously mentioned Microscope, there's a problem that must be solved first."

"What problem?"

Xu Yun's eyes flashed with a mysterious gleam, saying:

"Mathematical calculations."

.....

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Chapter 164 164: Zhang 134 Calling for Reinforcements

[1,781 words]

In the astronomical community of the future, there are many types of astronomical telescopes.

According to technical principles, they can be divided into many models:

For example, reflecting telescopes, refracting telescopes, radio telescopes, etc.

The first astronomical telescope in human history, made by Galileo, was a very standard refracting telescope.

The modern Hubble Telescope is also a refracting telescope, although its diameter has reached the human manufacturing limit of a single optical mirror.

Telescopes like the James Webb Space Telescope are reflecting telescopes.

As for radio telescopes, they are much less common.

For instance, the giant radio telescope in our local mountainous region is a radio telescope, and the ticket is only fifty yuan.

As for the astronomical telescope Xu Yun mentioned, it naturally refers to the reflecting telescope, which is the most manually constructed telescope in the future.

But regardless of how simple this manual construction process is, there is an unavoidable aspect:

That is the calculation of data.

From the smallest basic imaging focus,

to the medium atmospheric disturbances,

to the large human optimization through the axial spherical aberration curve.

Almost every process requires mathematical calculations.

Of course.

Xu Yun, as a professional who has been engaged in scientific research for two generations, these data calculations do not trouble him.

With just a few basic data, he could calculate them even with his eyes closed.

But the problem is...

Is it meaningful to do so?

Scientific knowledge is not like the liberal arts where rote memorization suffices; especially for professional research and development, spoon-fed education is meaningless.

Because the research and development field needs constant updating and iteration, meaning practitioners must possess hands-on operational abilities.

The previous preparation of allicin was to address an emergency, so Xu Yun didn't have time to elaborate deeper knowledge.

But now, in a conventional physics teaching scenario, if everything is explained thoroughly, it might not be beneficial to Old Su and others.

Even in future education, teachers sometimes let students conduct experiments by themselves to verify phenomena.

Hands-on practice to break through cognitive barriers.

This is much better than purely one-sided knowledge infusion.

Therefore, this time, Xu Yun chose to be a rare person.

He pondered for a moment and said to Old Su:

"Sir, according to the notes left by the Wind Spirit Moon Shadow Sect, the construction difference between telescopes and microscopes is not great.

Both require objectives and eyepieces, but focusing... that is, mirror precision is somewhat different.

But unfortunately.....

The notes on the telescope only describe it up to this point, and the latter part was unexpectedly lost.

And the latter part is precisely the most critical step in the manufacturing process, involving a large amount of calculated deduction, and some necessary precision was lost, then the telescope..... sigh."

Old Su could not help but furrow his brows; as a boss involved in combinatorial engineering, he naturally understood what precision data truly represented:

"Xiaowang, why was the data lost?"

Upon hearing this, Xu Yun sighed, seemingly remembering some regretful matters, and explained:

"It is rumored that in a certain year and month, the sage Shi Hao was calculating whether it was possible to sever time, but unexpectedly, a person covered in red fur suddenly barged in and stole the latter half of the notes and Shi Hao's beloved milk jug.

Since then, Shi Hao became disheartened, secluded himself from the world, and is not recorded in ancient histories..."

After listening to Xu Yun's words, a trace of regret instantly appeared on Old Su's face.

Throughout the history of former dynasties, talents who secluded themselves in the fields due to disheartenment are as numerous as stars in the sky.

Some, like Tao Yuanming, lived carefree and unrestrained after seclusion, leaving future generations with a magnificent silhouette of openness amidst mountains and rivers.

Others, like Wang Rong, merely left behind a footprint or two, occasionally lamented by future generations.

And many more have become unknown, with all traces dissipating with time.

They can only be glimpsed once or twice in the county records during their seclusion, often with the words 'birth and death unknown' added afterwards.

Meanwhile.

Old Su also thought of his good friend, another Old Su—Su Shi.

Currently, Brother Zizhan is situated in Danzhou (future Hainan), and no one knows how his health is at the moment?

It is said that in another year's time, the Emperor might proclaim a great amnesty, and hopefully, Brother Zizhan will be blessed with heavenly grace by then.....

Thereafter, Old Su withdrew his thoughts back to reality and focused on the astronomical telescope.

For such a "divine artifact," he really did not want to give up.

He contemplated for a moment, with some hope, and said to Xu Yun:

"Xiaowang, although the notes concerning the telescope have been lost, you still remember the object construction, correct?"

Xu Yun pretended not to understand the purpose of this question, obediently nodding:

"That's right."

Old Su upon hearing this, his eyes suddenly gleamed with a hint of light.

He remained silent for a moment, seeming to have made a certain decision, and solemnly said to Xu Yun:

"Xiaowang, if sufficient materials and calculated deductions are provided, is it possible to reconstruct an astronomical telescope?"

Xu Yun gently responded with a hum, a trace of seriousness appearing on his face:

"Although precision data needed for the astronomical telescope has long been lost, the axiomatic basis for measurement accuracy is still there.

If we can find some manpower and materials are available, and combine principles for back deduction... there is indeed a chance to recreate an astronomical telescope..."

After hearing Xu Yun's words, Old Su immediately showed a joyful expression and turned to exchange glances with Xiaoli and Xiaozhao.

Moments later.

Only then did Old Su take a deep breath, make certain decisions resolutely, and said to Xu Yun:

"Since that is the case, we will try to see if we can restore the astronomical telescope once again!

"Such tools that allow mortals to gaze upon the heavens, buried so silently, it's truly a pity."

Saying this, he paused, and continued speaking to Xu Yun:

"Xiaowang, what people or materials are needed to create an astronomical telescope?"

Xu Yun thought for a moment and said:

"First and foremost, mirror-making craftsmen, and they must be among the best of the era.

Be it a microscope or an astronomical telescope, the true core is actually the objective lens and the eyepiece.

Especially with telescopes, if the precision of the glass lens is high enough, you could cut a bamboo stick to make the body.

So high-quality glass materials and craftsmen are essential, and of course, further processing and polishing are needed afterwards.

Oh, and that donkey must also be prepared."

In the peculiar DIY circles of the later generations, handcrafting telescopes is quite a common activity.

Its prevalence is even higher than that of crafting hand-made generators.

After all, self-made generators generally aren't useful, whereas self-made telescopes can observe distant or celestial objects.

Thus in the DIY circle, sextoys and telescopes are basically the two most common items.

There are generally three methods of making homemade telescopes:

One is to buy parts from a package directly and assemble them oneself, thereby saving on brand fees and processing costs.

Two is to buy a cheap convex lens, grind the lens to indulge in a silver mirror reaction, fully polish and assemble the entire setup.

The third is to use Gaussian Optics to formulate equations with three surface curvatures as variables to calculate spherical aberration coefficients, which is standard handcrafting.

Of course.

The third method seems primarily calculation-based, but in producing and polishing the lens, the requirement for manpower and materials is definitely as high as possible.

Thus after listening to Xu Yun's requirements, Old Su pondered for a moment before turning to Xiaozhao:

"Prince Jian, I'm afraid I must trouble you this time."

Xiaozhao placed his hands behind his back, readily agreeing:

"No problem, leave the craftsmen to me. Also list all needed materials, and we'll gather them within seven days."

On hearing this, Xu Yun quickly bowed to Xiaozhao:

"Then I must trouble Prince Jian."

"Trouble?"

Xiaozhao lifted his eyelids to glance at Xu Yun, the corners of his mouth curling into a slightly mocking smile.

However, he seemed to restrain from saying anything, ultimately remaining silent.

Currently, Zhao Ji had just ascended the throne, and apart from a few trusted aides, he hardly had any reliable high-ranking influential figures.

Although the transition of the imperial throne was relatively smooth, appearing to go well.

But for the Royal Family, having no allies in the court almost directly equates to hidden dangers everywhere.

Even Zhao Ji, regarded as an unwise emperor by posterity, in such an environment, is rather sensitive.

Thus, if Xiaozhao voluntarily proposes that craftsmen and resources are needed to create a star-gazing toy, with the entire process unfolding under Emperor Huizong's watchful eyes.

Then Emperor Huizong would not only refrain from refusal, but may even gladly satisfy Xiaozhao's requests, granting whatever is needed.

After all, among all the brothers, Xiaozhao is the one posing the greatest potential threat to him.

If he indulgently plays around, it means Zhao Ji can devote more attention to developing his inner circle.

Or at least, he can fetch more power from Empress Dowager Xiang.

In fact.

This is also one of Old Su's goals, hoping the relationship between the two brothers of Emperor Zhezong may soon ease to friendliness.

But...

Is that possible?

Thinking of this.

Old Su let out a frustrated breath, compelling himself to not ponder these political matters any further.

After all, he had already resigned and retired, some matters were merely out of sentiment, and there was no need or energy to interfere too much.

He then turned to Xu Yun and asked:

"Xiaowang, besides wealth and craftsmen, what else needs to be prepared?"

Xu Yun looked at Old Su, who had a 'My house is quite fine, you can say anything' expression, paused for a moment, and answered:

"Besides finances and craftsmen, there's only one other thing left..."

"What is that?"

"A master capable of computational deductions!"

"Computational deductions?"

Old Su repeated the term, not looking too surprised.

After all, Xu Yun had previously said that the precision of the telescope must be calculated before manufacture.

Although everyone present possesses basic mathematical knowledge, they are evidently a notch below such sophisticated manufacturing calculations.

Even Old Su himself doesn't have particularly deep mathematical knowledge.

This phenomenon is common even in later generations, where top physicists seldom cross paths with top mathematicians.

Many physicists merely have better mathematical prowess than others, excluding mathematicians.

This is true for well-established mathematical and physics systems in later generations, let alone ancient Huaxia.

Simultaneously delving deeply into two of the most complex scientific fields, even Old Su couldn't accomplish it.

Afterward, Old Su pondered for a while, and suddenly a person's image flashed through his mind.

His expression shifted, and he said to Xu Yun:

"Xiaowang, I have a friend named Han Gonglian, known as Mr. Yang Huai.

Early on, when ordered to inspect the Celestial Sphere used by the Imperial Observatory, I happened to meet this person.

This person is extremely fond of computational deduction throughout his life, his numerical prowess is exceptional, even considered among the top five in the capital.

Currently, he is idle, researching mathematics in the capital, if I ask, he would surely be willing to assist!"

.....

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- Chapter 165 135: It's Not Just as Simple as Han Gonglian -

Chapter 165 135: It's Not Just as Simple as Han Gonglian

[934 words]

Han Gonglian?

Upon hearing this name, Xu Yun's expression froze.

Unexpected, truly unexpected.

The candidate that Old Su proposed....

Is it really him?

Han Gonglian.

This is a mathematician from the Northern Song Dynasty, with very little information left behind about him, and later generations don't even know his courtesy name.

It's only in his birthplace's "Guping County Anecdotes" that there's some brief mention of him calling himself Mr. Yang Huai.

After all, nicknames in those days were like Bilibili usernames in later times, anyone could choose one.

Apart from the well-known users, only a few ordinary people, like those agreed upon by fate or the Mongolian solo top, are remembered.

However, even from those scant details preserved, later generations can still easily judge Han Gonglian's ability.

First Year of Song Yuan You.

Han Gonglian served as an official at the Ministry of Personnel, at the lowest rank of Senior Ninth Grade.

At that time, Old Su was serving as Minister of the Ministry of Personnel, obliged to inspect the Celestial Sphere used by the Imperial Observatory and to prepare to make a new instrument.

In the end, during his visit, Old Su heard that Han Gonglian was proficient in mathematics and astronomy and was a master of calculation in Bianjing.

Old Su personally visited him and informed him of the instrumental methods of previous astronomers such as Zhang Heng, Liang Lingzhan, and Zhang Sixun.

He hoped that Han could thoroughly investigate and emulate them.

Han Gonglian thus wrote a volume titled "Nine Chapters on Gougu and Celestial Measurement" and created a wooden mold of a geared wheel.

After reviewing it, Old Su believed that while it wasn't entirely like the ancients described, the design of the hydro wheel had unique features with high feasibility.

Thus, this scheme was chosen and submitted to the Court, where it was approved.

Second Year of Yuan You.

Han Gonglian was appointed as an institutional officer and began creating the new instrument.

Seventh Year of Yuan You.

The instrument was finally completed and named the Yuan You Celestial Sphere.

Meanwhile, in history, Han Gonglian is also considered the most crucial figure in the creation of the Yuan You Celestial Sphere, besides Old Su.

Therefore, it is evident.

Although Han Gonglian may not have much written about him in historical texts, his ability in mathematics was significantly above that of ordinary people.

From a certain perspective.

He was actually quite like a Portuguese player named Eder from later generations.

Previously unknown, almost no one had heard of his name, and he seldom played.

In the 2016 European Championship final, he came off the bench, scored the winning goal, helping Portugal win the championship, and then faded into silence again.

No other way.

Although mathematics developed rapidly during the Song Dynasty, the feudal dynasty was ultimately focused on personnel struggles.

Many mathematicians didn't have much chance to showcase their skills, let alone be recorded in history.

Of course.

While that's the reason.

If truly a top-notch mathematician, they should, to some extent, leave some traces in history.

For instance, Qin Jiu Zhao.

Or Yang Hui.

Or even the person who wooed away Nobel's wife, well, that doesn't count...

So, speaking objectively:

Han Gonglian should be an advanced, perhaps nearly top-tier talent in mathematics.

But the distance from the 'pinnacle of the era' is probably still quite a way off.

Therefore, Xu Yun thought for a moment.

He was still prepared to ask Old Su if he could find a few more talents like Han Gonglian.

After all, the workload for this calculation is quite large, and you can't put all your eggs in one basket:

"Sir, if as you said, Mr. Yang Huai is indeed quite a formidable candidate.

However, the steps required for the astronomical telescope's calculations are extremely complex, relying on one person may be time-consuming and laborious.

Thus, if you have other candidates, it would be prudent to find a few more skilled in calculation to assist, as a contingency strategy."

Old Su nodded while listening, seemingly accepting this suggestion.

He had seen Xu Yun tinkering with generators and electrolysis cells, knowing that some knowledge of the Wind Spirit Moon Shadow Sect was extraordinary.

There might be some discrepancy with existing knowledge, perhaps even necessitating a refreshing of established understanding.

If only Han Gonglian were recruited and he could grasp the principles, it might still be manageable.

But if there were hesitations or doubts.

Then the entire 'restoration' process of the astronomical telescope could face delays or even halts.

Then he carefully recalled the mathematicians he knew, and after a minute, suddenly his eyes lit up:

"Xiaowang, could you describe the mathematical knowledge you're speaking of in writing?"

Xu Yun looked at him curiously, a bit puzzled by Old Su's intentions, but still nodded:

"It's not difficult, since I read the content in books after all, summarizing some key points is quite easy."

Old Su, seeing this response, waved his hand excitedly and said:

"Excellent, later you shall accompany me to the study to draft a letter to be sent to Yingtian Prefecture.

There resides a master of contemporary calculation in a countryside hut; if persuaded to come to Bianjing to assist, the precision of the lens can certainly be achieved!"

Seeing Old Su express such excitement and admiration for the first time, Xu Yun grew interested:

"Who might this master be?"

Old Su paused for a moment, organized his words, and said with some reverence:

"This person is named Jia Xian, studied under the master of Nine Chapters Calculation, Chu Yan..."

Before Old Su could finish, Xu Yun's eyelid twitched fiercely.

Oh my.

Jia Xian?

This monument-level figure in the history of ancient mathematics is still alive at this time?

Speaking of well-known mathematicians of ancient Huaxia.

In many people's minds, the first name likely to come up is Zu Chongzhi.

The man who was the first in the world to calculate the value of Pi to the seventh decimal place, more than a thousand years before Europe.

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Chapter 166 135 More Than Just Han Gonglian_2

[911 words]

But aside from Zu Chongzhi, Huaxia also had quite a few standouts in the field of mathematics.

And they can be classified into many categories based on their contributions and directions.

For example, regarding influence on modern mathematics, Qin Jiushao undoubtedly deserves to be at the forefront.

Because only his Great Derivation Technique and Chinese Remainder Theorem from native mathematics are preserved by modern math.

The rest of Huaxia's various ancient mathematical techniques and tools were reinvented by Western mathematicians.

In terms of groundbreaking innovation.

Then unquestionably, Liu Hui and Zhu Shijie lead, as they represent two major leaps on the two mathematical peaks of Huaxia:

Liu Hui organized the entire body of mathematical knowledge from the Qin and Han periods, establishing an overall framework for ancient Huaxia mathematics, summarizing the overall computational framework of linear algebra.

Broadly similar to Euclid in Greek mathematics.

Zhu Shijie organized math since the Tang and Song, standardizing the mathematical framework of Celestial Essence Skill, advancing Huaxia algebra from signless to signed computation.

And in the field of trigonometry, Jia Xian is without a doubt a standout among standouts.

Remember the Yang Hui's Triangle mentioned in Dungeon 1665?

The Yang Hui's Triangle was actually proposed by Jia Xian, which is why some call it Jia Xian's Triangle.

However, due to the loss of his works, his excellent ideas were recorded by another great mathematician, Yang Hui.

Thus, later generations defined this pattern by the name Yang Hui's Triangle.

The reason given by the Asian Mathematics Conference 11 years ago was that Yang Hui's records had physical proof, and there's nothing wrong with this logic actually.

Additionally,

Jia Xian also created the square root methods "Multiplication and Square Root Method" and "Multiplicative Opening Method,"

which are a class of efficient methods for solving numerical solutions to high-degree polynomials.

That's right.

Solving numerical solutions to high-degree polynomials.

You know?

In those years in Europe, they were still using "Roman Numerals."

That's right, numerals, even representing numbers was very difficult, not to mention such complex square root calculations.

The computational procedure of Jia Xian's Multiplicative Opening Method was roughly the same as the method of the European mathematician Horner (1819), but it was 770 years earlier.

And this is precisely an important link in the precision calculation of mirrors, and there are many derivative numerical formulas to solve.

In other words.

From both a capability and a professional perspective, Jia Xian is a much more suitable candidate than Han Gonglian.

But at the same time.

He is also a figure outside of Xu Yun's plan, someone Xu Yun never even considered at the beginning.

Because nobody knows Jia Xian's exact birth and death dates either, by most accounts, he passed away before Emperor Huizong of Song ascended the throne.

According to the Song History: Art and Literature,

Jia Xian completed the work Emperor Huang's Nine Chapters on Mathematical Art around 1050, at which time he held the position of Left Palace Attendant.

Left Palace Attendant is one of the three classes, a Standard Ninth-Rank Official.

According to the comparison table of Song Dynasty official positions and ages collected by later generations, the Left Palace Attendant was generally held by adult men aged 25-35.

Meanwhile, Wang Shu wrote in the National Annals:

"Xian is now the Left Palace Attendant, Jili Tai Shi. His calculations are mysterious, and there are books passed down in the world."

Wang Shu wrote National Annals in 1043, and it was completed in the autumn of 1045.

So.

In 1045, Jia Xian was at least 25 years old.

It is now 1100, a good 55 years later.

If Jia Xian were still alive, he would be at least eighty, possibly ninety or older.

Old Su, although he's also in his eighties, who is he?

A former Prime Minister!

His standard of living and access to healthcare could be said to be one in ten thousand or even one in a million.

But Jia Xian was just an ordinary minor official and quit his job not long after.

In terms of living standards, he was far below Old Su, at most at the level of a small landlord, maybe not even that well-off.

Thus, in the later mathematical community, most people believe Jia Xian passed away when Emperor Huizong ascended.

Even in encyclopedic entries, he is defined as an 'outstanding mathematician of the first half of the eleventh century.'

But as it seems now...

Jia Xian is actually still alive?

Moreover, according to Old Su's words,

If persuaded, he might even come over from Yingtian Prefecture!

Yingtian Prefecture is the later Bai Xia, and Bianjing is Junyi.

It is more than six hundred kilometers from Bai Xia to Bianjing; in later times, a bullet train takes three hours, so in the ancient times, it would indeed count as a long journey.

So from this, we can reason.

That currently Jia Xian's physical condition is probably quite good; otherwise, he wouldn't be able to handle such long-distance travel.

What can be said...

Though unexpected, this is undoubtedly good news.

After all, Xu Yun's goal is far beyond just an astronomical telescope...

Some things, unlike the astronomical telescope, although outwardly claiming incapability, can be easily calculated with their own ability.

For those calculations, even with Xu Yun's personal ability, it is an insurmountable task and external assistance is necessary.

Therefore, in response to Old Su's suggestion, Xu Yun promised on the spot:

"I have long been in spiritual communion with Mr. Tongyu. With his help, the telescope matter may succeed!"

Subsequently, Old Su mentioned a few more names to Xu Yun, all mathematicians who are leisure and staying within twenty or thirty miles around Bianjing.

Among them, Xu Yun had heard of one or two names, but their capabilities were much inferior to Jia Xian and Han Gonglian, considered as high-level talent types.

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Chapter 167 135 Not Just as Simple as Han Gonglian_3

[1,312 words]

And more are names of people unheard of in later generations, whose abilities are unknown, but it can be estimated that they are probably not very high either:

After all, when Old Su was creating the new instrument, a large amount of mathematical calculations was needed, and at that time, he basically searched all over Bianjing for mathematicians, and had a deep understanding of the whole mathematics circle of Bianjing.

Unless they are some up-and-coming talents, otherwise their abilities obviously couldn't be very strong.

As things have reached this point, today's lesson naturally is almost over.

Then Old Su thought about it and cheerfully said to Xiaozhao and Xiaoli:

"Prince Jian, Qingzhao, why not stay for dinner at the mansion before leaving?"

Xiaoli and Xiaozhao exchanged a glance and declined by saying:

"Your Grace Junior Master, it was kind of you, but I still need to return to the palace early to find artisans, after all, you know about my brother... so let's schedule it for next time, definitely next time."

Looking at this enigmatic person with a face of 'you understand', Xu Yun blinked in confusion.

As a non-history major science enthusiast, he naturally did not understand.

In this short period after he ascended to the throne, Emperor Huizong of Song had already shown a few traits of the Flower and Bird Emperor:

Spending at least three hours each day on painting and calligraphy, occasionally switching to playing cuju or some other activities.

His brothers could only see him in the afternoon during the hour of Shen.

Of course.

His claim to Empress Dowager Xiang was that he enjoyed reviewing memorials alone, and since Empress Dowager Xiang died early, she was really deceived by Emperor Huizong before her death.

When Empress Dowager Xiang, this low-budget version of Cixi, was alive, Zhao Ji dared to do this, but he became timid when the Jin army came, which is quite ironic.

Then Old Su returned to the study to start writing a letter to Jia Xian, while Xiaoli and Xiaozhao were entrusted to Xu Yun to see them off.

After all, Xu Yun is currently both a "teacher" and a guest, making it appropriate for him to see off Xiaoli and Xiaozhao given his status.

Old Su's courtyard wasn't very large, and since the venue where the lesson took place was in the front yard, it was only a short distance from the main gate.

In just a short walk, the three reached the entrance.

"Mr. Wang."

Just before they parted, Xiaozhao took the initiative to cup his hands towards Xu Yun:

"As the ancients said, listening to your words is better than reading for ten years.

The words of Mr. Wang today truly enlightened me; the concepts of gravity and the planets... I'm afraid I'll never forget them in this lifetime."

Xiaozhao's expression and tone were sincere, and it was indeed from his heart, not just polite words.

After all, if he weren't interested in science, he wouldn't have followed Xiaoli to come to Old Su's mansion to meet Xu Yun — at that time, Xiaoli still didn't know that Xu Yun had been promoted; a prince meeting a servant, this had already exceeded the concept of lowering one's status to make friends.

On the other hand.

Xu Yun also had a good impression of this dashing gentleman, seeing him was like seeing the equally dashing reader:

"Prince Jian flatters me, I'm just relaying the content of the notebooks written by the sages, similar to an instructor of elementary learning, teaching the sacred books, anyone else could do the same.

The real admiration should be for the wisdom of the sages, as vast as the sea of stars, yet so much has been buried in the passage of time."

Xu Yun's words seemed to touch a chord in Xiaozhao's heart, and he sighed:

"Indeed, if Mr. Wang hadn't mentioned it, I'm afraid I would have never known in my entire life that there exists such a mystical sect as Wind Spirit Moon Shadow.

Oh yes, Mr. Wang, is it true that currently, you're the only one left in Wind Spirit Moon Shadow?"

Upon hearing this, a trace of sorrow flashed in Xu Yun's eyes, his face showed bitterness and heartache:

"Wind Spirit Moon Shadow has long dissipated in the tides of time, I was merely lucky, a fortuitous happenstance gained me a broken legacy.

Just like the astronomical telescope, many heritages are now fragmented, we later generations only hear of them by name, never seeing them, alas....."

Xiaozhao shook his head wistfully, then lightly coughed to console:

"Mr. Wang, people should look forward, let's not talk about melancholic words anymore,

As for the matters of artisans and finances, once I return to the palace, I will make arrangements, striving to restore this wonderful astronomical telescope at the earliest!"

Xu Yun nodded, instinctively wanting to advise this Prince Jian to move out of the imperial palace.

But considering it was inappropriate to speak so deeply in light acquaintance, in the end, he could only transform his depression into a deep sigh.

He then glanced at Xiaoli beside him, forcing a slight smile:

"Miss Li, let us part for the day."

At this time, Xiaoli was drooping the corners of her eyebrows, somewhat sullenly waved at him:

"Sorry, Wang Lin, I can't help with this astronomical telescope..."

"Oh, what does it matter?"

Xu Yun gestured indifferently to her and said with a smile:

"Miss Li, don't worry, we have plenty of time, maybe the next chapter... cough, cough, next time, I will have something to trouble you with!"

Xiaoli still nodded weakly, but soon thought of something.

With some anticipation and nervousness, she said to Xu Yun:

"Wang Lin, when they start making the astronomical telescope, can I still come to the workshop?"

Xu Yun nodded firmly, gladly agreeing:

"Of course you can."

Only upon hearing this did Xiaoli regain some energy, letting out a soft sigh of relief.

After all, although women's status in the Song Dynasty was not low, an unmarried girl mingling with a bunch of men still challenged traditional views somewhat.

Xiaoli herself wasn't worried, but her father, Comrade Li, had already resigned himself to it.

Therefore, the biggest obstacle came from this side with Xu Yun and Old Su.

After all, scholars esteemed themselves highly, people like Old Su feared ruining their late stages of life and might find ways to refuse.

Seeing Xu Yun personally agree to let her observe a round of the telescope's manufacture thus meant overcoming the biggest obstacle.

After a few more simple courtesies, the three parted at the door.

Xu Yun followed the courtyard path and returned to the East Wing.

He planned to rest a little longer, and at the same time, organize the knowledge points he was about to write down for Jia Xian.

If there was still time.

He would consider what steps to take next.

As he approached his courtyard, before he even entered the gate.

He saw Wang Bing, this stern-faced man, standing like a pillar at his courtyard entrance.

Seeing this situation.

Xu Yun instinctively felt a shock:

Could it be that something has happened again to Wang Yue?

After all, they only passed through the period of highest risk before, far from being out of danger.

In the inadequate medical environment of the Song Dynasty, anything could happen at any time after antibiotic injections.

So he hurried forward, cupped his hands to Wang Bing, and asked somewhat anxiously:

"Captain, you've come to see me? Could it be that there's a change in Zhonghou's condition?"

Seeing Xu Yun's concern for Wang Yue, Wang Bing's heart was immediately warmed, he waved with a smile:

"Xiaowang, you can rest assured, my brother's condition is fine, I'm here mainly for you this time."

Xu Yun was puzzled, pointing at himself with his index finger:

"Me?"

Wang Bing nodded, took out a few bound books from his body:

"Without you, Xiaowang, saving grace is unrepayable."

"This morning, I couldn't stop thinking, noticing that your physique seems a bit thin, so..."

"Here are a few secret martial arts manuals, although they are not superior martial arts, they can be mastered quickly; are you interested?"

.....

Note:

6600 words delivered, all-nighter till now, more tonight!!!

This month promises at least 200,000 words, said and done, please vote!!!

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Chapter 168 168: 136 Zhang Heaven-Peace Sword Technique!

[990 words]

All the classmates who have been gender transformed know.

In later generations, people who undergo gender transformation usually take some estrogen to develop certain female characteristics, making it easier to attract customers.

And during the Song Dynasty, male actors were similar.

They were required to take drugs containing estrogen over the long term, forcing male actors to appear more 'seductive'.

Therefore, any man born as a male actor generally didn't have very good health.

But it was precisely because of this consideration.

After learning of Xu Yun's background from Old Su, Wang Bing pondered for several days before coming up with a good approach:

Help Xu Yun strengthen his physique!

Although martial arts during the Song Dynasty weren't as mystical as described in martial arts novels, the Court even valued literature over martial arts.

But just like the remedies mentioned earlier.

Almost everywhere among common folk, you could see all sorts of secret martial arts manuals...or martial arts halls.

At this point.

Some classmates might object:

That's not right.

In the Song Dynasty, unarmed play was generally sumo, such as Yan Qing from Water Margin and Ren Yuan both engaged in wrestling, martial arts weren't common.

And the martial arts described in Water Margin are Ming Dynasty moves, so it can be seen that Song Dynasty martial arts weren't developed.

Actually, this statement is erroneous.

Firstly.

The only move in Water Margin that is definitively from the Ming Dynasty, and can be found in official records, is just one.

Lin Chong and Master Hong competed using the move "Grass Pulling and Snake Seeking Stance."

Its origin is in National Strategy and Martial Arts Preparation:

The book records that during Ming Army training for practical combat stick techniques, the starting move indeed included one called "Grass Pulling and Snake Seeking Stance."

There is currently an imprint version of this move online, though the posture somewhat resembles defecation.....

Other than that.

Many of the martial arts in Water Margin are hybrid creations covering even foreign tribes.

For example, Xu Ning's Hooked Scythe Spear Technique.

Its prototype comes from the Jin Kingdom's elite heavy cavalry "Iron Butcher," the same Jin Wuzhu that Han Shizhong defeated at Yellow Heaven Dang.

In fact.

Due to border problems at the end of the Song Dynasty, the martial arts atmosphere among the common people was quite strong.

Facing the marauding behavior of northern nomadic tribes, the Court continually encouraged the people to form societies for self-protection and practice martial arts to resist strong enemies.

Thus, numerous civilian martial arts organizations emerged according to militia standards, offering training and teaching.

Such as Loyal and Righteous Society, Archery Club, etc.

According to Song History: Yue Fei's Biography records:

"Yue Fei sent Liang Xing across the river, rallied Loyal and Righteous Society to take Hedong, Beizhou County... Liang Xing joined Taihang Zhongyi and Heroes of the Two Rivers Zhao Wen, Li Jin, Dong Rong, etc., to defeat the Jin People at Yuanqu... Jin People Grand Protector Zhang, Grand Protector Cheng and others surrendered with their troops."

In other words.

Even Yue Fei collaborated with 'martial arts sects' like Loyal and Righteous Society to resist the Jin, achieving victory, which shows that the martial arts atmosphere during the Song Dynasty was far from low.

Not to mention Wang Bing came from a family with generations in military service, so possessing high-quality secret martial arts manuals is quite normal.

Actually, this is not yet the peak period for civilian martial arts during the Song Dynasty. The real peak comes a few years later when Zhao Ji initiates the Flower Stone Gang, angering people in Jiangnan, further increasing the number of martial arts halls among common folk.

However, by that time, martial arts halls weren't purely for resisting foreign enemies, but mainly to resist Zhao Ji's troublesome actions.

Of course.

Xu Yun didn't understand these underlying stories, nor did he know Wang Bing's motivations, but he was clearly moved.....

The reason is simple:

Who hasn't dreamed of being in the Jianghu during childhood?

A jug of murky wine, a garb of plain clothes.

A wool hat, a spear and stick with a bundle carried in the landscape of vengeance and gratitude.

Sleeping in the wild mountains at night, then getting bitten to death by South China Tiger, hungry for beef at a mountain inn and getting drugged into pieces...

Ahem.

Got carried away, got carried away.

In summary.

Even setting aside personal feelings and looking at it practically, Wang Bing's proposal was very valuable:

Xu Yun will inevitably enter more dungeons in the future, and it is uncertain what kind of background it will be.

If it's modern or peaceful times, that's fine, but what if it's a war-torn setting?

Whether in the West or at home, there's almost always plenty of time spent in warfare.

Even in peacetime, there might be some unscrupulous individuals one might encounter.

If one has some martial arts skills during the cold weapon era, even if it's just basic techniques, there might be situations where it can save one's life.

Therefore, Xu Yun didn't hesitate much, generously cupping his hands to Wang Bing:

"Lord Middle Marquis, to be honest, I've yearned for the Jianghu since childhood, seeking righteousness, vengeful and grateful.

Unfortunately, due to special circumstances, after growing up, I could only read some miscellaneous books to pass the time. Today, thanks to Lord Middle Marquis's kindness, I shall accept graciously."

Wang Bing laughed heartily at these words, patted Xu Yun's shoulder, and seemed very pleased:

"That's great, Xiaowang, let's head into the courtyard and discuss further."

Xu Yun nodded:

"Please follow me."

He then led Wang Bing into the courtyard, to a stone table beside the grape trellis, and they sat opposite each other.

Then Wang Bing spread out seven or eight cultivation techniques like dealing cards on the table and introduced them to Xu Yun:

"Xiaowang, these cultivation techniques aren't top-tier martial arts, so don't expect to become a martial arts knight with them.

These techniques can only help you stay fit, at most becoming difficult for ordinary people to approach once fully mastered."

Xu Yun nodded in understanding, while a curious thought arose in his mind, he asked Wang Bing:

"Captain, may I ask, if the top-tier martial arts in the army are fully mastered, how many people can be fought?"

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Chapter 169 169: 136 Zhang Heaven-Peace Sword Technique!_2

[1,192 words]

Wang Bing was taken aback and discreetly glanced around before musing:

"Nowadays, the Imperial Guard Officers study military books authored by Mr. Le Zheng, specifically the 'Essential Military Classics', which primarily focuses on strategy and planning, while body techniques emphasize the 'Boge Spear Technique'.

If the infantry can master the 'Boge Spear Technique', they can roughly contend with two to three elite warriors from the Western Xia Tixu Tribe.

As for the cavalry, that's another story.

After all, on the battlefield, the impact of armor and warhorses might be even greater than that of cultivation techniques."

"With a good horse and robust armor, even a pig butcher could take down quite a few foes on the battlefield."

Xu Yun nodded thoughtfully.

Mr. Le Zheng, mentioned by Wang Bing, refers to Zeng Gongliang, who has been deceased for over 20 years now.

Back in the day, Zeng Gongliang and Ding Du collaborated to write the military treatise 'Essential Military Classics', which is the first comprehensive state-sponsored military compendium in the region.

Now, the 'Essential Military Classics' has become the official military book for the Song Army, considered as a sort of encyclopedic reference for military strategists.

Comparatively, it can be seen as akin to a major university textbook in later generations, meant to be studied at the collegiate level.

Regarding the Tixu Tribe mentioned by Wang Bing, it is an elite clan on the western front.

The tribe has approximately over forty thousand members, formidable in strength, and is one of the main foes on the western frontline.

Xu Yun pondered further and asked:

"So, what about unarmed combat between a soldier and civilians?"

Wang Bing blinked:

"Civilians?"

Xu Yun nodded, eager not to miss this chance to understand ancient military prowess:

"I mean ordinary adult males, both sides bare-handed."

This time, Wang Bing took much longer to contemplate and slowly said:

"There would be a significant difference, like Old Zhong under the command of the Minister of Strategy who leads the Hundred Battle Camp, where all soldiers practice 'Boge Strength'.

If they confronted ordinary farmers and had space to maneuver, handling seven or eight individuals would be no issue."

Xu Yun nodded slightly:

"That's intriguing."

Xu Yun had a real-life friend who had won a provincial-level boxing medal and been interviewed on television.

Currently, in Shanghai, he runs a boxing club, doing quite well.

This person has been practicing boxing for about ten years. Back in the early 2000s when public safety was less assured, Xu Yun witnessed him solo four thugs at a BBQ stand in his hometown.

Later he told Xu Yun.

If there were no blades involved, and the opponent hadn't trained much in boxing nor been hit directly by a kick aimed to the groin, theoretically he could hold his own against six or seven people.

Of course.

The cost would be that he'd inevitably sustain some injuries himself.

This friend also frankly said.\p>

The special forces in the military, when it comes to combat, might not be that much more formidable than him.

Considering the project variety and training diversity among special forces.

Some elite units might hold an edge, but ordinary special forces wouldn't necessarily outmatch the top three provincial fighters in combat.

Particularly, some reconnaissance-focused special forces members have quite average physiques, maybe even shorter than typical people.

As for whether special forces possess any alleged lethal skills, Xu Yun's friend wasn't sure.

In any case, if such skills existed, they'd likely not be encountered in everyday life.

Given this is true for modern times, it's even more so for the Northern Song.

Both are regular people.

But modern adults and Song Dynasty adults are clearly two very different concepts.

Additionally, with the soldiers of the Western Army having consistent meat supplementation for nutrition, it's not outlandish for a soldier from the elite camp to deal with seven or eight ordinary people.

Even to Xu Yun, this seems somewhat weak.

He then directed his gaze to the stone table, starting to sift through the martial arts techniques.

"Liu's Saber Technique'..."

"Yellow Cloud Eagle Claw Technique'..."

"Fairy Meow Meow Fist'..."

"Otherworld Conquest Manual'..."

"Songchuan Pushing Hands'..."

"Red Whip Leg"

Wang Bing provided names for the techniques that were straightforward and clear, where the category was evident just from the name.

In terms of imagery, they weren't as enigmatic as the names one would find in martial arts novels, like the 'Exorcism Sword Manual' or the 'Jade Sea Tide-Rising Skill'.

Though this is actually quite normal.

If something like the 'Azure Sky Qi Refining Technique' appeared, Xu Yun would suspect he's transmigrated into a mythical Great Song.

While he continued looking.

Xu Yun suddenly locked his gaze, exclaimed softly, and focused on a book on the left side.

On the cover of this book, engraved in large typeface, were four characters:

'Heaven-Peace Sword Technique!'

Growing up as a modern person raised on martial arts films, Xu Yun's preferred weapon among all is the sword.

This fascination even extends into games.

In games like League of Legends, Xu Yun's favorite champion is Master Yi the Sword Saint, while on various platforms he favors stories featuring Raven.

Not to mention how the name of this technique book perfectly strikes a chord with Xu Yun.

The word "Heaven-Peace" exudes an overwhelming sense of grandeur.

As if a white-robed Sword Immortal stands atop a mountain, gracefully wielding his sword against the sky!

No idea why a technique as distinct in style as this would be grouped with the others.

Then Xu Yun shook his head.

No matter.

Wang Bing must have meticulously reviewed these techniques before arriving, it's unlikely that any unrelated books got mixed in by accident.

Plus, as he mentioned earlier.

These techniques are genuinely selected works with a low entry barrier.

Perhaps after a few months or one or two years of practice, one could begin to gain mastery.

With this thought.

Xu Yun took a deep breath, pointed to the 'Heaven-Peace Sword Technique', and said:

"Captain, I'll learn this sword manual."

Wang Bing followed Xu Yun's gesture, took a clear look at the book, and nodded in strong agreement:

"This sword manual isn't difficult to start with, it trains the use of a light sword, which doesn't demand particularly high strength, suited for a beginner like you.

So, Xiaowang, should we settle on this one?"

Xu Yun eagerly nodded, decisively affirming:

"This one it is!"

Seeing this, Wang Bing refrained from further comments and placed the sword manual in front of Xu Yun.

Then, he collected the rest of the thread-bound books.

Xu Yun picked up the book, his left hand brushed over the somewhat yellowed cover, flipping through a few pages lightly.

Then, impatiently, he asked Wang Bing:

"Captain, when can I start practicing this 'Heaven-Peace Sword Technique'?"

"Brother has now escaped danger and has servants attending to him, so if Xiaowang has time, we can start now."

Wang Bing first answered Xu Yun's question about timing, then noted oddly:

"Besides, Xiaowang, there's something you should know..."

"What's the matter? Do I need to change into training clothes first, or prepare a wooden sword?"

"That's not necessary, it's just Xiaowang, you might not be aware..."

"These books passed down from my father's generation have been around for a while, so some of the text might be difficult to make out.

"Especially at the book cover spot, like the one you mentioned..."

"Its original name actually is..."

"Lai Fu Sword Technique"

Xu Yun's eyes widened instantly:

"What???????"

....

Note:

I've looked into several Song Dynasty books, and the Song Dynasty's standard script for Lai, Ping, Fu, and Tian is no different from modern times, sourced from Mi Fu's calligraphy 'Elegy for Empress Dowager Xiang'.

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Tip: You can use left, right keyboard keys to browse between chapters.

Chapter 170 137 "About My Sword Training in the Northern Song

[1,987 words]

In the courtyard.

Seeing Xu Yun's bewildered expression, Wang Bing continued to explain:

"The 'Lai Fu Sword Technique' was created by a female swordsman named Lai Fu from Qinfeng Road. It is very famous in the area of Qinfeng Road.

Of course.

Whether by coincidence or not,

any woman who practices the 'Lai Fu Sword Technique' usually finds a suitable husband not long after.

Therefore, among the folk of Qinfeng Road, the legend of 'Lai Fu Sword Technique' gradually became associated with finding a husband."

Xu Yun: "????"

Goodness gracious.

Wasn't it supposed to be the Heaven-Peaking Swordsmanship?

How did it turn into Matchmaking Swordsmanship?

Then Wang Bing paused, cleared his throat, and continued:

"However, Xiaowang, although the 'Lai Fu Sword Technique' is mostly practiced by women,

it is precisely because of this.

This swordsmanship is relatively easier to learn at the beginning, and once mastered, its lethality is no less than other sword techniques.

After all, given the historically unsettled nature of Qinfeng Road, the 'Lai Fu Sword Technique' becoming a unique self-defense technique for women means it has its merits."

Just as Wang Bing said.

In the Song Dynasty, the primary administrative regions were called roads, established as fifteen roads starting from the year 997.

By 1072,

the Jingxi Road was split into two roads: North and South, Huainan Road into East and West, and Shanxi into Yongxing Army and Qinfeng Road.

In a few more years,

Emperor Huizong will elevate Junyi Prefecture to Capital Road, forming the ultimate structure of 24 roads in the Song Dynasty.

In these years, Qingtang... later known as Qinghai, had not been recovered, making Shan Province, where Qinfeng Road was, a typical border area.

From south to north along Qinfeng Road, war and chaos have been continuous, large and small.

In such a background and environment,

the 'Lai Fu Sword Technique' becoming a unique swordsmanship for women in Qinfeng Road signifies it is not just a fancy gesture:

In a peaceful city like Bianjing that might be justifiable, some women might practice performance sword dances for their own entertainment or to please others.

But in a war-torn place like Qinfeng Road, no one would risk their lives on frivolity.

Given that Xu Yun had little martial arts foundation to begin with, from a practical standpoint...

The 'Lai Fu Sword Technique' indeed seems like a good choice?

If he were truly in a war-torn dungeon scenario, self-preservation would be key, who cares about the origins of the swordsmanship?

Like modern university military training.

Have you not seen many men standing on the sanitary pads of women?

Thus, without much hesitation, Xu Yun said to Wang Bing:

"Captain, I have decided to practice this 'Lai Fu Sword Technique'. What preparations do I need to make?"

Wang Bing thought for a moment and said:

"The preparations are not difficult, just have some soup to replenish moisture, and also change into hemp clothing and prepare a few towels.

After all, when practicing, you are bound to sweat."

Xu Yun nodded knowingly:

"Understood."

In the 21st century, many people have probably heard this kind of saying:

There was no heat island effect in ancient times, so the summers were much cooler then than they are now.

But actually, this is a misstatement.

Because nowadays we are at the end of the Little Ice Age of the Ming and Qing, compared to historical warm periods, our current weather is quite cold and monotonous.

Even with the 'enhancement' of the heat island effect, the temperature is still not much higher than during warm periods.

For example, the original Vice President of the Chinese Academy of Sciences, Zhu Kezhen, created the renowned Zhu Kezhen Curve.

It is currently an authoritative chart for researching ancient temperatures.

From the curve, it can be seen that the temperatures during the Sui and Tang, and Northern Song periods were much higher than other times.

Foreigners have also conducted similar temperature statistics, with the famous one being the Greenland Island Curve.

That is, by studying the oxygen content in samples from the original glacier ice in Greenland Island to determine temperatures of corresponding eras.

Surprisingly.

The processes of creating the Zhu Kezhen Curve and the Greenland Island Curve had virtually no exchanges, yet many of the nodes are astonishingly consistent.

That is to say,

some past temperature changes were global climate crises.

Currently, it's summer, and from the charts, you can see, the temperature in Bianjing is about 35.3 degrees Celsius, comparable to the four great furnaces of later generations.

Therefore, Xu Yun wishing to practice must change into more breathable or sweat-absorbing clothing.

Otherwise, he might be suffocated before mastering the skill.

Fortunately, Xu Yun considered being a Guest of Su Mansion, his treatment and voice were much higher than that of a servant.

Hence, in less than a quarter-hour,

Xu Yun changed into a hemp short-sleeved outfit.

Following Wang Bing's guidance, Xu Yun began.....

Horse stance.

No mistake.

Horse stance.

"In swordsmanship, the spirit manifests through the sword, and the soul returns to the footwork; if the stance is unstable, one will be top-heavy."

At this moment, Wang Bing, hands behind his back, had returned to his earlier stern demeanor, and spoke confidently to Xu Yun:

"And the footwork breaks down into horse stance, side-by-side step, resting step, servant step, crossover step, empty step, etc., among which the horse stance is the most fundamental method."

As he spoke, he glanced at Xu Yun's lower stance, nodding slightly:

"Xiaowang, you have passed the best age to learn swordsmanship. To grasp 'Lai Fu Sword Technique,' one must practice horse stance for at least half an hour daily."

Upon hearing this, Xu Yun slightly twitched at the corner of his eyes.

A very long, long time ago, as early as when Xu Yun was in first or second grade of elementary school, he joined a school martial arts class.

Now, after two reincarnations, he had long forgotten what was taught in the martial arts class, or what the teachers and students looked like.

He doesn't even remember if it was a school interest group or a paid extracurricular training class.

But one move he still remembers vividly and is unlikely to forget in this lifetime.

And that is horse stance.

This thing is pretty much like riding a bike, once mastered, even with eyes closed, one can recall it.

Therefore, after Wang Bing made the request, Xu Yun quickly performed the standard action.

Of course.

Standard action as it might be, but the physical exertion was terribly exhausting.

Just after a few minutes or so, Xu Yun's legs began to tremble slightly.

However, Wang Bing had no intention of easing the requirements in the slightest. Facing the life-saving benefactor of his elder brother, he continued to maintain a strict attitude:

"Xiaowang, don't move your legs!"

"Straighten your waist!"

"Breathe steadily, follow my lead, deep breath... exhale slowly... and deep breath again..."

"Hold on, endure hardships to become a superior man!"

Just like that.

With Wang Bing's encouragement, Xu Yun's first horse stance in the Song Dynasty ultimately lasted...

Not even ten minutes.

To be honest.

This time isn't actually short.

If you don't believe it, you can try it yourself.

Without long-term exposure to such movements, your body might give some feedback in less than half a minute.

Wang Bing clearly understood this as well, so when he felt the time was about right, he no longer insisted:

"Alright, Xiaowang, you can stop now."

Upon hearing these words, Xu Yun immediately relaxed his body, plopped down onto the ground, baring his teeth as he rubbed his thighs.

I've got to admit.

Wang Bing's judgment was indeed accurate.

At present, Xu Yun's muscles had reached a critical point. If he insisted further, he could perhaps stand for another minute or two, but muscle strain was highly likely.

Then Wang Bing handed him a water pouch and patted his body:

"Here, wet your throat first."

Xu Yun took it and gulped down a big mouthful.

A second later.

Xu Yun couldn't hold back and 'puh-ha' sprayed out a big mouthful.

He wiped his mouth and, while feeling the slightly stimulating taste in his mouth, bitterly smiled and said to Wang Bing:

"Captain, this... how come it's wine?"

Wang Bing immediately burst into laughter, clearly in a good mood:

"A real man, walking the martial world, how can he not drink? Haven't you, according to Elder Su, dabbled with some form of alcohol?"

Xu Yun, upon hearing this, helplessly cupped his hands to Wang Bing, then lifted the neck of the water... or rather the wine pouch, up to his face.

After hesitating for a moment, he continued to drink it down.

After all, the alcohol content in Song Dynasty drinks wasn't high, and Wang Bing had chosen a slightly sweet rice wine.

Once prepared, it was actually quite pleasant to drink.

Watching Xu Yun sipping wine while sitting on the ground, Wang Bing contemplated for a moment and continued:

"Xiaowang, aside from footwork, the most crucial aspect of swordsmanship is the sword technique. Let me demonstrate a few of them for you."

With that, he picked up a wooden sword from the side, assumed a stance, and first thrust it forward.

In just a few breaths.

His wrist flipped, and he swiftly lifted the sword.

"This is called 'Dragonfly Touching Water'."

He then swung a sword flower in the air, continuing to attack from below to above, though it was actually a feint.

When the sword rose a foot, his hand moved with his arm, slashing horizontally from east to west.

"This is called 'Turn Over and Cross'."

As Wang Bing showcased, he demonstrated with both hands and feet, sending sand and stones flying.

The wooden sword seemed to emit a chilling aura, and in Wang Bing's hand, it appeared to come alive.

Unlike modern performances, Wang Bing was a genuine battlefield warrior.

His moves carried a rather fierce killing intent, genuinely effective techniques for overcoming adversaries.

After demonstrating several sets of moves, Wang Bing set down the wooden sword and breathed steadily:

"The above techniques are the core killer moves of the Lai Fu Sword Technique. Although not as mystifyingly complex as the Rainfall Thousand Threads Sword, it saves energy and is more than enough to intimidate ordinary martial world bandits."

Xu Yun slightly nodded.

Although he was merely an outsider, he could still sense a touch of agility.

Wang Bing didn't mention concepts like inner strength, whether it was due to the swordsmanship level or other reasons, Xu Yun couldn't ascertain.

But still, the same words.

Perhaps the Lai Fu Sword Technique isn't the best, but it's the most suitable choice for Xu Yun.

After adjusting his breathing, Wang Bing suddenly remembered something and said to Xu Yun:

"By the way, Xiaowang, if you plan to walk the martial world, there's one more thing to settle first."

Xu Yun blinked in confusion:

"What is it?"

"You need to take a nickname."

"A nickname?"

Xu Yun was momentarily stunned by the remark, but quickly understood what was meant:

Wang Bing presumably meant a martial arts alias.

Just as scholars liked to give themselves the title of Mr. XX, martial world people also enjoyed adopting some imposing names for themselves.

Such as Cloud-Entering Dragon, Wisdom Star, Blood-Handed Butcher, and so on....

However, compared to scholars being a bit 'shameless'.

Martial artists often prefix their nicknames with 'commonly known as' when introducing themselves, making it seem as though others gave them the name.

But considering that he would be in this dungeon for a long time and might engage with ancient dungeons in the future.

Having a nickname seemed quite necessary. Who knows when it might come in handy to bluff someone?

Therefore, after some thought, Xu Yun said:

"Captain, rumor has it that before the destruction of the Wind Spirit Moon Shadow Sect, every disciple who wanted to enter had to first become a code farmer and endure a challenging trial.

The code farmers' work involved writing text tirelessly, not pausing for a moment's rest.

Every day they could only nibble on buns and drink plain clear soup.

Each day they wrote at least 4,000 characters, the efficient ones could write 6,000, and those even more diligent could write over 10,000 characters a day.

Now, although the Wind Spirit Moon Shadow Sect has long vanished, as a descendant, I must not forget our roots."

Then Xu Yun paused and continued:

"Therefore, the nickname I want to take is... "

"Geng Sanwan (Daily Update of Thirty Thousand Words), how do you think it sounds?"

As he said this, Xu Yun's facial expression was quite calm.

Besides, it's not Xu Yun who does the daily updates of thirty thousand words, but Wang Mazi, what does it have to do with Xu Yun?

.....

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Tip: You can use left, right keyboard keys to browse between chapters.

Chapter 171 138 Following the Internet Cable to Urge Updates! (Large Chapter)

[886 words]

In ancient Huaxia.

Nicknames in the martial arts world are usually linked to animals or well-known figures from ancient times.

Examples of the former include Jade Qilin, Churning River Dragon, Brocade Tiger, and so on.

Examples of the latter include Little Wenhou or Sai Ren Gui, among others.

However, while Xu Yun's 'Update Thirty Thousand Daily' somewhat deviates from the usual rules, it doesn't fit with other scattered conventions either.

But considering Xu Yun was not originally from the Jianghu and wanted to commemorate the long-gone Wind Spirit Moon Shadow sect,

After a moment of silence,

Wang Bing still agreed with his nickname.

"Update Thirty Thousand Daily" Wang Xiaochun, thus officially settled.

Anyway, it was just a slogan, an expression of beautiful intention, and Xu Yun showed no worry at all.

As the saying goes,

Six thousand words are the human limit; any more, and it's an anomaly.

....

In the days that followed,

Xu Yun began to repeat a life of practicing swordsmanship in the early morning, teaching Old Su and others in the afternoon, and changing Wang Yue's dressing before bed.

In a certain sense, it was quite fulfilling, at least able to adapt to a life without phones.

Eight days later.

Still in Wang Yue's guest room.

"Stage three, six scales, four levels flat....."

Xu Yun raised the mercury thermometer in his hand, and after seeing the reading clearly in the light, his expression slightly relaxed.

He then turned to Old Su and Wang Bing, cupped his hands, and said:

"Sir, Captain, congratulations, congratulations.

Lord Middle Marquis's bacterial infection has healed; what remains is the recovery of his physical injuries."

By this time, more than ten days had passed since Wang Yue first started medication, and Xu Yun had stopped intravenous injections a week ago after observation.

Occasionally, garlic essence was used to dab on the wound to remove pus, depending on the wound recovery.

Although Wang Yue's wound on his chest wrapped in gauze still looked horrific, the surrounding abscess had completely disappeared.

Overall, from his mental state, he was already much better than before, with improved spirits and energy.

Under Wang Bing's support, he had regained some mobility.

Of course,

It was still a long way from being fully healed or going to battle.

Upon hearing Xu Yun's conclusion, the long-ready Wang Yue's expression instantly filled with joy:

"Does this mean I can eat lamb now?"

Xu Yun shrugged upon hearing this and glanced at Old Su beside him.

After all, compared to Old Su, he wasn't a professional doctor and could only make superficial judgments:

"You should ask the master."

Old Su stepped forward, took a pulse, pondered for a moment, then shook his head:

"Xiaowang is right; Zheng Ru's condition is out of danger.

But lamb...

Let's not rush; I believe stability should be the priority.

However, you can start with some blackfish soup. Since your life is no longer under threat, isn't it easy to eat lamb in the future?"

Wang Yue, hearing this, couldn't help but regretfully utter an "ah," and his expression turned dejected.

He instinctively showed his teeth, seeming to want to resist, but ultimately did not speak up.

After all, Old Su was firstly his elder and secondly for his own good, which he understood.

So both emotionally and logically, there was no justification for objection.

As for the blackfish soup Old Su mentioned, it refers to the modern blackfish.

Soup made from blackfish is milky white and greatly aids postpartum or post-surgery recovery, making it a high-quality medicinal diet.

So in later generations, many creators at starting points would cook a bowl of blackfish soup after cutting books.

As the saying goes, "Spring breeze blows anew."

Then Old Su's gaze shifted to the thermometer in Xu Yun's hand and said:

"Xiaowang, can you let me take a look at this item?"

Xu Yun respectfully handed the thermometer to Old Su, then, with a cute expression, held his hands together.

This mercury thermometer had been crafted by an artisan a few days ago, at a quite low cost.

After all, the principle of the mercury thermometer is relatively simple, summed up in one sentence:

Mercury is the only metal in liquid form at room temperature, so it is used as the thermometer's medium.

The most challenging part of the entire thermometer fabrication was the capillary tube, which theoretically should be as thin as possible.

However, through the artisan's efforts, even this most challenging barrier was overcome.

Compared to syringes,

The thermometer's capillary tube is a 'semi-hollow structure' to a certain extent; it can be punctured with a fine needle while the glass is not yet formed.

As for Xu Yun's previous mention of "stage three, six scales, four levels flat," it referred to thirty-six point four degrees.

Xu Yun labeled tens digits as "stage," units as "scales,"

and "flat" representing the decimal's first place.

Similar to ancient numerical expressions, it was somewhat easier to understand than pure numbers.

Old Su then took the thermometer and carefully looked at the scale above.

Three stage, six scales, four levels flat.

According to his previous pulse for Wang Yue, it was indeed an accurate figure.

He then gripped one end of the thermometer and gently shook it like Xu Yun had demonstrated before.

Sure enough.

The mercury naturally receded to the bottom.

He then held the base with his fingers.

After more than thirty seconds.

The mercury expanded with heat and naturally moved up a little.

Old Su's pupils slightly constricted.

As a renowned medical expert, Old Su had frequently seen discussions on human body temperature in various ancient books while compiling the "Herbal Atlas."

Although in practical sessions, traditional Chinese medicine can discern the body's condition through pulse diagnosis.

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Tip: You can use left, right keyboard keys to browse between chapters.

Chapter 172 138 Following the Internet Cable to Urge Updates! (Large Chapter)_2

[870 words]

But this belongs to the category of 'internal', not something all doctors can accurately diagnose.

Otherwise, there wouldn't be such a word as "quack".

But if it's relying solely on touch without using pulse diagnosis, then it becomes even more challenging.

Especially in terms of precision:

For instance, differentiating between 36.7 and 37.2 degrees—it's truly challenging for a doctor to sense this by touch alone.

Because a doctor can't guarantee their own body temperature is normal, making misdiagnosis quite likely.

In medical terms, 37.2 degrees can already be considered a sign of an elevated temperature.

It may seem fine at first glance, but the illness might erupt after nightfall.

Therefore, the 'thermometer' Xu Yun created, from a medical perspective, is as significant as chalk!

Of course.

Considering the toxicity of mercury, the widespread use of thermometers must be more tightly controlled than that of chalk.

"Wind Spirit Moon Shadow Sect..."

Old Su couldn't help but murmur, "What sort of sect is this..."

In the past few days, he hadn't failed to research this topic.

However, among all the books he could find, none recorded information about this sect.

But on the other hand.

This sect most likely exists:

Because there's no other explanation, apart from a hidden sect, to explain Xu Yun's abilities rationally.

Of course.

From a metaphysical perspective, the reincarnation of an 'all-knowing being' could also explain Xu Yun's condition.

Yet, from a rational standpoint, the identity of a descendant from a hidden sect is undoubtedly more plausible than the tale of immortal gods.

After all, over the course of thousands of years, countless things have indeed been lost.

For example, the wooden kite crafted by Gongshu Zi.

Rumor has it that this thing could fly in the air for three days and nights without any external force.

But now, centuries later, the skills of Gongshu Ban have long been lost, leaving later generations to only imagine the appearance of such wonders.

In fact, don't speak of Gongshu Ban, just take Old Su himself:

Who can be certain that the things he created, such as siphoning devices, will be fully known to future generations?

Time can erode everything.

Thus, the existence of such a hidden, now perished ancient sect in history is not untenable.

Only the scion of this sect lived rather miserably, becoming the plaything in others' hands, only to escape not long ago...

Old Su then took a deep breath and looked at Xu Yun:

"Xiaowang, the various materials you mentioned earlier are almost ready, including the volcanic glass stone you spoke of.

Barring any unforeseen circumstances, all the resources should be ready within two to three days."

Xu Yun nodded in understanding.

Shortly after Xiaozhao left the mansion, Emperor Huizong of Song agreed to Xiaozhao's request, approving a large batch of materials and funds.

Combined with the manpower and resources Old Su possessed, it means that within a couple of weeks, all the materials Xu Yun needed were fully prepared.

Given the efficiency of this era, this time frame can indeed be described as "miraculous".

Meanwhile, as Old Su and Xu Yun were conversing.

Outside Bianjing City.

Da da da—

At this moment.

A large official road, running from east to west, connecting Daming Prefecture and Bianjing City.

A carriage was moving swiftly and steadily.

Not only was this era in Huaxia the most economically prosperous, but it was also one of the most advanced in transportation.

For instance, with the Capital City Bianliang as the center, the Northern Song Court constructed official roads connecting various routes, prefectures, and counties to Bianjing, expanding outward.

Land routes connecting Xijing, Yingtian Prefecture, and Daming Prefecture formed a network-like extension.

Creating an extensive, interconnected transportation network.

Travelers merely needed to set off along the official road to reach any destination, making travel very convenient.

However, even the smoothest official roads ultimately couldn't compare to the highways of later eras; especially on lengthy routes, the road surface would always have some stones or protrusions remaining.

After the carriage had traveled some distance, its wheels suddenly rolled over a fist-sized stone.

Due to this foreign object, the carriage rocked slightly for a moment.

Though this degree of jostling didn't cause much damage to the carriage's physical structure.

Yet an elderly man, who had been dozing inside, was startled awake and slowly opened his eyes.

Seeing the old man rubbing his eyes and exhaling, he spoke to the outside:

"Zhongping, where have we arrived?"

A moment later.

Whoosh—

The curtain of the carriage was drawn back from outside, and an old servant sitting beside the coachman leaned in and said:

"Master, we are over thirty li away from the Chenqiao Posthouse ahead."

"Chenqiao Posthouse?"

The old man repeated the name and nodded slightly:

"I understand. You may withdraw."

Chenqiao Posthouse, originally known as Chenqiao Village, was renamed when a post station was established in the Later Zhou era.

However, this small post station with only six rooms left its mark in history:

In the year 960, Later Zhou General Zhao Kuangyin staged a mutiny at Chenqiao, donned the yellow robe, and founded the Song Dynasty.

Known in history as Northern Song, with its capital in Kaifeng.

Thus, Chenqiao was included at the beginning of the Song History, forever inscribed in the annals of history.

In this era.

Chenqiao Posthouse is entrusted with the Northern Song Court's significant responsibilities of transmitting orders, military intelligence, and managing the reception and lodging of visiting officials.

As the number of visitors increased, commercial trade in the town developed, and the market trade flourished.

In a certain sense, it's somewhat similar to Songjiang's role in Shanghai.

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Tip: You can use left, right keyboard keys to browse between chapters.

Chapter 173 173: Zhang 138: Follow the Internet Cable to Urge for an Update! (Large Chapter)_3

[813 words]

Wait another five years.

Emperor Huizong of Song will issue a decree to rename the posthouse to "Xianlie Temple" to commemorate the achievements of his ancestors.

However, at this moment, the old man is not an official, nor is he preparing to do business in the marketplace.

To him, the three words Chenqiao Posthouse represent another message:

At this moment, he is less than a hundred li from Bianjing...

Then he thought of something, took out a package he carried, and retrieved a letter from it.

In the past days, the old man was leisurely at home.

Sometimes playing with Yi'Er, or engaging in some mathematics, fulfilling and leisurely.

If nothing unexpected happened.

He would have lived happily like this for a few more years, eventually dying of illness in peace.

However, just over a week ago, he suddenly received an urgent letter from Bianjing.

Judging from the time the letter was sent.

The whole letter took only three days from dispatch to delivery.

Moreover.

The sender of the letter was extraordinary:

This person was the former Prime Minister, the renowned Counselor to the Crown Prince, Duke Zhao Su Song, Su Zirong!

About forty years ago, the old man met this peer who was three years younger than him.

Back then, they even participated in the imperial examinations together, watching a performance by a spicy soup stall on the day the results were announced.

Unexpectedly.

Of the four people at one stall, two eventually rose to high positions, one became a literary master of the era.

Only he was unsuccessful in the exam, eventually securing a modest position as a Ninth-Grade Left Palace Attendant through connections.

Later, he authored "Emperor Huang's Nine Chapters on Mathematical Art" and gained slight fame in the mathematics world.

Unexpectedly, Su Song still remembered him, sent a congratulatory letter, and offered a gift, one piece of old ginseng even saved the old man's father's life.

After that.

The old man went to Dai Prefecture as an Eighth Grade minor official and corresponded with Su Song yearly.

Occasionally, when he returned to Bianjing, the other party didn't mind his status and often took him out to brothels... restaurants to dine and drink.

Therefore, over the years, Su Song and the old man maintained a good relationship.

When Su Song encountered complex math problems, he would often write to the old man for advice.

But what truly caught the old man's attention, prompting him to set off immediately that very day.

Were a few sentences in the letter.

[An old friend has recently acquired a young companion, named Wang Lin, with extraordinary knowledge, I have selected some of his words for Mr. Tongyu's careful contemplation]:

"...Yin transforms while Yang remains unchanged, observe quadrants through Tianyuan and Diyuan."

"...Square of the head, square of the tail, twice the product of the head and tail is in the center."

"...This person doubted the foundation of extraction methods, stating to list the numbers from which roots are extracted, calculate the corner once, add under to the front position, stop at the first position, then ascend and increase at the corner like before, reducing one place each to solve."

Then the old man moved his gaze downward and focused on the last section of the letter:

"Shao Guang Zhang says, there is now an accumulation of 1,860,867 feet, question: what is its cubic value?"

"Wang Lin says, first place the real part quotient in the first position to get the number one hundred, then multiply the top method by the lower square to place in the corner one hundred, multiply the corner to form fifteen thousand, divide the real, finish."

"Again multiply the top method by the lower part entering corner two hundred, multiply the corner to form thirty thousand. Again multiply the lower part entering the corner three hundred."

"Its square one, corner two, lower third retreated ten."

"Again at the next of the first position quotient number, multiply the top method by the lower part to enter the corner three hundred twenty."

"Multiply the corner to form thirty-six thousand four hundred, divide the real, finish leaving one hundred thirty-two thousand eight hundred sixty-seven."

"Again, multiply the next twenty by the lower method to enter the corner three hundred forty, multiply the corner to form forty-three thousand two hundred feet."

"Again, multiply the lower method to enter the corner three hundred sixty."

This is a problem involving the "Nine Chapters on the Art of Mathematics" of extracting the cube root of 1860867.

However, just as the old man was engrossed in reading that day, he was shocked to discover.....

There was no more text?

It was gone!

The last sentence from "Wang Lin" was:

"To know what happens next, please proceed to the Su Mansion in Bianjing, and I, the humble one, will certainly sweep the couch in welcome."

So.....

The old man immediately grabbed the package, called the old servant, and brought out the family carriage.

Followed the network... cough, the official road, to personally urge the continuation.

"For every time there's an abrupt ending, someday there'll be a knife in hand to slay the world's cliffhanger authors!"

.....

Note:

Requesting some monthly passes, writing through the night!!!!

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Tip: You can use left, right keyboard keys to browse between chapters.

Chapter 174 139 Flapping Butterfly Wings (Long Chapter)

[894 words]

A little over a week ago.

When writing a letter to Jia Xian, Old Su once mentioned some situations to Xu Yun:

Jia Xian is advanced in age, and what he studies daily are relatively profound mathematical problems, not swayed by money.

To persuade him to come to Bianjing to help, they must present something compelling enough to entice him.

Therefore, when choosing what to write in the letter.

Xu Yun could only rack his brains to include the knowledge Jia Xian might be most interested in.

Such as yin-yang... which is the odd-even changes, a few binomial issues, and...

The very famous cube root problems in the "Nine Chapters on the Art of Mathematics," which up to now have few solutions, among others.

Unexpectedly.

The 'dose' Xu Yun gave seems a bit too much, and the other party is already on the way, following the internet cables.

Of course.

Due to the limited perspective.

Xu Yun was unaware that a reader was preparing to visit him personally with a knife, and he was still leisurely teaching his class.

On the second day of Wang Yue's recovery, he saw Xiaoli coming to the mansion on time again.

"Miss Li."

Xu Yun first greeted Xiaoli familiarly, then glanced behind her with some surprise and asked:

"Why don't I see Prince Jian today?"

In the past period.

Xiaozhao and Xiaoli would come together almost every day or two, listening to Xu Yun teaching the basics of physics with Old Su.

Now ten days have passed.

Even Xiaozhao and Xiaoli, who had no foundation in physics, could already do basic force analysis.

According to the agreement when dispersing the class two days ago.

Today, Xiaoli and Xiaozhao were supposed to arrive at the mansion simultaneously even if Xiaozhao could not come due to something, he should have sent a message in advance.

After all, the concept of keeping promises was valued by ancient people.

Even standing someone up required following etiquette, and perhaps even offering gifts as an apology.

Unlike some authors later, who have no expressions even if they delay.

Upon Xu Yun's inquiry, Xiaoli's face immediately became solemn:

"Wang Lin, some unforeseen events occurred in the palace today, and I'm afraid Prince Jian won't be able to attend the lesson."

Xu Yun blinked and asked in surprise:

"In the palace? Isn't Prince Jian no longer involved in palace affairs?"

Previously mentioned.

After Emperor Huizong ascended the throne.

To avoid suspicion... or to save his life, Xiaozhao's personality 'was forced' to change drastically.

Not only did he frequent taverns and brothels, but he also avoided attending court meetings and had little contact with the court.

He was even reported to the Zongzheng Temple several times but was "generously" suppressed by Emperor Huizong.

In this context.

Today's Xiaozhao being in the palace is indeed surprising.

Seeing Xu Yun's surprised expression, Xiaoli first glanced around.

After confirming no one else was nearby, she lowered her voice and said:

"Last night at the hour of Yin, Empress Dowager Xiang fell during the night; it seems like it's quite serious..."

Upon hearing this, Xu Yun's pupils shrank immediately.

Empress Dowager Xiang.

This is a character in Huaxia history who is not prominently featured but is nonetheless significant.

She is considered insignificant because her past life was uneventful:

She was the great-granddaughter of Prime Minister Xiang Minzhong and the Empress of Zhao Xu, Emperor Shen Zong of Song. In 1085, when Emperor Zhezong ascended the throne, she was honored as the Empress Dowager.

In Huaxia history, women with similar resumes are not exceedingly many, but neither are they too few.

From the time of Ying Zheng proclaiming himself as emperor during the Qin Dynasty to Pu Yi's end, there have been over 400 emperors in Huaxia history, and conservatively estimated over 300 Empress Dowagers.

Compared with empress dowagers like Cixi, Empress Dowager Xiang indeed lacks highlights.

As for being unignorable.....

It's the fact that she, as mentioned before about Xiaozhao, was the greatest contributor, or possibly the sole aid, allowing Emperor Huizong to ascend the throne.

In terms of nature.

Empress Dowager Xiang's misjudging of people... or her choice to forcibly support Emperor Huizong to secure her position is a key turning point in Northern Song's path to sudden collapse.

Therefore, as a Song Fan, Xu Yun vaguely remembered the cause of Empress Dowager Xiang's death:

In the year 1101.

Empress Dowager Xiang died suddenly in January due to a sudden stroke.

She was fifty-six or fifty-seven years old at the time.....

Before this, historical records noted she 'remained in good health.'

Which means...

According to historical trajectories, Empress Dowager Xiang did not... maybe... possibly... likely.....

experience this fall?

Realizing this.

Xu Yun's eyes flashed with a moment of surprise and doubt.

Because he thought of...

Old Su.

Similarly, according to the normal trajectory, Old Su should have already left Bianjing, returning to his hometown in Jingkou.

But currently.

Due to Xu Yun's sudden appearance, Old Su gave up the idea of returning to Jingkou and temporarily stayed in Bianjing.

Additionally, having saved Wang Yue who should have died, it can be said that in terms of the timeline, there are already severe discrepancies between the dungeon and historical standard lines.

More crucially...

Xu Yun, or many experts in the later generations, speculated:

Old Su might die next year because he fell during this time, leading to a sudden and depressed mental state.

Suppose - just suppose, if Old Su's fall happened on the way back to Jingkou?

Could this lead to another speculation:

Empress Dowager Xiang's fall was supposed to happen to Old Su instead?

Just like the butterfly effect that has been mentioned countless times.

Xu Yun flapped his wings at Old Su Mansion, and Empress Dowager Xiang in the palace was blown down?

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Chapter 175 139 Butterfly Wings Fluttering (Large Chapter)_2

[939 words]

Of course.

This is just Xu Yun's baseless speculation, without any evidence to support it.

After all, this era and the future are separated by a full nine hundred years, and no one can say for sure what the true historical details are.

Perhaps in real history, Empress Dowager Xiang did indeed just take such a fall, and it was all just a coincidence?

Then Xu Yun shook his head, pushing these thoughts aside.

He turned and said to Xiaoli:

"The Empress Dowager is unwell, and as a junior, Prince Jian should visit her as is proper.

Since that's the case.

Miss Li, let's focus on our own matters first; the master is already waiting in the study."

Upon hearing this, Xiaoli nodded, a hint of anticipation flashing in her eyes.

Then Xu Yun led Xiaoli through several courtyards, eventually arriving outside Old Su's study.

Or more accurately, Old Su's academy:

As a renowned bibliophile whom even Emperor Shen Zong of Song envied, the Old Su family's library in Records of the Grand Historian contained a staggering ten thousand volumes, vast as a sea.

In normal history.

When Old Su returned to Jingkou, he even directly leased three carriage teams, deploying dozens of carriages just to transport his collection back to Jingkou.

Therefore, in this residence.

The location of Old Su's collection was not a single room, but a courtyard consisting of three two-story pavilions.

When Xu Yun and Xiaoli arrived at this courtyard, Old Su was seated at a stone table, examining a microscope.

That's right.

A microscope.

Of course.

This was a simple microscope, crudely made by craftsmen based on blueprints provided by Xu Yun, with a magnification of only over twenty times.

After all, higher precision lenses require calculations to prepare, such as the lens maker's formula $1/f = (n-1)(1/r_1 - 1/r_2)$, etc.

Moreover, one must consider various indices of the glass product.

Even if Xu Yun directly applied the formulas, it would take at least another half month just to possibly complete it.

Not to mention Xu Yun intended for Old Su to derive and experiment on their own, which would take even more time, at least over a month.

But high magnification precision is one thing, and a low magnification microscope is another.

Just like how Old Su once created a five-times magnification telescope.

In the Northern Song period, without the need for professional formula derivation, you could grind your way to a set of low magnification microscope lenses.

Although a microscope magnifying over twenty times is not sufficient to observe cell structures, it can barely serve as introductory equipment for microscopic fields.

At least it satisfies Old Su's curiosity or something of that sort.

Upon entering the courtyard, Xiaoli obediently saluted Old Su:

"Good morning, Uncle Su."

"Oh, Qingzhao is here."

Old Su shifted his gaze from the microscope, greeting Xiaoli first.

Then he let out a light "hmm" and asked about the same topic as Xu Yun:

"Hmm? Why isn't Prince Jian here?"

Xiaoli exchanged a glance with Xu Yun, then retold the earlier words:

"To Uncle Su, some matters arose in the palace today..."

Old Su listened quietly, and a glint of insight flashed in his eyes:

"What? The Empress Dowager has fallen?"

As a former Prime Minister, Old Su maintained neutrality between the old and new political factions for a long time, so his political skills were actually quite high.

Upon suddenly hearing the news of Empress Dowager Xiang's fall, many speculations instantly crossed his mind.

"If the Empress Dowager recuperates and releases power, the pressure on Prince Jian will likely increase....."

However, given that Xiaoli could only access general situations, insider information was obviously unavailable, so many judgments couldn't be accurately made.

Therefore, after pondering for a moment, Old Su decided to set this matter aside for now, planning to investigate through his own channels later.

Then he pulled his thoughts back to the present, picked up a box from the table, and said to Xu Yun:

"Xiaowang, in the box is the cockroach that was killed, pressed with a glass slide as per your request, see if it's suitable."

Xu Yun took the wooden box, gently opened the lid, and looked inside.

At this moment.

The wooden box contained several cockroach glass slides, which had been pre-disinfected with alcohol, so they didn't appear too disgusting.

No one knew who crafted the slides, but the gas tightness and neatness were very well-done.

Then Xu Yun took an empty glass slide and moved the microscope under the shade of a tree.

He adjusted the slide holder to its lowest position and began the operation.

He placed the slide into the gap at the rear of the slide holder, slowly pushing it forward with both hands.

Simultaneously, he spoke to Old Su and Xiaoli:

"The movement while placing the slide should be gentle, ensuring it faces the light hole directly.

Then, look through the eyepiece with your left eye, rotating the reflector with both hands like this until you see a bright field of view."

Old Su watched Xu Yun's way of rotating the reflector and mimicked it with empty hands.

Then he nodded, indicating he remembered.

Xu Yun continued to operate while explaining:

"Once the light is adjusted, slowly rotate the turret to align the low power objective lens with the light hole."

"Then focus both eyes on the eyepiece, turning the coarse adjustment knob to slowly lower the tube until the objective lens is close to the slide."

"Look through the eyepiece with your left eye, turning the coarse adjustment knob to slowly raise the tube."

"Until you see an image, then finely adjust with the fine focus knob for a clear view."

After completing the final step, Xu Yun clapped his hands together and said,

"These are the steps for focusing a microscope. Once these steps are completed, you can begin observing the image."

Old Su nodded, prepared to ask about any steps he hadn't memorized, but was interrupted by Xiaoli's words from the side:

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Chapter 176 139 Butterfly Wings Fluttering (Large Chapter)_3

[826 words]

"Wang Lin, may I try this microscope?"

Xu Yun was startled:

"Miss Li, did you remember all the steps?"

Xiaoli tilted her head, seeming a bit confused herself:

"Not really remembered all of them...just feel like I can reconstruct it."

Xu Yun thought for a moment, scrambled the order of the microscope, and stepped aside:

"Miss Li, would you like to try?"

Xiaoli didn't hesitate much, walked over boldly, and somewhat awkwardly picked up the glass slide.

She murmured to herself while replicating Xu Yun's actions:

"First the slice...adjust the aperture...rotate the coarse focus...then the eyepiece...fine focus...done!"

Xu Yun was immediately surprised to look at this little sprout.

You should know.

Over the past few days.

Within the small class consisting of Xiaoli, Xiaozhao, and Old Su, each person's learning progress varied.

The fastest among them is naturally Old Su.

As a contemporary master with some physics knowledge, Old Su has now learned the concept of acceleration.

He often asks Xu Yun for additional lessons after class, sometimes questioning for several hours.

A few days ago, he even dragged Xu Yun to a small hill outside Bianjing City to conduct Galileo's iron ball experiment.

Among the remaining Xiaozhao and Xiaoli, Xiaoli's progress is noticeably slower than Xiaozhao.

Often, the knowledge that Old Su and Xiaozhao can grasp immediately requires Xiaoli to ponder over two or three times to understand.

After all, this girl is a standard liberal arts student.

Interest is one thing; thinking and acceptance ability are another.

But what surprised Xu Yun was.....

Although Xiaoli is a bit stuck in physics and math, she seems to have some talent in biology?

That's quite interesting...

Of course.

Whether this little sprout can eventually walk the path of biology requires further observation.

After all, this is just a mere reconstruction of microscope steps.

Then Old Su tried his hand as well, and after confirming he had mastered the steps, Xu Yun officially replaced the slice with a cockroach specimen.

The twenty-times magnification of the microscope gives an observation effect similar to the close-up cameras of later generations — interested students can search on certain online platforms. Fifteen to twenty-times cameras cost only a few bucks.

Buying one to attach to a keychain and occasionally observing plants is not a bad idea either.

This magnification may not show cells, but with several folds of enlargement, some organs of the cockroach can be seen very clearly.

"So that's it..."

Looking at the magnified cockroach hind leg, Old Su mused:

"Cockroaches can stand firm on walls because their feet have so many fine hooks.

The hooks catch onto wall protrusions to prevent them from falling off....."

"Not only that."

Beside him, Xu Yun picked up a cockroach egg with a homemade tweezer and addressed Old Su:

"You probably don't know, cockroaches only need to mate once in their lifetime and can continuously reproduce offspring.

Simultaneously, they carry a large number of pathogenic bacteria, and many plagues through history were caused by cockroaches and rats.

Therefore, if possible, cockroaches and rats should be eradicated."

Old Su nodded slightly, keeping this matter in mind.

Although he had retired from official duties, when it comes to disease sources, he wouldn't stand idly by.

After all, across various dynasties, the number of civilians dying from plagues is innumerable.....

In a certain sense.

Plagues drain a nation's vitality and hollow out its foundations.

If what Xu Yun says is true, then...

Cockroaches must be killed!

Then Old Su glanced at Xiaoli, who was observing an ant with apparent keen interest.

He couldn't help but touch the microscope, admiring:

"Microscopic, microscopic, Xiaowang, this device is indeed as miraculous as you said.

Even twenty-times lenses can clarify cockroach organs; if it could magnify five hundred times, perhaps it would reveal those fine details invisible to the naked eye..."

Although in recent days, Old Su gradually accepted many concepts proposed by Xu Yun.

But as an ancient science master, he retained some caution about certain ideas.

Such as microorganisms.

After all, this stuff is different from generators and electrolytic cells; Xu Yun has always put forward theories without evidence.

Acceptance is one thing; believing and treating it as truth is quite different.

At least before truly seeing microorganisms or bacteria, Old Su would have some doubts.

This is quite normal, an understandable human reaction.

In a certain sense.

The concepts Xu Yun articulated seem more absurd than brainwashing, almost like reshaping cognition...

We can only say that as Xu Yun presents more scientific tools, the possibility of these becoming reality continually increases, approaching confirmation.

Amidst Old Su and Xu Yun's conversation.

Mr. Xie's figure suddenly appeared at the doorway of the study courtyard:

"Sir."

Seeing this, Old Su promptly drew his thoughts back to reality:

"Oh, First Year, what matter do you have?"

Mr. Xie hurried forward, handing over something resembling a visiting card.

Then he whispered a few words to Old Su.

Upon hearing them, Old Su was delighted, quickly saying:

"Really? Please invite him quickly!"

Mr. Xie bowed and obeyed the order, while Old Su looked at Xu Yun:

"Xiaowang, the person you were waiting for has arrived."

"The person I was waiting for?"

Xu Yun was first stunned, then thought of something:

"Could it be Mr. Tongyu?"

As soon as these words fell.

Outside the study.

A somewhat elderly but bold voice was heard:

"Where is Wang Lin? Damned cliffhanger, hurry and update!"

...

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Chapter 177 140 Fooling Old Jia

[946 words]

Su Mansion.

Inside Old Su's study.

At this very moment.

A small but vigorous old man sat on a chair, his sharp eyes like an eagle's were locked intensely on Wang Lin who sat opposite him.

As if the next second, beams of light would shoot out from his eyes and turn Wang Lin into dust with a "biu":

"You are Wang Lin?"

Xu Yun rubbed the back of his neck and sighed:

"That's me, the humble one."

Hearing this, the old man immediately pulled out a letter.

Slam!

The old man flung his wrist and smacked it heavily onto the table:

"Did you write this letter?"

Xu Yun opened his mouth, wanting to say something cheeky like 'The master wrote this letter.'

But considering he might get a beating if he said that, and his character isn't like Wang Qiang, that joker, he simply sighed and said:

"That's right."

"....."

The old man frowned and said in a deep voice:

"Wang Lin, though this is our first meeting, you don't seem to be that treacherous of a person, and your calculations are far above average. Why do you like to cut chapters so much?"

I know a chapter-cutter... ahem, a chapter-ender, and now there's probably a mound a meter high on his grave."

This question was one Xu Yun had been asked countless times in his past life, so he replied reflexively without thinking:

"No particular reason, just got used to it."

The old man:

"???"

He then took a deep breath, suppressed his anger, and said resolutely:

"Wang Lin, I've already personally come to Bianjing, shouldn't you show me the rest of the content?"

This time Xu Yun was straightforward, taking out a piece of paper from his body.

Unfolding it, laying it flat.

Pressing down on one corner, he pushed it in front of the elder... which was Jia Xian:

"Mr. Tongyu, the rest of the content is all here, please take a look."

Jia Xian's eyes lit up instantly.

He eagerly took the paper and started reading it seriously:

"...Upon completion, one hundred and thirty-two thousand eight hundred and sixty-seven units, calculation steps as follows..."

"....Then one proceeds with the next divisor twenty, entering solid together three hundred and forty, multiply solid into mass, total forty-three thousand and two hundred square feet."

"...Then multiply again entering solid together three hundred and sixty... its mass one, solid two, remainder three downwards, as before."

Jia Xian analyzed as he read, the entire process without using any paper, pen, or tools, completely relying on mental arithmetic!

"...The upper divisor of the third position yields three, multiply again entering solid, total three hundred and sixty-three, multiply solid into mass, total forty-four thousand two hundred and eighty-nine...."

"....Use the upper divisor three to divide the actual, exactly, obtaining...."

"The number of one side of the cube."

After reading the last sentence.

Jia Xian couldn't help but close his eyes, frowning slightly, as if verifying the result.

After about a minute or so.

This seemingly hot-tempered little old man slowly opened his eyes, exhaled a breath of impure air, and looked at Xu Yun with a complicated expression:

"No errors in the calculation text, yet the method for finding solid in the Nine Chapters now has a third solution."

Nine Chapters on the Art of Mathematics.

This is an ancient book even modern elementary students have heard of.

But many have only heard of its name, not knowing why it's called the Nine Chapters on the Art of Mathematics.

The reason is simple.

Because it is composed of nine chapters...

That's right, it's that simple...

These nine chapters are Field Measurement, Millet and Rice, Disproportion, Lesser Width, Functional Operations, Equitable Distribution, Surplus and Deficiency, Solving Systems of Linear Equations, and Pythagorean Theorem.

Among them, in the chapter 'Lesser Width', the most famous should be the process of finding the cube root of 1860867. (Note: previously someone actually asked me which person the Lesser Width chapter is about...)

Until the year 1100 AD, the ancients had only proposed two methods for extracting cube roots.

The method proposed by Xu Yun, however, was one that had never been discovered before.....

The third solution!

Similarly.

This was also a mystery that Jia Xian had always wanted to solve in the first half of his life.

But unfortunately.....

Human energy is limited.

After discovering the secret of triangles, Jia Xian could only regrettably give up on solving the problem of cube roots, devoting all his thoughts to the field of triangles.

This is like some online writers in later generations.

Originally writing a book with one to two thousand subscribers, but suddenly an unexpected hit came out under a pseudonym, so they helplessly abandoned the former to write the latter.

Of course.

Xu Yun definitely wouldn't do such a thing, as most of his books were only followed up upon being banned.

.....This is truly a sad story.

Then Jia Xian took another deep breath, pointing to a corner of the envelope, and asked Xu Yun:

"Wang Lin, what do the symbols in this corner of the letter mean?"

Xu Yun leaned over, took a few glances, and explained:

"You mean these? These are Arabic numerals."

"Arabic numerals?"

Xu Yun nodded and continued:

"They're symbols invented by the people of the Western Regions, corresponding to Huaxia's one, two, three, four, and make writing somewhat simpler. Mr. Tongyu could also give them a try."

Arabic numerals, unlike Yang Hui's Triangle, were indeed invented by ancient Indians and weren't an overlooked ancient achievement of Huaxia.

So Xu Yun didn't deliberately claim them as his own, since he's no thief.

Currently, Huaxia frequently uses a small tool called chips for calculations.

Somewhat similar to chopsticks of later generations, each about ten to twenty centimeters in length, they are also called counting rods.

When calculating.

One simply has to arrange these chopsticks in different formations to represent various numbers for calculations.

Moreover, sometimes if there were no calculation chips, one would use it.....

Ahem.

In short.

Although this way is a bit more convenient than paper calculations, it is still somewhat cumbersome compared to Arabic numerals.

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Tip: You can use left, right keyboard keys to browse between chapters.

Chapter 178 140 Fooling Old Jia_2

[966 words]

Though this tool was invented by the ancients, one must admit, it indeed possesses a convenience apparent to the naked eye.

Therefore, after careful consideration.

Xu Yun ultimately decided to first introduce the concept of Arabic numerals.

Considering the calculations needed in the future are bound to be quite substantial, having a convenient tool would certainly make things easier; efficiency being higher is naturally better.

Of course.

Although Jia Xian did not recognize Arabic numbers and symbols, this does not mean he did not understand these concepts:

Quite the contrary.

Whether it's addition, subtraction, multiplication, division, or square and cube roots, ancient Huaxia mathematicians had long been studying them.

Thus, it took almost no time for Jia Xian and Old Su beside him to quickly understand and accept Arabic numerals.

And after understanding the content of the letter and the related mathematical concepts, Jia Xian somewhat calmed down, not as irritable as before.

He cleared his throat lightly, then subtly put away the letter and Xu Yun's paper, and said to Xu Yun:

"Alright, Wang Lin, you went to such lengths to lure this old man to Bianjing, surely it is not just to introduce Arabic numerals, is it?"

In ancient Huaxia.

Although the mathematics circle did not have BBS or forums like in later generations, under the organization of some highly respected and well-off bosses, regional communication was quite common.

Even in the Jiangnan Region, a small-scale publication akin to a mathematics newspaper started to emerge.

This kind of publication was very cheap, costing only a few coins to subscribe, and was printed about once a month.

Considering the cost of paper, transportation, and printing at this period, this price was basically akin to selling at a loss.

In short.

If Xu Yun merely wanted to publish his findings, he could easily make his solutions public by using the connections of Old Su to contact a few 'editors'.

Therefore, it was very obvious.

The reason Xu Yun went to such great lengths to 'trick' himself into coming to Bianjing must be because he had a request.

Xu Yun did not keep him in suspense, he paused briefly, then bowed slightly to Jia Xian and said:

"This time, inviting Mr. Tongyu here, I indeed have an important matter, hoping sir could lend a hand."

"What matter?"

"Studying the lens formula."

Jia Xian was taken aback at once and blinked his eyes vacantly:

"Lens? Formula?"

The latter could be understood, but what on earth was the former?

Old Su, who was beside them, upon seeing this, immediately took out a roughly polished lens from his sleeve pouch and handed it to Jia Xian:

"This is the object."

Jia Xian took the lens and examined it for a while, contemplating:

"It seems like Ai Dai, but both sides are fuller, yet judging by the material... it also seems to be made of glass?"

Xu Yun nodded:

"Correct."

Jia Xian's eyes filled with increasing puzzlement:

"But what does it have to do with a formula?"

Xu Yun was silent for a moment, then said:

"Mr. Tongyu, I have heard you say once, 'The myriad things in the world, each has its inherent reasoning', is it not?"

Jia Xian nodded gently, this saying was somewhat a motto of his life:

"Correct."

"So have you ever thought... the light we see every day might also have some undiscovered reasoning?"

Jia Xian's pupils immediately constricted, and he instinctively looked out the window:

"Light?"

Xu Yun thought for a moment, then took paper and pen.

He drew a right-angled triangle with its right angle facing the right and its base at the bottom.

He then drew several lines on each side, sequentially marking them with the words "Sun, Moon, Mountains, Winter Green, North Heart," totaling 22 characters.

He then drew an inscribed circle and narrated while writing:

"Mr. Tongyu, from the center of the circle, vertically and horizontally extracted, one can get fifteen shapes, all without oddity."

"The three vertices are, respectively, Heaven, Earth, and Qian; the incenter of the Heaven-Earth-Qian triangle is called the Heart."

"A vertical line passing through the Heart intersects the triangle and the incircle at Sun, South, and North points respectively."

"A horizontal line passing through the Heart intersects the triangle and the incircle at River, East, and West points respectively."

"The vertical line passing through East and the horizontal line passing through South are both tangents to the incircle, they intersect the Heaven-Earth-Qian triangle at Gen, Kun, Mountain, and Moon four points, intersecting each other at Xun point."

"Qian, Kun, Xun, and Gen four together can form a square."

"The vertical line passing through the Moon intersects the East-West horizontal line at the Green point, and the Ground-Qian edge at the Spring point. The horizontal line passing through Mountain intersects the North-South vertical line at the Vermilion point, and the Sky-Qian edge at the Gold point. These two lines intersect at the Fan point."

"Finally, the horizontal line passing through the Sun intersects the Sky-Qian edge at the Dawn point, and the vertical line passing through River intersects the Ground-Qian edge at the Dusk point."

"The above points total 22."

When Xu Yun initially started drawing, Jia Xian's gaze was somewhat casual.

He didn't understand why Xu Yun, while speaking about light, would divert the topic to a triangle.

But as he watched.

His expression gradually became more serious.

By the end.

Only one emotion remained on his face...

Astonishment!

As an expert in triangular problems, Jia Xian had proposed an idea... or rather a theory, many years ago:

"The sum of the legs and the hypotenuse is harmony, the difference is contrast, equality is change, for multiplication, for segments, squared is the product, is the power."

This is the famous Thirteen Diagrams of the Pythagorean Reply:

Referring to the leg (a), another leg (b), hypotenuse (c), the contrast of legs (b-a), contrast of leg and hypotenuse (c-a), contrast of hypotenuse and another leg (c-b), sum of legs (a+b), sum of leg and hypotenuse (a+c), sum of hypotenuse and another leg (b+c), contrast with hypotenuse added (c+(b-a)), sum and contrast with hypotenuse (c+(a+b)), sum and contrast (a+b)-c, contrast contrasted (c-(b-a)).

One can say this.

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Chapter 179 140 Fooling Old Jia_3

[728 words]

Jia Xian has already completed all the relationships of the Pythagorean triples and their sums and differences, and has moved beyond the problems in the "Nine Chapters" to conduct an abstract analysis of the Pythagorean theorem.

Yet the diagram drawn by Xu Yun not only closely resembles his ideas but is even more vivid and concise than the concepts he proposed!

Looking at the stunned expression on Jia Xian's face, Xu Yun couldn't help but let out a sigh of relief:

It seems that he had successfully 'invoked the divine'.

Seeing this.

Many students must have already understood the origin of Xu Yun's drawing:

Indeed.

It is the "Measuring Circle Sea Mirror"!

"Measuring Circle Sea Mirror".

This is a mathematical masterpiece written by the mathematician Li Ye during the Jin Yuan Period, also known as the renowned Celestial Essence Skill.

Early in the year 1234.

Li Ye obtained a mathematics book from Dongyuan at Tongchuan, in which there was the theory of the Nine Guests.

Li Ye then combined the findings of Dongyuan and Jia Xian to compile the Pythagorean circle theorem into a complete system.

Moreover, more crucially.

After the "Measuring Circle Sea Mirror", Li Ye, based on the Pythagorean circle theorem, proposed the problem of the half-segment yellow square power.

Yes.

Half-segment yellow square power.

Which is the prototype of the paraxial approximation....

Of Kirchhoff's diffraction formula!

After drawing the dividing lines.

Xu Yun took Old Su's lens and placed it upright at the center of the inscribed circle he had drawn.

He then pointed to the 'Qing' line within and said to Jia Xian:

"Look."

At this moment.

Under the effect of the lens refraction, a visible deflection has appeared on the 'Qing' line both inside and outside the lens!

Then Xu Yun wrote a 'Tian' outside the Qing line, removed the lens, and wrote a 'Di' on the Qing line where the deflection had occurred inside.

Then he continued to write:

Assume the bottom position of the Qing line is Xuan, and the deflected end is Huang.

The positions relative to the circle are Hong and Huang, respectively.

Then we have:

$Tian = \frac{1}{2} Di$.

$Xinbei^2 = Xuan^2 + (Hong - Huang)^2 + (Hong - Shanxin)^2$.

Meanwhile:

$(\frac{\delta}{2} Xuan) Hong^2 + Huang^2$ is much smaller than the circumference rate.

$(Hong + Hong) \times \delta = Xinbei \times ?? (Huang + Xin朱) \times ? = Hong - Shanxin \times ?$.

After writing this, Xu Yun said to Jia Xian:

"Mr. Tongyu, this is a certain deflection solution passed down by my predecessors, but several unknown symbols and deduction methods within it are unknown.

Moreover, this kind of solution is necessary for the preparation of a certain item, so I can only ask sir to come, hoping you can lend a hand."

Jia Xian was silent for a moment, then looked at the lens on the table again and said:

"Wang Lin, the third solution in the 'Shao Guang' chapter has been my lifelong wish. Originally, I thought no one would solve it before I died, but today you have given me an extraordinary surprise.

The ancients said.

If in the morning you hear the Way, in the evening you can die content.

My gratitude for dispelling confusion is immense, and I shall never forget it. Previously I called you a fragment dog, that was just a momentary outburst.

Now, even if just to repay this kindness, regarding the lens formula, I absolutely will not shirk any responsibility.

However, Wang Lin,

Regarding lenses, I have never ventured into it, so I cannot guarantee any results. I can only do my best and leave it to the Celestial Mandate.

If I cannot solve this problem, I will divide half of my family estate with you as a reward."

Xu Yun was taken aback by this and immediately broke into a cold sweat.

Oh my.

This boss is astonishingly straightforward, does it mean that in ancient times people gave pensions at the drop of a hat?

So he quickly said:

"Mr. Tongyu, your overstatement, your willingness to help is already more than I could ask for. Please do not mention the reward again."

Jia Xian looked at him but said nothing, instead turning to Old Su and bowed:

"Brother Zirong, could I borrow some paper and pen?"

Old Su smiled and returned the gesture to his old friend:

"Mr. Tongyu, feel free to use as you wish."

Jia Xian nodded at this, walked to the table, and was just about to start calculating.

But just at that moment.

The voice of Mr. Xie suddenly came from outside:

"Sir, Mr. Yang Huai, Mr. Jinqu, and others have arrived at the courtyard."

....

Note:

This afternoon I chatted with a certain old dove, he plans to start a new book, but it turns out he hadn't logged in for too long and forgot the password to his writer account, hahaha.

Also, writing this chapter exhausted me, purely original deduction....

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Chapter 180 141: The World's Strongest Mathematics Team of the 11th Century! (6.6k)

[992 words]

"Oh? Mr. Yang Huai?"

Inside the room.

Hearing this name mentioned by Mr. Xie, the Old Chief Steward.

Old Jia, who was grinding ink, suddenly put down the ink block, lifted his head, and asked Old Su:

"Brother Zirong, Mr. Yang Huai... Is this the same person as Han Gonglian, Han Wenyi, who calculated the gears and scales in the Yuan You Celestial Sphere?"

"That's correct, it's him."

Old Su nodded, confirming his words.

At the same time, he raised a slight apologetic smile on his face and explained:

"The matter of lenses is of great importance; therefore, I shamelessly invited several mathematics masters to assist us. I kindly ask Mr. Tongyu not to take offense."

Old Jia waved his hand indifferently, saying:

"Brother Zirong, it's a small thing, no need to talk about blame.

It just so happens that I haven't seen Wenyi for many years, so it's a good opportunity to meet him at your residence and see what he's turned into.

Moreover, I can save a few coins and get a free meal from you; isn't that wonderful?"

Old Jia spoke with remarkable frankness, without a hint of falseness.

From this, it was clear.

He indeed found nothing wrong with Old Su's actions.

After all, he was once a Left Palace Attendant and had participated in several engineering designs organized by the prefecture after being transferred to Dai Prefecture.

Thus, he understood clearly.

In some practical projects, an individual's capability is quite limited, and the official won't put all their eggs in one basket.

At most, they would prioritize based on status, but the final calculation result would still prevail.

Although he wasn't clear yet about what grand ambition Old Su, or rather Xu Yun, intended to achieve using lens principles this time.

But judging from the formulas Xu Yun had previously written, it wasn't hard to see that this was evidently an endeavor requiring a large number of tools... ahem, computational power.

Therefore, he wasn't just neutral about the arrival of Han Gonglian and others; he was very, very welcoming.

After a while.

Led by Mr. Xie, the Old Chief Steward.

Six men differing in height, build, and age walked in from outside.

"Mr. Tongyu, come, let me introduce them to you."

After the six entered the room, Old Su pointed at them and said:

"This is An Shisong, courtesy name Yingtong, currently an Assistant Chief of Works at the Ministry of Personnel, known as Mr. Dongping."

An Shisong was a little old man in his fifties, even skinnier than Old Jia, with a tuft of goatee.

However, what caught people's attention the most was not his beard but the fact that he was wearing a black riding jacket in the middle of summer.

After Old Su finished introducing him, this person respectfully saluted Old Jia:

"Junior An Shisong, greetings to Mr. Tongyu."

Although Old Jia seemed to have a bad temper, he was relatively polite toward peers.

After all, mathematicians of this era were as rare as authentic readers in later generations; he simply returned the salute:

"Mr. Dongping is too kind."

Old Su, seeing this, continued introducing:

"This is Xiong Huanzhi...."

"This is Song Ke...."

"This is Lin Huainan....."

And upon reaching the fifth young man, Old Su added a few extra comments:

"This is Liu Yi, courtesy name Le Yi, styled Mr. Jinqu.

He is the youngest mathematics instructor at Jigu Academy, a scholar of vast knowledge with a promising future."

Hearing the name Liu Yi.

Old Jia didn't react much, but Xu Yun, on the side, couldn't help giving him a few more glances.

Liu Yi.

This is the mathematician briefly mentioned in historical records, discussed during the selection process.

However, the historical records of Liu Yi were sparse, merely mentioning him as a late Northern Song figure.

Around the Third Year of Yuanfeng, namely 1080, he completed a work titled "On the Root of the Ancient," proposing a method for solving quadratic equations.

Given that later Yang Hui included him in the "Land Area Comparison and Rapid Calculation Method," his capabilities ought to have been stronger than those of ordinary mathematicians.

After all, Yang Hui was a person who lived in the mid-13th century, only about a hundred years apart from the Northern Song Dynasty.

This is equivalent to studying a figure from the time of the Opium War in modern terms, theoretically not prone to significant mistakes or omissions.

After introducing Liu Yi.

Old Su pointed to the tallest and apparently largest man on the far right:

"Mr. Tongyu, you don't need me to introduce this person, right?"

Old Jia stepped forward, sized up the person a bit, and said with some nostalgia:

"Wenyi, it's been twenty years since we met, right?"

The large man... which is to say, Han Gonglian, cheerfully cupped his fists towards him and said:

"It's been twenty-three years; sir, you look as distinguished as ever despite the time."

Old Jia returned the salute briefly and then curiously asked:

"Wenyi, when I last saw you, it seemed you couldn't even get enough to eat; you had to work odd jobs to make a living after leaving the court.

How is it that you seem to have gained quite a bit of weight over these years?

And those clothes... let me see... ah yes, from the Celestial Fresh Pavilion?"

Celestial Fresh Pavilion.

The name alone indicates this shop isn't ordinary.

After all, in ancient Huaxia, while personal names were understandable, shops with 'Heaven' in their name were not common.

Especially under the nose of the Emperor in Bianjing, such shops were at least owned by regular members of the royal family.

Looking at Old Jia's face full of surprise, Han Gonglian maintained his cheerful demeanor:

"Mr. Tongyu, you might not know, but in the Seventh Year of Yuan You, I won seven hundred coins from a gambling game, bought a few acres of land, and stocked some grain after the fall harvest.

Come the new year, with Qingtang being recovered, grain prices soared unexpectedly, making me quite wealthy...."

Old Jia and Xu Yun:

"...."

Well.

Another little mystery was solved.

Those familiar with Song History know that the Song Dynasty was a period where the gambling industry was exceptionally developed.

The more common activities included betting on coin tosses and a game called "Guan pu," with more advanced ones being Cuju and horse racing.

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Chapter 181 141: The World's Strongest Mathematics Team of the 11th Century! (6.6k)_2

[830 words]

A more outrageous bet would be on which concubine the Emperor favored today—sometimes the Emperor himself was backing these bets, can you believe it?

Basically, other than the succession of the imperial throne, anything could become the subject of a wager.

Therefore.

Something quite miraculous happened:

In the Northern Song Dynasty, until before the year 1023, the name of each person who hit the jackpot annually was recorded.

In the Seventh Year of Yuan You, which is 1092 AD.

A certain Emperor of Europe in Bianjing won more than seven hundred guans of money, and the registered name was Han Gonglian.

Thus, some people in later generations of the mathematical community firmly believe that this Han Gonglian was indeed the mathematician, that they were the same person.

After all, the name Han Gonglian is fairly rare, and the odds of coincidence aren't high.

However, another group of people denied this for lack of accurate records.

Although officially it's for the sake of so-called rigor, in reality, Xu Yun was more inclined to think it was out of the anger of those who never win...

As the focus returned to the original subject.

After introductions were made, Xu Yun briefly reiterated the issue at hand.

After a while.

Several mathematicians, at least top-ranked ones of the current era, formally began their calculations.

Just look at this setup:

Jia Xian, Han Gonglian, and Liu Yi, these three mathematicians are recorded in history books.

The other three might not be famous, with little historical documentation.

But from simple exchanges, it was evident that they had significant mathematical talent, just overlooked because they weren't recognized as mathematicians.

It could even be said.

In this era, in the year 1100 AD.

These six were the strongest math troupe in the world!

A truly exclusive lineup.

From a future perspective.

The problem posed by Xu Yun wasn't particularly difficult:

It was a gateway problem in Fresnel approximation, technically a part of geometric optics, with multiple solution methods available.

The simplest one, of course, was the geometric optics diagram method.

However, as simple as it is, the diagram method provides very limited information; it can only detail the imaging properties of a lens with a known focal length.

It can't link the focal length with the lens's inherent properties, representing the simplest mathematical approach.

Going further, one could employ the fundamentals of geometric optics, namely Fermat's Principle.

With Fermat's Principle, one could determine the influence of lens shape and material on imaging under geometrical optics approximation, being mathematically more complex.

The third stage was the Huygens-Fresnel principle, the scalar wave diffraction theory of light.

Using this theory for image analysis could provide more information—such as the influence of lens aperture, which is why larger apertures are preferred for astronomical telescopes.

The most rigorous, naturally, would be Maxwell's equations, solving the wave equation under given boundary conditions.

But this last method is exceedingly complex.

To give the most straightforward example:

Everyone has seen the blackboards in university lecture halls, right?

If you used the fourth method, at least six of those blackboards would be needed—and even then, you might not derive an analytical solution.

So unless the earlier approximation theories aren't applicable, this method is generally avoided.

For this reason, Xu Yun intended to follow the third approach.

Although this third method is much more complex theoretically, evaluating a lens requires performing double integrals twice.

But firstly, it produces the best practical results, and in an era where the theoretical framework is severely lagging, the importance of practical results is paramount.

Secondly...

Old Jia, he was actually the real inventor of Yang Hui's Triangle.

Yang Hui's Triangle is one of the most appropriate ancient tools for solving integrals, so theoretically having Old Jia take that step is quite practical.

Of course.

The step referred to here isn't about inventing calculus, but a temporary conceptual application.

After all, a single Yang Hui's Triangle alone can't conjure calculus; it requires a certain mathematical foundation.

The most critical aspect is.

This mathematical foundation refers not just to individual accumulation but to the entire mathematical community and era's accumulation, a qualitative transformation.

Therefore, Xu Yun wasn't planning to rush into solving everything at once, especially as his relationship with Little Niu was quite good, being drinking buddies after all.

Returning to the original focus.

Discovering a new field, Old Jia, Han Gonglian, and the others showed considerable enthusiasm.

After all, in these times, teamwork for overcoming challenges was rare.

They were seen either discussing their thoughts or directly engaging in data measurement.

For example, in Liu Yi's hands, there appeared a primitive tool:

A ruler.

Speaking of rulers, one must first introduce another concept:

Angle.

In their long technological practice, the ancient Huaxia formed an abstract concept of angles quite early—this 'early' can be traced back three to four thousand years.

Unfortunately.

They did not develop precise angle measurement from this.

Note.

It's about precise measurement.

This situation persisted until the Ming Dynasty, when the concept of angles brought by the missionary Matteo Ricci broke this impasse:

The "Elements of Geometry", which he translated with Xu Guangqi, defined angles, their classifications, various situations, ways to represent angles, and how to compare angles.

Since then, the division of angles into 360 degrees formally entered the recognition of the Huaxia mathematicians.

Before that.

Huaxia only had two rough ways to measure angles.

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Chapter 182 141: The World's Strongest Mathematics Team of the 11th Century! (6.6k)_3

[994 words]

The first method is very simple; it is based on the division of obtuse and acute angles, using the characters "ju" and "gou".

"Ju" indicates obtuse, and "gou" indicates acute.

"Ju and gou with the ruler" means a right angle.

But the second method is more complicated.

It is somewhat similar to measuring directions:

Using the twelve earthly branches: Zi, Chou, Yin, Mao, Chen, Si, Wu, Wei, Shen, You, Xu, Hai, together with the ten Heavenly Stems: Jia, Yi, Bing, Ding, Geng, Xin, Ren, Gui and the eight trigrams: Qian, Kun, Gen, Xun to create a set of twenty-four specific names to represent angles.

This means each name roughly represents fifteen degrees.

However, it's quite strange... you could even say it's still an unsolved mystery to this day...

The ancient sages of Huaxia actually understood the concept of 360:

The ancestors used a division system for celestial bodies that was actually 365 and 1/4 degrees.

In a sense.

This was infinitely close to the 360-degree method.

Unfortunately, alas.

In occasions other than astronomical angle measurements, the ancestors did not use this system at all.

Therefore.

This method of division had no impact on establishing angle measurement in Huaxia.

So in some media accounts, you might hear claims like "Huaxia was actually the first to define 360 degrees," which uses the celestial division system.

It's a shame.

The latter half of that sentence is correct, but the whole sentence is wrong.

Or to use a more modern example, it should be clearer where the oddity lies:

This is somewhat like a 21st-century scientist rightly discovering the concept of higher-dimensional space, but instead of using this concept in research, he uses it for the basic setting of novels and films.

Strangely, this setting is adopted by many films, so almost every ordinary person on Earth has heard of it.

But in the scientific community, everyone seems to ignore this setting, focusing instead on exploring various inefficient theories.

This is indeed a very strange situation:

Because the celestial circumference is also determined by circular method, given the wisdom of the ancestors, it is unimaginable that they wouldn't consider this.

Therefore, in some later circles of lay scientists, people proposed some strange hypotheses.

For instance, that the cognition of the ancient ancestors was blocked, or fragments related to angles were taken away, etc.

There are even proponents of the 256-degree theory, which is quite bizarre.

Let's return to our original topic.

No matter what system the ancestors used for angle division, after dividing the angles, they must take another step:

Measurement.

Therefore, the Ruler appeared.

This is a right angle ruler with one long side and one short side, and there are also more special arc rulers.

In some places, this is also called an angle ruler, colloquially known as a corner ruler.

At this moment.

Liu Yi was holding the ruler, measuring the angle of the lens:

"Marking below the Chou angle... marking below the Wu angle... marking above the Hai angle... marking above the Yin angle..."

Above, below, and middle marks.

This seems to be a classification Liu Yi devised himself, refining the 24 divisions further.

Yet even so.

This only reached a precision of 72 divisions, five times less precise than 360 divisions.

And to refine this fivefold difference, there is only one method:

By continuously adjusting the lens angle, collecting vast amounts of corresponding information.

Then, through manual calculations, step by step, filter out the most accurate answer.

Seeing this, Xu Yun flashed a hint of unwillingness in his eyes.

You must know.

This is the most fundamental link in the entire process.

Whereas future generations can lock into a certain range with just three to five surveying data, Old Jia might need hundreds of sets.

After all, there's an extraction process here, equivalent to dramatically increasing the amount of calculation.

Thinking of this, Xu Yun couldn't help but open his mouth.

Instinctively wanting to convey the concept of angles to Liu Yi and Old Jia.

But after hesitating several times, he abandoned this idea.

After all, according to his intention.

He really could not be too involved in the deduction of the convex lens this time.....

If he told Old Jia about the angle concept.

Then what about the angle of incidence and angle of refraction?

What about the waist radius?

What about screen function sampling?

What about Fourier transforms?

These are all interconnected concepts.

Although Xu Yun could summarize them in a few words, to break through these barriers, the ancient sages (whether Chinese or foreign) paid a huge price.

Therefore, no matter what, this breach could not be opened.

It's like cross-dressing; once it starts, there will only be zero or countless times.

You should know.

Xu Yun's time in this world is not long, only a little over a year.

If the task is completed ahead of time.

He might even return to reality in just a few months, like in the 1665 dungeon.

Indeed.

He could stir some big news during this time, shocking these ancient people.

But if he only imparted finished knowledge, without hinting at deeper reasons, without establishing a system capable of self-reflective feedback.

Then after Xu Yun leaves, everything will just become superficial 'black technology.'

This rootless floating plant's outcome is vividly demonstrated in the later Huaxia's Jin Yuan football:

When capital flooded in.

Capital introduced famous foreign aid, keeping overseas stars or those likely to go abroad domestically.

Exhausted their youth, not cultivating new talents.

The league prospered temporarily, fan excitement soared, and good results were achieved in the Asian Champions League and even the Club World Cup.

But when the Jin Yuan retreated.

Everything reverted to its original form, even worse than before.

For example, now.

National football fans can even look forward to losing to Myanmar.

This is what Xu Yun is worried about:

Knowing what but not knowing why is a very dangerous situation.

Therefore, Xu Yun would rather slow his pace a little and bring less change to this world.

He also hopes to cultivate a piece of vibrant soil for them.

And the first step in cultivating the soil.

Fell on Old Jia, Han Gonglian, and Liu Yi.

Thinking of this, Xu Yun couldn't help but take a deep breath and said to Old Su:

"Sir, let's talk outside."

.....

Note:

6.6K big chapter, all-nighter until now, a total of 13,000 words, please vote for monthly passes!!!

This month's end has no double, only in March, so don't save them....

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Chapter 183 142: Taking Advantage of Free Time to Get Things Done (9k words)

[945 words]

Upon hearing Xu Yun's call.

Old Su first glanced at Old Jia and the others who were busy counting.

Then he quietly left the study with Xu Yun.

Afterward, the two came to the courtyard, where Xu Yun proactively said:

"Master, the issues involving Mr. Tongyu and others are quite challenging and may take several days.

My words are humble, so I hope, Master, you can persuade Mr. Tongyu a bit, and not let them damage their health."

Xu Yun spoke these words earnestly, truly fearing something might happen to Old Jia and the others.

Looking at history, both domestic and foreign,

people involved in research mostly have a common flaw.

Using a certain idiom to describe it, it's easy for them to become interested in hunts they encounter:

Whenever they encounter topics of interest, they not only like to delve deeply but also frequently ignore the time, even affecting their biological clock.

Actually, Xu Yun is one of those people.

Not to mention the distant past.

Just take the recent fifth generation Ci Insect Forest development for example.

At the most critical stages, Xu Yun, Qiu Sheng, Zhou Peiyao and others hardly rested well.

Qiu Sheng and the others simply laid a sleeping bag in the next room, each taking turns on night watch.

Xu Yun was most clear about how alluring his problems were for Old Jia and the others, not to mention the few partially solved formulas he wrote.

The truth, like a mountain peak shrouded in fog.

While the clouds are swirling, one can truly grasp some parts that seem within reach.

Therefore Xu Yun dared to guarantee.

If no one is watching Old Jia and persuading him, he will surely calculate nonstop day and night, neglecting food and sleep.

If Old Jia were Younger Jia, that would be relatively easier.

Young people, after all, pulling an all-nighter or two is no big deal.

But now Old Jia is already ** years old, his body truly can't take such wear and tear.

If no one watched over this old man, he might really pull that death-by-dawn stunt upon learning.

Should it truly be the case.

At that time, Old Jia might laugh heartily all the way to the grave, but Xu Yun would be left with nowhere to cry.

So, in emotion and reason, he cannot let these elders whose average age rival the AC Milan defense line go their own way.

Old Su clearly understood this point too, since he is somewhat experienced.

Without much hesitation, Old Su nodded cleanly and said:

"No problem, leave this matter to me, they will still listen to me."

Xu Yun then felt slightly relieved, then asked casually:

"By the way, Master, will Prince Jian be coming to class tomorrow?"

According to Xu Yun's previous agreement with Xiaoli, Xiaozhao, and others,

the small class of the trio is held once every three days, during which Xu Yun would leave some 'homework' for them to spend two days thoroughly digesting the knowledge.

This frequency was somewhat better for Xiaozhao and Xiaoli than having a class every day.

As for Old Su...

it is one class a day, or even several classes a day.

After all, his studies are quite broad; the trio's class currently focuses mainly on physics, differing in direction and positioning.

And tomorrow is the day the trio's class starts, so Xu Yun, as the 'Class Teacher', being concerned about the students' situation is also normal.

Old Su paused for a moment upon hearing this, looked around a few times.

He led Xu Yun to a more secluded corner and said:

"Xiaowang, you must prepare yourself, Prince Jian... might skip class tomorrow again."

Xu Yun felt a slight anxiety within, asking:

"Master, has Empress Dowager not yet recovered?"

Old Su shook his head, initially not wanting to speak.

But thinking of Xu Yun's background, he finally said succinctly:

"In short... not optimistic."

After hearing the news brought by Xiaozhao earlier, he specifically asked someone to inquire about the situation inside the palace.

Even though he has been retired from the position of Prime Minister for nearly two years, his network is still there, thus he learned more inside information.

The most crucial piece of information is...

Empress Dowager Xiang not only fell this time, but fell rather severely:

While getting up from bed in the middle of the night, supported by only one leg, Empress Dowager Xiang lost her balance and her head hit the bed's edge.

Don't underestimate these wooden beds of this era, the bed materials are top-grade agarwood that's fully infused with oil!

Agarwood, agarwood.

Referring to the kind of fragrant wood that sinks in water, a class of wood with extremely high density.

Without any cushioning.

The head collided with vast dense agarwood, the injury is not much less severe than hitting a stone.

Using later era terms, it's...

besides fractures and problems from blood conduction caused by the fall, Empress Dowager Xiang also suffered a concussion.

This led to a brief period of unconsciousness, prompting the emergency call for Xiaozhao to come over as a precaution.

Even Xiaoli could hear such news, suggesting a hand behind the scenes pushing this information outward, eager for more people to know.

Thinking of this,

Old Su couldn't help but sigh complexly.

Emperor Zhezong had only passed away for less than four months, and now another heavyweight in the palace had an accident...

Although personally, Old Su was somewhat dissatisfied with Empress Dowager Xiang's choice of designating Emperor Huizong of Song, believing Prince Duan unfit for huge responsibilities.

But aside from this matter.

Empress Dowager Xiang generally didn't have much problem.

Even one could say.

The Great Song Court at present must rely on Empress Dowager Xiang's experience and methods for transition; the transfer of power could never be too peaceful.

It's truly a stormy time...

Seeing Old Su unwilling to delve into the discussion, Xu Yun pondered thoughtfully.

Although he doesn't understand the specific insider details, historically Empress Dowager Xiang lived perhaps only another half a year—this was still without likely having fallen.

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Chapter 184 142: Taking Advantage of Free Time to Get Things Done (9k words)

[883 words]

Therefore, it is very clear.

At present, Empress Dowager Xiang's situation is not optimistic and may even be somewhat critical.

In this manner,

the pressure Xiaozhao must face has also increased significantly.

After all, according to the normal historical trajectory,

Empress Dowager Xiang passes away early next year, and Liu Kuang would accuse Deng Duo in July.

The Prince Cai's Mansion case erupts, leading to the severe punishment of Deng Duo and several of Xiaozhao's key allies, resulting in conflicts between Emperor Huizong and Xiaozhao.

That is to say,

six months after Empress Dowager Xiang's death, Emperor Huizong cleared away some obstacles... perhaps larger obstacles, and then focused his attention on his greatest remaining rival.

It should be noted,

when the Prince Cai's Mansion case erupted, Xiaozhao's birth mother and greatest supporter, the Zhu Family, still had a year to live, which was far from the theoretically optimal timing.

That Emperor Huizong acted at this time indicates that certain issues were almost resolved.

In other words,...

time for Xu Yun to do certain things is also running out.

Thinking of this,

Xu Yun couldn't help but take a deep breath and said to Old Su:

"Master, I would like to travel outside for a while, and I hope for your approval."

"Travel outside?"

Hearing this, Old Su was momentarily taken aback,

Xu Yun had been at the mansion for over ten days, and as a Guest, coming and going was quite simple.

Unlike servants who could only leave when working.

However, apart from a previous visit to find Xiaoli, he hadn't stepped out again.

Of course,

this is partly due to being caught up in lessons with Old Su and partly due to Wang Yue's illness.

Upon hearing that Xu Yun was going out, Old Su quickly returned to his senses and readily nodded:

"Xiaowang, since you've been listed as a Guest, you only need to inform the gatekeeper to leave; there's no need to specially consult with me."

He then suddenly thought of something and added:

"...Is it that you need gold and silver, and lack funds on you?"

Xu Yun quickly shook his head, saying:

"It's unrelated to money. I wish to borrow the master's calling card to visit someone in the Capital City."

Calling cards were an indispensable tool for interaction among the ancient nobility.

They originated during the Han Dynasty when flat wooden strips were used to denote names and residences,

thus also known as "name cards."

After the invention of papermaking, they gradually replaced wood with paper.

The requirements for calling cards were high, generally including title + position + origin + name + courtesy name + respectful salutation + 'bai'.

For instance, 'The famous web writer Hu Jianren respectfully visits the Reader Lord' etc.

Additionally, calling cards usually needed a seal, making them very formal and useful visiting tools.

Of course,

since Old Su is retired now, the calling card isn't as significant, so he doesn't need to accompany it personally.

For example, when visiting Xiaoli's Family previously, Mr. Xie gave Yongzhu a calling card.

Therefore, faced with Xu Yun's request, Old Su was silent for a moment, not directly refusing, but asking:

"A calling card? Which influential individual are you seeking?"

Xu Yun shook his head, leaned in, and whispered a name:

"Not a current official, but..."

"What, visiting him?"

Hearing this, Old Su was startled, furrowing his brows in surprise:

"This person is not simple. Rarely did I have interactions with such individuals when I was in office; now that I'm retired..."

"Last night, I suddenly recalled a manuscript, recording a comet named Halley, along with several rare star charts....."

"In the First Year, where is my calling card? Quickly, fetch it!"

....

Half an hour later.

Xu Yun called Zhang San and left the Su Mansion through the main gate.

As a Guest of Old Su, Xu Yun was entitled to the carriage service for travels.

However, as mentioned earlier.

Old Su's only carriage was taken today by his son, Xiaosu number six.

Thus, Xu Yun had to walk a bit more, heading to the carriage stand to rent a carriage, much like taking a taxi nowadays.

Of course,

the fare was still covered by Old Su.

As a third-class "Dai" servant, Xiaosan, although having many opportunities to travel, had only ever ridden wagons carrying grain.

Therefore, hearing about a genuine carriage made him quite excited:

"Brother Wang, where are we going this time?"

Xu Yun handed him a piece of paper with an address written on it, saying:

"This place, have you been there?"

Zhang San took the paper, glanced at it, and embarrassedly scratched his head:

"Brother Wang, I can't read....."

Realizing this, Xu Yun slapped his forehead, took back the paper, and read out:

"Next to Wuqi Temple, River King Lane on Pupa Road..."

"Oh, Wuqi Temple—that place, I know."

Hearing this name, Xiaosan clapped his hands:

"We still have to enter through the Vermilion Bird Gate, but last time we went east, this time we go west along the Bian River, nearly reaching the area around Zheng Gate."

"Brother Wang, are we visiting a big merchant's house this time?"

Xu Yun smiled at him and asked while walking:

"What makes you say that?"

Xiaosan pointed in a direction. In the Bianjing City, it was rare to see buildings above two stories, so the five-story structure was highly noticeable in the distance:

"The Alum Building is right there, and just past the West Corner Tower Street, there's the Imperial Censorate and Western Ministry, a house in that area costs tens of thousands of guan!"

Hearing such a number, Xu Yun couldn't help but click his tongue in amazement:

"Goodness, a house costs tens of thousands of guan?"

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Tip: You can use left, right keyboard keys to browse between chapters.

Chapter 185 142 Taking Advantage of Free Time to Do Some Work (9k words)_3

[974 words]

Xiaosan nodded vigorously, a hint of envy in his eyes:

"Yes indeed, that's the priciest area in the capital."

Xu Yun glanced again at the Alum Building, which would be known as the famous Fan Building in later times, the surprise in his eyes still lingering.

Actually, what he didn't know was.

At this time, the housing prices in the Northern Song weren't any less than those in later times.

In the early Northern Song period.

The price of an ordinary residence in Bianjing was about just over one thousand coins, which wasn't considered expensive as it was a house for a family of several or even a dozen people.

With the comprehensive price level roughly equivalent to six hundred thousand to one million in later times, it was still acceptable.

But by the late Northern Song period.

Bianjing's housing prices went crazy, jumping significantly each year.

According to Professor Bao Weimin from Renmin University History College's 2014 publication "Research on Song Dynasty Cities."

The population density of Bianjing in the late Northern Song reached 12,000-13,000 people per square kilometer.

You should know.

Even in later times, Yanjing's crowded Chaoyang District had a population density of only about 7,000 to 8,000 per square kilometer.

Back then, when Ouyang Xiu was serving as Chief Judge of the Court of Imperial Petitions, he could only choose to rent a house.

Another person who had deep resentment towards housing was Old Su's friend, Su Shi's younger brother, Su Zhe.

That is, Old Su's friend, Old Su's brother, Old Su.

Su Zhe, much like Bai Juyi, who previously vented about presbyopia in a poem, also complained about housing prices more than once in his poetry.

For instance, "I'm old with no home, my children spoke of it."

And "At seventy no house, the axe pounds daily. My children hope I'll see eighty, house complete, ten-year guest therein."

Su Zhe's resentment carried on into his later years, only to build three new rooms in Xu Prefecture.

But he wasn't happy for a few months.

The following year an earthquake hit Xu Prefecture, causing a landslide that demolished the house.....

Truly a sad story.....

Returning our gaze to the original spot.

In conclusion.

Buying a house in the center of Bianjing City during that time surely required considerable financial power.

Even Xiaosan understood this concept.

The two then walked about a kilometer and finally arrived at a carriage shop.

"Shopkeeper, a ride, please."

Upon entering the carriage shop.

Xu Yun first surveyed the various carriages and asked an elderly man in purple clothing, who seemed to be a steward:

"How much to rent a carriage?"

The old man approached with a smile, bowing to Xu Yun:

"Young master, our humble carriage shop has over twenty carriages, separated into long journeys and short rentals.

If you choose a long journey, we can also provide some guards...

Xu Yun shook his head and interrupted:

"A short rental will suffice."

The elderly man's expression remained unchanged as he led Xu Yun to a corner:

"As you can see, young master, any of these carriages here can be rented short-term.

If you're coming from out of town and want to make connections or visit old friends, I suggest choosing one of these luxurious carriages pulled by good horses.

If it's just for a quick trip, you only need a regular draft horse, and the price is much cheaper."

Xu Yun glanced at the regular carriages and casually pointed to one:

"What's the rent for this one?"

"Four hundred wen for starts, rented for half a day."

"Can you provide a receipt?"

"Of course."

Xu Yun nodded slightly.

The degree of commercial development in the Song Dynasty was evident from this carriage shop.

He then spent half a day trying to haggle, and managed to save two wen through reasonable argument.

Counting the tea fees during this period, he made a blood-earned profit of four wen.

After finishing the price negotiation.

The old man called a driver over, instructing Xu Yun to provide the address and the two parties exchanged money.

Then, with the driver's guidance, the carriage slowly headed west.

The planning of Bianjing in the Song Dynasty was somewhat similar to later times, especially on the main thoroughfare at Vermilion Bird Gate where pedestrian and carriage paths were clearly laid out.

Thus, even with many pedestrians coming and going, the carriage was very easily able to enter Imperial Street.

In 1988.

The Junyi City Government built a vintage-style mock Song commercial street in the northern section of Zhongshan Road in Longting District, known as Song Capital Imperial Street.

Aside from the greenbelts, this Song Capital Imperial Street largely restored the appearance of the Song Dynasty Imperial Street.

It was considered a highly restored ancient project locally.

So if there's a chance, classmates of Xian Weiren should stroll around.

Of course.

Don't buy anything inside, as it's full of scams.

Clip-clop, clip-clop——

After the carriage traveled for more than half an hour.

As the slightly shaky carriage steadied, the driver's voice came from outside:

"Young master, we've arrived at the place you mentioned."

Xu Yun gestured for Xiaosan, who had a newly opened vision, to get off the carriage, politely bowing to the driver.

Then he looked at the building in front of him.

This was a mansion with a considerable expanse, walls tall and deep, and lavish decorations.

However, what's worth noting is...

The lions flanking the gate lacked curls.

Xu Yun thought for a moment while looking at the facade, handed Xiaosan some copper coins, and said:

"Third Brother, go buy some snacks around here with this carriage driver brother and wait for me outside. Don't wander too far."

After giving these instructions.

He moved to the main door and knocked:

"Is anyone there?"

After a moment.

A panel on the door was opened, and a somewhat youthful voice came from inside:

"Who is it?"

Xu Yun passed his calling card through the gap and said:

"Young man, kindly report this: a retainer of the Counselor to the Crown Prince, seeking an audience with the master of the house."

"Duke Zhao?"

At that time, Old Su had left the court for about two years, and some new aristocrats' gatekeepers might not recognize this name since the title of duke was quite broad in those days.

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Tip: You can use left, right keyboard keys to browse between chapters.

Chapter 186 142: Taking Advantage of Free Time to Get Things Done (9k words)_4

[994 words]

However, seeing that Xu Yun's speech and complexion were unlike that of a typical servant, the gatekeeper hesitated for a moment and decided to report.

He coldly threw out a sentence:

"Wait here, I'll inform the master."

Click—

Watching the panel close again, Xu Yun couldn't help but feel a bit speechless.

To think.

Previously, when he went to Xiaoli's family as a servant, the gatekeeper called Uncle Qin didn't even show them a sour face.

Now that he was promoted to a guest, he was actually looked down upon.

"As the ancients say, to see the whole leopard by examining a piece of its skin, it seems this host is not easy to deal with... but since it's him, it's also expected..."

After about a quarter of an hour.

Creak—

The side door on the left was opened.

A fair-skinned male servant poked his head out with a still indifferent tone:

"Come in."

Xu Yun wasn't annoyed and thanked the servant before walking into the residence through the side door.

However, just as he entered, the servant stopped him.

He saw the servant stretch out a hand directly, with an impatient expression on his fair face, asking:

"Wait, where's the gift list?"

Xu Yun blinked:

"Huh?"

The servant's face immediately darkened:

"Visiting the master, and your master didn't even prepare a visiting gift? Such manners are not understood? Or... did you pocket it?"

Xu Yun glanced at the servant.

Even with his good temperament, he couldn't help but frown:

"A visiting gift? Was this personally stated by your master?"

"It is the rule when visiting this residence..."

"Rule?"

Xu Yun snorted:

"In Xinglong City, under the Emperor's feet, with the blazing sun overhead, do you, a mere gatekeeper, dare to speak of rules?"

"You....."

"What me? Let me ask you again, your master has neither official title nor military achievements, under broad daylight, does a servant dare to demand a bribe from the Emperor Zhezong's personally appointed Duke Zhao, calling it a rule?"

"Do you know that back when the Duke was adorned with accolades, ruling as Prime Minister of the World, and culture and education flourished, your master was merely an illiterate rural child, and now posing as someone they're not, is this what you call a rule?"

Saying this.

Xu Yun couldn't help giving this person a glance, rarely pulling up the big flag:

"Do you want me to take you to Junyi Mansion to ask the Prefect to judge the real rule? —Oh, by the way, the Prefect is also my master's protégé."

He already didn't have a good impression of the person he intended to visit today. In a way, this person was also one of the culprits for the downfall of the Northern Song.

Now encountering an unruly servant, he vented his pent-up anger irrationally.

Anyway, with such a culprit, it didn't matter how vicious the words were.

Meanwhile.

Each word Xu Yun uttered made the servant's face stiffen more.

When passing the visiting card earlier, the master had initially felt a bit interested, but after hearing that the visitor was just a young man, he casually instructed the servant to lead him in.

No further explanation or reminder of the visitor's identity was given.

Thus, the servant thought the visitor was ordinary and planned to use his authority to gain some extra benefits.

But unexpectedly...

The other party seemed to be a tough one?

After all, Xu Yun's confidence was substantial, and the words "Prime Minister of the World" were something he could understand.

This was indeed a Prime Minister!

Even with an 'in the past' preceding it, this was not someone ordinary people could provoke.

The master misled me!

Thinking this.

He couldn't help but shrink back and cupped his hands towards Xu Yun, apologizing:

"Gentleman, please calm down. I did not recognize Mount Tai with my eyes so spare us; forgive and redeem the mistakes of this little person."

Xu Yun glanced at him, shook his head gently:

"Then won't you lead the way?"

The servant nodded repeatedly, stooping to lead the way.

Subsequently, the two crossed two courtyards and arrived in front of a room:

"Master, the distinguished guest is here."

Moments later.

A somewhat soft voice came from the room:

"Let him in."

The servant obsequiously gestured a please.

Xu Yun glanced at him, adjusted his collar.

Stepped boldly into the room.

At this moment.

A man was sitting inside the room, but due to the dim lighting, it was hard to see his attire and appearance clearly.

Seeing Xu Yun enter.

The man first simply sized him up, then casually asked:

"What important matter does Duke Zhao have to discuss, sending a young man here?"

Xu Yun remained silent for a moment, then took out a letter and handed it to the man:

"You'll know after reading it."

The man's brows immediately furrowed slightly.

In ancient Huaxia, there were many ways visitors addressed their hosts.

Such as Mr. XX, Lord XX, or Honor, etc.

Using 'you' directly was rare in grammar and somewhat rude.

The man addressing Xu Yun as 'young sir' was a basic courtesy.

Plus, since the man was regularly flattered, Xu Yun's use of 'you' made him a bit unhappy.

However, considering the person represented Old Su, the man still coldly snorted, accepted the letter.

He intended to read the content before deciding on his next attitude.

If this person was merely an ordinary servant...

Tear——

The man opened the envelope and began reading with furrowed brows.

But as he read on.

His expression gradually changed.

At first, he looked surprised, then appeared dazed.

After reading the whole letter.

His expression turned to sheer terror, his hands shaking as if he had Parkinson's.

Crash——

Perhaps due to excessive fear, the man failed to seat himself properly, slipped straight from his chair.

Yet his thoughts were entirely elsewhere, ignoring his posture.

Half-sitting on the ground, he extended a finger, tremblingly pointed at Xu Yun, stammering:

"Who... who exactly are you? Man or ghost? Huh? Man or ghost?!"

Seeing this, Xu Yun shrugged his shoulders:

"Of course, a man."

Gulp——

The man swallowed hard, asking fearfully:

"Then... then what's the intent behind writing this letter?"

Upon hearing this, Xu Yun's lips curled into a mysterious arc.

Then he stepped forward, whispering something inaudible to the reader:

"Such and such... so on and so forth...."

.....

Note:

Are there any unluckies who failed the CET-4 or CET-6? Let me see your hands~

Request a monthly pass after writing 9000 words, is that too much?

Share to your friends

Tip: You can use left, right keyboard keys to browse between chapters.

Chapter 187 143 Li Qingzhao: Is writing poetry as fun as doing experiments?

[941 words]

An hour later.

Accompanied respectfully by a man, Xu Yun walked slowly to the mansion's entrance.

"That's enough, let's stop here."

Xu Yun then glanced at the man whose face was still full of anxiety, and continued:

"Did you remember all the things I said?"

The man hurriedly bowed, his waist bent resembling that of later generations of the Neon People, just short of growing a few mutated heads:

"Young master, I will keep your words in mind. Tomorrow... no, I'll start preparing later!"

Xu Yun looked around the area, and added:

"That's good. Actually, you're also a smart person, and should be able to assess whether what I said is beneficial or not.

If this matter is handled well, you can rise to a high position, and a life of wealth and honor will be within reach."

The man quickly agreed.

A few seconds later.

He quietly lifted his eyelids to glance at Xu Yun, cautiously asking:

"Dare I ask, young master, since you care for me so much, are you planning to...?"

"Don't ask what you shouldn't ask."

Xu Yun rarely showed a stern face, and said in a deep voice:

"Just follow my instructions first. When necessary, I'll inform you. Knowing too much may not be a good thing."

The man was so startled that he bent his waist again:

"Yes, yes, yes..."

Then Xu Yun gave a few simple instructions, detailing what needed to be said.

After that, he turned and left the mansion.

After Xu Yun left.

The man stood alone in the courtyard, staring at the closed gate, his face uncertain.

To be honest.

Even without thinking hard, he knew that the guest of Duke Zhao's Mansion had ulterior motives, and would have something planned in the future.

But on the other hand.

Although this person had laid bare his past, the proposal given was indeed too tempting...

Just like that.

After a good fifteen minutes.

The man finally made up his mind, calling to the servant in the side courtyard:

"Donghua, fetch my name card, prepare pen and ink!"

...

Two flowers bloom; each presents a branch.

Meanwhile, as Xu Yun and the man engaged in their secret transaction.

On the other side of Bianjing City.

In the home of the Assistant Minister, Li Gefei.

Li Gefei, who had just returned from the court, tiredly removed his official garments, and untied his belt, leaning against a pillar chair and panting.

He had suffered a major illness seven or eight years ago, leaving him with the aftermath of heavy breathing.

Any physical exertion would cause him to gasp and whatnot.

The old servant beside him quickly took a porcelain cup from the maid's hand:

"Master, have some roasted pear soup, with added rock sugar."

Li Gefei took the porcelain cup and sipped a few mouthfuls.

The clear and smooth soup entered his stomach, seemingly dissolving the obstruction in his chest, making him instantly feel much better.

Then he adjusted his breath and said to the old servant:

"Shangcai, are there any important matters at the house today?"

"Master, everything is normal in the house, only Green Rattan accidentally broke a porcelain bowl."

"It's a minor matter, don't blame Green Rattan. By the way, where's Qingzhao?"

"Master, the lady asked me for a few crickets and ants this morning, saying she wanted to observe something..."

Thud—

Before the old servant finished speaking, Li Gefei heavily placed the porcelain cup on the table and said in a deep voice:

"Bring her to see... forget it, take me to see her!"

The old servant dared not slack off, quickly guiding Li Gefei to the courtyard study, the same courtyard where Xu Yun had picked up books previously.

Seeing this.

Some students might wonder:

No, that's not right.

Wasn't Old Li just a bottom-grade foreign official? Why was he able to buy such a large mansion in Bianjing?

The reason is simple.

It was the financial power of his wife's family...

Old Li's father-in-law was Wang Gui, who once held the position of Prime Minister and was conferred the title of Duke Qi.

Even though the "Song History" noted Wang Gui "From Chief Executive to Prime Minister, all the sixteen years, he established nothing," his business acumen was basically comparable to Emperor Huizong.

But ability is one thing, and official position is another.

Ultimately, the fact is that Wang Gui served as Prime Minister for quite a few years, hence the family wealth was still quite substantial.

Incidentally.

Later on, Wang Gui's fourth son, Wang Zhongwan's daughter married Qin Hui as his wife.

In other words.

Qin Hui's wife Wang was Xiaoli's cousin, and Qin Hui was Xiaoli's brother-in-law; however, the two hardly interacted.

Also, Wang Gui's eldest granddaughter married Cai Jing, which was, in a sense, quite impressive.

The focus returned to the present scene.

When Li Gefei reached the book courtyard, Xiaoli was fiddling with the microscope borrowed from Old Su's Family:

This microscope could only magnify over twenty times, and for Old Su, it was used only for entertainment, unable to detect microorganisms.

Therefore, when Xiaoli proposed the rental idea earlier, Old Su did not hesitate to agree to her proposal.

"Left eye looks through the eyepiece, rotate the coarse adjustment spiral to slowly raise the barrel of the microscope..."

"Turn the fine adjustment spiral..."

Entering the courtyard, watching his daughter mutter words while operating, Li Gefei couldn't help but frown:

"Qingzhao."

Xiaoli did not respond, still busy with her work.

Li Gefei slightly raised his voice, repeating:

"Qingzhao!"

This time, Xiaoli finally reacted.

She slowly lifted her small head from the microscope, identified the visitor's face, and her expression grew slightly more earnest.

Then she stood up, tidied her appearance, and respectfully saluted:

"Qingzhao greets you, sir."

Li Gefei glanced at the slide in Xiaoli's hand, fell silent for a while, and asked:

"Qingzhao, why are you doing these things again? Rest for a while and perhaps read some books?"

Xiaoli shook her head:

"Father, I'm not tired."

Li Gefei couldn't help but sigh in his heart.

Since returning from Old Su Mansion days ago, Xiaoli's disposition seemed to have transformed completely.

Share to your friends

Tip: You can use left, right keyboard keys to browse between chapters.

Chapter 188 188: 143 Zhang Li Qingzhao: Writing Poetry Isn't As Fun As Experimenting? _2

[1,516 words]

All day long, you're busy with those so-called 'experiments', writing and drawing things that are incomprehensible even to yourself, and the poetry is all set aside.

Actually, if it were just like this, it might be bearable.

Li Gefei had always been very lenient with Xiaoli, without particularly strict family teachings or constraints.

Otherwise, he wouldn't have allowed her to go drinking in taverns or gambling in casinos.

Therefore, if Xiaoli simply liked some new and peculiar things, Li Gefei might not even get angry.

But the problem is...

What Xiaoli is involved in right now is not just a simple interest.

Thinking of this, Li Gefei once again looked complicatedly at his daughter and waved to her:

"Qingzhao, come with me."

Xiaoli pursed her lips and obediently followed.

Here we go again, being lectured.

After taking Xiaoli to a corner of the academy, Li Gefei dismissed the servants and asked:

"Qingzhao, are you going to the Commandery Prince's Mansion tomorrow?"

Xiaoli nodded affirmatively, a hint of anticipation in her eyes:

"Of course, we're learning about acceleration tomorrow."

Li Gefei's eyes flashed with a trace of worry and he asked:

"Qingzhao, do you know the current situation in the capital?"

Then, without waiting for Xiaoli to reply, he accelerated his speech:

"The Empress Dowager is unconscious, the situation is critical, and there are even rumors that she might not last a month.

Right now, the Emperor is poised to strike. Once the Empress Dowager passes, the Emperor will swiftly wipe out the remnants.

After the remnants, the next step, the next step is..."

Li Gefei quickly glanced around and lowered his voice, saying slowly:

"To clean up Prince Jian!"

After saying this, Li Gefei closely watched his daughter, observing her expression.

Indeed.

What he worries about is not other issues, but.....

Prince Jian!

In the past few days, Xiaoli and Prince Jian often went to the Su Mansion together and occasionally went out to discuss issues.

They seemed close, inseparable.

If Empress Dowager Xiang's health were untroubled, it would be fine. With such a prominent figure as a restrainer, Emperor Huizong couldn't act against Xiaozhao.

But once Empress Dowager Xiang passes, a large number of followers will swiftly flock to Emperor Huizong.

Presumably in three to five months.

The overt obstacles will be completely eliminated.

By then, the Emperor's next target will be none other than Prince Jian alone!

And if Prince Jian collapses, there may be people who will unjustly implicate Xiaoli, throwing dirty water onto Li Gefei.

Looking back through three thousand years of history.

When it comes to disputes over the imperial throne, which case can end well?

Facing her serious-looking father, Xiaoli couldn't help but argue:

"But... but Prince Jian and I are just attending classes together..."

Li Gefei glanced at his daughter, knowing that Xiaoli was not lying.

In the past few days, he had also briefly understood the so-called 'science', which indeed had its unique and attractive aspects.

Yet...

He took a deep breath and shook his head, saying:

"Indeed, perhaps you really are just seeking knowledge.

But what Prince Jian involves is the stability of the imperial throne, and will His Majesty listen to your explanation?

Go to the taverns and see, among those who used to be merry with Prince Jian, who isn't avoiding him now?

As the saying goes, 'better wrongfully kill than let go unpunished,' who would listen to your argument in such matters?"

Xiaoli was silent.

Father and daughter thus stood in silence for a moment, then Li Gefei, as if making a decision, said:

"Qingzhao, you should stop going to the Su Mansion in the future..."

"That is absolutely impossible!"

Xiaoli instinctively retorted, interrupting her father, then thought for a moment and continued:

"Sir, if Qingzhao recalls correctly, in the First Year of Shao Sheng, Zhang Dun was in power and summoned you as a censor for drafting compilations of Yuanyou ministers' memorials.

You refused to take office, and therefore were offended, thus exiled as Guangxin Army Assistant Governor, correct?"

Li Gefei was silent for a moment and slowly nodded:

"That's true."

Xiaoli continued:

"That year, Qingzhao was ten years old, do you remember what Qingzhao said outside Suicheng?"

Li Gefei nodded again.

Xiaoli, seeing this, saluted her father:

"Back then, you expressed your ambition with 'Li Sao', saying 'Even though I might face death nine times, I will not regret it.'

Righteousness is the essence of trust.

Father, you were willing to die for your belief, so why are you stopping Qingzhao now?

Even if Qingzhao is implicated by Prince Jian, at most she'll have to cut her hair and go to prison; no matter what, it won't be a crime punishable by death.

Could it be that over a few years, my father has changed so much, no longer seeking reason or truth, and only blindly pursuing the way of the monarch and his ministers?"

Li Gefei was taken aback.

Speaking of the court in the late Northern Song, one must mention a certain group of people:

The Yuanyou Faction.

The Yuanyou Faction, also called the Yuan You Party.

Their roots must be traced back to Wang Anshi's reforms.

The right and wrong of Wang Anshi's reforms are quite complex, widely discussed even in later generations, let alone in the Northern Song back then.

Therefore, during the reform process, naturally, there were many supporters as well as many opponents.

The political faction supporting the reforms was called the "Yuanfeng Faction" by contemporaries.

The faction opposing the reforms was known as the "Yuanyou Faction."

And Li Gefei was a standard member of the Yuanyou Faction.

1094.

Zhang Dun imposed cruel punishments and exile on the Yuanyou Faction members, ordering Li Gefei to be summoned to tally these affairs.

Li Gefei resolutely refused, and thus was sentenced to exile.

At the time, in a letter to a friend, Li Gefei also quoted the idiom of being unrepentant despite facing death multiple times, expressing his determination to die for his principles.

This exile lasted for more than a year, nearly two years, before he was summoned back as Chief Proofreader, returning to his official career.

In fact.

According to the historical trajectory.

In about two years, the court would again suppress former ministers of the Yuanyou, and Li Gefei would again be dismissed for being listed in the "Yuanyou Faction."

Therefore, Xiaoli's refutation truly left Li Gefei speechless:

Even if Xiaoli were truly implicated because of her association with Xiaozhao, at most it would mean Li Gefei being demoted or dismissed, and Xiaoli imprisoned, cutting off ties with relatives.

Surely, it would be quite miserable, but it wouldn't take their lives.

After all, the six traitors haven't yet controlled the court, and there are still some good ministers holding significant power.

And the things Li Gefei insisted on back then, while it's an exaggeration to say it would wipe out nine generations, quite a few were executed under the label of 'party traitor.'

You must know.

Back then, Xiaoli was only ten years old, just a sapling among saplings.

Naive and ignorant, knowing nothing.

If what Li Gefei did back then were truly convicted, Xiaoli would indeed be innocent.

Therefore, upon hearing Xiaoli's words, Li Gefei fell silent, and fragments of memory gradually surfaced in his mind:

The year he was exiled to Xishui Suicheng, it coincided with a winter blizzard, the world vast and pale.

He held Xiaoli, leaning on each other in the cold winds.

Aside from the annoyance of the exile, his heart was filled with guilt towards his daughter.

Yet, just as he sighed over how he had caused his daughter suffering, secretly shedding tears.

Eighty-year-old Xiaoli pressed tightly to his chest, saying to him in a tender yet firm voice:

"Father, Qingzhao has no resentment....."

Thinking of this.

Li Gefei couldn't help but close his eyes.

Yes.

Compared to the factional strife that was a matter of life and death back then, the issue between Xiaoli and Xiaozhao is nothing.

If truly pursued, at most it's a matter of being demoted again.

Though these years of climbing through officialdom have been somewhat exhausting, losing the official hat would certainly be distressing.

But compared to family bonds, that official hat is far lighter.

Never mind.

If Xiaoli really encounters trouble, I'll bear it together.....

When Li Gefei opened his eyes again, clarity had returned to his gaze.

After a moment of contemplation, he said:

"Never mind, Qingzhao, if you wish to attend the lectures, go ahead freely.

But I have one request; under the current premise, you must not advance further with Prince Jian. Do you understand?"

The meaning of Old Li's words was actually very straightforward:

If it's just fellow student courtesy, then even if it becomes a matter of scrutiny, it can still be settled; at worst, your father loses his official hat and returns to the fields.

But if it turns from fellow student courtesy to something intimate, then the whole family's lives could be in danger.

Xiaoli was caught off guard by her father's sudden sternness, but considering Old Li had already compromised a lot, she obediently replied:

"Qingzhao understands."

Then Old Li pondered for a moment and continued:

"By the way, I have an old friend who is currently the Minister of the Ministry of Personnel, a person of integrity and impartiality.

This person has a son named Zhao Mingcheng, highly cultured, with beautiful writings. I will introduce you to talk tomorrow, discussing poetry; how does that sound?"

"Highly cultured?"

Upon hearing this, Xiaoli glanced at her father lightly and asked in reply:

"Does he know how to calculate dynamic friction? Can he adjust the magnification of eyepiece and objective lens? Does he know how many forces act on an object placed on an inclined plane?"

Li Gefei: "?????"

...

Share to your friends

Tip: You can use left, right keyboard keys to browse between chapters.

Chapter 189 144 - The Mathematical Achievements That Led Europe by 863 Years... Born! (6.8k)

[918 words]

Looking at Xiaoli, who keeps talking about science incessantly.

Old Li eventually had to give up the idea of arranging a match for his daughter.

Actually, this is quite normal.

After all, in a normal course of events, the union of Xiaoli and Zhao Mingcheng had its reasons.

They were certainly in love, but there was also a certain level of interest exchange on the family level:

Zhao Mingcheng's father, Zhao Tingzhi, was a member of the Yuanfeng Faction, staunchly supporting reform or the New Laws faction, which opposed Li Gefei for a long time.

However, at this time, Emperor Huizong had just ascended the throne, and the two opposing factions were relatively restrained, with many choosing to marry to ease relations.

The union of Xiaoli and Zhao Mingcheng was influenced by certain factors, otherwise, Old Li wouldn't have agreed so quickly.

Of course.

In later generations, when discussing the marriage of Xiaoli and Zhao Mingcheng, people rarely mentioned the exchange of interests.

After all, for literary youth, love should be pure and untainted.

But in ancient Huaxia.

How many men and women born into official families could truly pursue untainted love?

For example, many in later generations knew that Xiaoli and Zhao Mingcheng were exceptionally loving, a model couple, an immortal match.

But few knew they lived apart shortly after marriage:

In just over a year, Emperor Huizong would employ Cai Jing, purging Sima Guang's old faction whom he loathed.

At that time, being a protégé of the old faction's prominent Su Shi, Li Gefei naturally was assigned to this faction, lost his job, and was sent back to his hometown.

Meanwhile, relying on his Yuanfeng faction background, Zhao Mingcheng's father, Zhao Tingzhi, was promoted three levels, becoming exceedingly prominent.

At the time, Xiaoli even sought Zhao Tingzhi's help, asking her father-in-law to exonerate her father.

Who knew.

What she awaited was not her father's pardon but Zhao family's declaration of boundaries:

Utilizing the court's new policy that "members of the Imperial Family must not marry into the Yuanyou Faction," even though not part of the Imperial Family, Zhao family expelled Xiaoli from the Capital City.

Xiaoli's phrase "burning hands can warm the heart" was written against this backdrop.

A few more years later.

Cai Jing was dismissed, Yuanyou Faction members were restored, allowing Xiaoli to reunite with Zhao Mingcheng in the Capital City.

However, the world is unpredictable. The following year, Cai Jing returned to office, and Zhao Tingzhi, who had been contending against Cai Jing for power, suddenly passed away.

And so.

Cai Jing acted, and the entire Zhao family was thrown into prison.

Among them, Zhao Mingcheng spent a few months in jail but was released due to lack of charges, though he lost his job and home.

Thus, he could only follow Xiaoli to seclude in Qing Prefecture, which was the most loving ten years of their marriage.

Later on, Zhao Mingcheng's revival, and as soon as he was away from Li Qingzhao's gaze, as they were seeing less and less of each other, Zhao Mingcheng soon took several concubines—some later defended this as a norm in ancient times, but would you read Li Qingzhao's "Feelings·Preface"?

A few more years later.

Zhao Mingcheng made the scandalous move of abandoning his city and fleeing while serving as a prefect, prompting Xiaoli to write her most resolute line: "Even now, I think of Xiang Yu, preferring not to cross the Jiangdong."

Since then, Xiaoli and Zhao Mingcheng's affection plummeted to an all-time low, ultimately leading to Zhao Mingcheng's death due to depression.

It can be said this way:

Their love began with affection and ended with contempt.

Can one say that such a Xiaoli...

Was truly happy?

Clearly, in those ten years at Qing Prefecture, yes, no one can deny that.

But what about those six years expelled from the Capital City, and the years post-separation?

The entire marriage?

Xiaoli's subsequent poems are enough to tell the whole story.

In later generations, Xu Yun loved a phrase: nightmares are better than dreams.

Because nightmares, after all, are dreams.

No matter how desperate the scenarios you encounter in your dream, once you wake up, at least nothing gets worse.

But beautiful dreams are different.

Once shattered, the gap can crush a person entirely.

Though middle-aged Xiaoli wasn't crushed by the shattered dream's shock.

However, from her words, it is not hard to see that her state of mind underwent quite some pessimistic changes.

Therefore, maybe in this timeline, Xiaoli not meeting Zhao Mingcheng could be a blessing.....

Of course.

At this moment, Xu Yun was unaware of these occurrences at the Li Mansion.

After leaving the mysterious man's house, he went straight back to Old Su Mansion to start preparing his lesson plan.

The next day.

Xiaoli arrived on time, whereas Xiaozhao, as Old Su had predicted, was nowhere to be seen.

At the same time, Xu Yun also noticed.

Something seemed off about Xiaoli's mood, underneath the excitement was a hint of melancholy.

However, Xu Yun didn't choose to probe further, for as long as she was attending class, it meant the young lady was okay.

"Today we are discussing acceleration, a physical quantity that describes how fast a velocity changes..."

The basic concept of acceleration isn't too hard; simply put, it is a vector generated by force.

In later textbooks, it's primarily explained through the motion state of an object, then extended to uniform circular motion and such.

But to actually understand acceleration, starting from its units might be even easier, a small technique of Xu Yun:

The unit of acceleration is m/s^2 , speed is m/s , and time is s .

A change in speed over a period divided by that time shows $m/s/s=m/s^2$, representing acceleration's unit.

After more than an hour.

Seeing Xiaoli's bewildered face, Xu Yun smiled slightly:

"Miss Li, isn't it very simple?"

Xiaoli stared with eyes like spirals:

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Chapter 190 144 - The Mathematical Achievements That Led Europe by 863 Years... Born! (6.8k)_2

[907 words]

"@@..."

And just as Xu Yun was imparting knowledge to Xiaoli.

Outside the main gate of the yard serving as a temporary classroom, there suddenly came a hurried knocking:

"Wang Lin! Wang Lin! Open the door quickly!"

Upon hearing this, Xu Yun instinctively exchanged a glance with Old Su, who was listening nearby.

Then he quickly walked to the gate and removed the latch.

As soon as the door opened.

He saw Old Jia standing outside with his hands behind his back and Sun Xiaochuan looking somewhat anxious.

Seeing this, Xu Yun hurriedly offered a junior's salute and said:

"Mr. Tongyu..."

But before he could finish his greeting, Old Jia grabbed him and said:

"Wang Lin, cosine, cosine, it's cosine!"

The sum of several cosines can yield a value, roughly between one and a fourth and one and a third, correct?"

Old Jia's words seemed disjointed, unclear, almost as if he were rambling intoxicatedly.

But upon hearing the word "cosine," Xu Yun's heart suddenly surged with a tempestuous wave:

Oh my God!

No way?

Did Old Jia and his team really calculate the range of the incident wave's cosine?

This damn thing is already the concept of an envelope!

Even with Xu Yun's strong heart, he couldn't help but feel it pounding wildly in shock.

This.....

This is simply outrageous!

But according to the last value Old Jia mentioned, this clearly is the specific mathematical solution to the Helmholtz equation in the optical field!

You must know.

Before demonstrating to Old Jia and the others, Xu Yun had performed a simple calculation on that convex lens, as one must know the answer when posing a question.

The process of calculation was quite simple:

It involved using Green's theorem to solve the wave equation, with spherical waves as the basic algorithm for a simplified computation.

The resultant curve value was approximately around 1.2993.

And Old Jia's one and a fourth to one and a third was 1.25-1.33.

Clearly.

This is a set of similar answers.

Although in later generations, the calculation error for this thing usually doesn't exceed six decimal places, and in some cases, not even eight.

But what kind of calculation conditions exist in modern times?

In the ancient times without systematic precision, this error was already quite terrifying.

Thinking of this.

Xu Yun couldn't help but look up at Old Jia in front of him.

After days of calculations, Old Jia, who already looked quite terrible, appeared even more haggard and worn.

His hair was messy, and there were ink stains on his cuffs and collar.

But this arithmetic expert's gaze remained as sharp as an eagle's, staring directly at Xu Yun with a fire seemingly burning within.

Xu Yun had no doubt.

If he were to say "The data is wrong," this elder would not be discouraged in the slightest.

Instead, he would immediately turn around, return to the study, and recalculate the data with the others.

Then he took a deep breath and solemnly said:

"The number calculated by Mr. Tongyu is almost identical to what is recorded in the sect's notes, with only a minute difference.

But just in case, could you let me look at Mr. Tongyu's manuscript first..."

"This is simple."

Old Jia said, grabbing Xu Yun's wrist and dragging him along:

"Just follow me to the study!"

Watching as this nearly ninety-year-old little old man dragged him like a chicken, Xu Yun looked at his right hand in confusion, deeply questioning the basic skills he had practiced with Wang Bing over these days:

"...?"

Seeing this, Old Su also turned to Xiaoli and said:

"Qingzhao, let's go and take a look as well. Hopefully, the preparation of high-powered microscopes and telescopes can be put on the agenda."

And so.

The lesson was unexpectedly interrupted as the group followed Old Jia to the study.

As soon as they entered the room, Old Jia shouted:

"Everyone, I brought Wang Lin."

Upon hearing this.

Han Gonglian and others, who were already in the study, were instantly startled and prepared to say something.

But before they could speak, Old Jia continued:

"Wen Yi, go fetch our manuscript first."

Han Gonglian was taken aback for a moment upon hearing this, then quickly came to his senses.

He picked up a few manuscripts that had been prepared earlier from the desk, organized them briefly, and swiftly approached Xu Yun:

"Mr. Wang, here are all the manuscripts."

Xu Yun thanked him, found a spot with good lighting, and began examining the manuscripts.

Old Jia and the rest wisely fell silent, despite having much to say, they held it back.

The manuscript Han Gonglian provided was about ten centimeters thick, each page densely packed with numbers and symbols.

The manuscript not only recorded the entire calculation process but also served as a memo or diary, noting much of the daily deductions.

"One half of the outer ring, forming three numbers together with the disk, two axis lengths totaling twenty-five, known as the product of the axes..."

"The outer length of the lens to Qing is five and three-fourths, noted with Arabic numbers, that is, 5.75..."

"The inner lens length to Chuan is three and one-fifth, noted with Arabic numbers, that is, 3.20..."

"The mid-axis under the noon angle... the next axis above the hai angle... totaling one thousand seven hundred thirty-seven in group numbers, Liu Yi and Xiong Huanzhi respectively handle the calculations from one to three hundred eighty-eight..."

"Diameter is one-third of the circumference, squared and rooted..."

"Set the unknown as the Tianyuan... Open multiple small holes to allow light, yielding varied numerical values, so strange... so strange... could the light also be tangent?"

"Today Zi Rong came again, advising us to eat and sleep early, but due to interest, he joined us in calculations late into the night and informed us about the 'particle theory,' enlightening us greatly..."

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Chapter 191 144 - The Mathematical Achievements That Led Europe by 863 Years... Born! (6.8k)_3

[1,000 words]

"If light rays are particles, then their refraction can be precisely calculated, the next day's calculation comprised over five thousand three hundred groups, the constant obtained is approximately..."

"Between one and one-quarter to one and one-third..."

Seeing this.

Xu Yun couldn't help but bite down hard on his back teeth, trying to maintain his composure.

Yet despite this, his fingers continued to tremble slightly.

The reason is none other than because of Old Jia and others...

They really did an amazing job this time.

It is well known.

In Fourier optics, spherical and planar waves can represent any complex wave.

Complex function = a DC zero-level Fourier term + higher-order Fourier terms.

Which means.

Spherical and planar waves are the fundamental solutions to the wave equation.

Among them, the complex amplitude of a planar wave can be represented as $a \exp[jk(x \cos \alpha + y \cos \beta + z \cos \gamma)]$.

$\cos^2 \alpha + \cos^2 \beta + \cos^2 \gamma = 1$, this is the direction cosine of a planar wave.

Based on this, one can derive the inclination factor $K(\theta)$ in Kirchhoff's diffraction theory.

Of course.

The deeper reason is because the forward-moving wave, each point in front can be seen as a source of secondary waves.

The envelope surface of different secondary wave sources becomes the next new wavefront.

θ is the angle between the position direction and the wavefront normal, involving the wave nature of light.

Very simple and easy to understand.

In conclusion.

If the Kirchhoff theory describing the coherent superposition of spherical secondary waves is called the spherical wave theory of diffraction.

Then the angular spectrum theory is the planar wave theory of diffraction.

Initially, Kirchhoff's calculations were done through vectors, using mathematical tools like integrals and Green's theorem.

At that time, the field of mathematics was becoming quite refined, at least there was no talk of mathematical crises or the collapse of the mathematical edifice.

While Old Jia and the others' calculation method is much more "simplistic":

It was by locking down the interval through exhaustive comparison in a triangular manner, then using the most primitive Jia Xian triangle binomial for calculation.

As for the core idea of this algorithm...

Of course, it's the microscopic theory proposed by Old Su.

According to the manuscripts of Old Jia and others, although they did not realize the wave-particle duality of light, they conceived the idea of segmenting light:

They divided the refraction region into countless minute parts, extracted five or six segments with significant refraction, and used them to calculate the tangent.

This method is theoretically feasible.

But if there are only a few data points, the calculated deviation can be quite large.

So in order to reduce this error, Old Jia and the others used Jia Xian (Yang Hui) triangle's binomial remainder division, then continued to.....

Classify and sum all the data.

Or more precisely, hand calculate the classifications.

And the quantity of classified data is the aforementioned...

Over five thousand three hundred groups.

This is undoubtedly a very large amount of calculations, especially for this elderly group in front of them, who might need to spend more energy to persist.

As for what that 1.x value implies?

Let's put it this way.

As long as further inductive statistics can be performed.

The half-wave band method and such, whether or not it can reveal opportunities, deriving the formula $f=(l^2-d^2)/4l$ is still quite easy.

Once this formula is derived, the only limitation to lens grinding is the industrial hardware level.

Friends who have studied optical physics should know.

The earliest in the West was the Huygens-Fresnel principle, which was Xu Yun's initial goal, involving scalar issues.

Actually, the Huygens-Fresnel principle is not a strictly theoretical product, it's mostly derived from simple intuition.

So why "all secondary wavefront overlaps are just taking their envelope" is unclear, but it can serve as a lead.

Again, in some cases, incomplete concepts in an ancient context can be more convenient and easier to understand.

But Xu Yun did not expect.

After days of arduous calculation, Old Jia and the others.

Actually touched upon the fourth layer he mentioned before, which is the concept in Maxwell's realm!

Indeed.

Old Jia and the others only made a very small touch into this field, there's still a long way ahead.

Like in the national higher education exam, you unexpectedly solve the last math problem everyone couldn't solve through a certain formula.

But besides that, you can't solve any other math problems, and every subject scores only in the twenties or thirties.

Therefore, from a knowledge structure perspective, solving this problem is essentially useless, you can't even make it into a vocational school.

To truly grasp the related concepts, you need to study minimum light path, half-wave band method, perturbation contribution expressions, and many other things.

But on the other hand.

You have indeed solved that problem, a problem many graduates couldn't solve, designed by the exam committee member Grandpa Ge x just for challenge.

This is an achievement that cannot be overlooked and has a certain real-world value:

In such a topical context, as long as you want, you could open a self-media account to make some money, whether you earn little or a lot.

So that's the situation for Old Jia and the others:

They have this "topic heat," but it's unclear how much value they can create.

Under normal circumstances, Old Jia and others would most likely just be a flash in the pan, like the one who said "Hang High People have no difficult exam paper" Lin Huan.

But the issue is....

Do not forget, Old Jia and their group have Xu Yun, this talented individual, nearby.

Who knows if today's spark could become tomorrow's sun?

Thinking this.

Xu Yun's emotions surged once again.

From the capabilities shown by Old Jia and others, their recognition of knowledge clearly exceeded his expectations.

In native history.

Kirchhoff's diffraction theory wouldn't be formally proposed or completed until the late nineteenth century.

Today is the year 1100 AD, though it is the twelfth century AD, the timeline is merely at the intersection of two worlds.

Therefore, one could say.

Old Jia and their team are ahead of Europe by a full 863 years, first proposing partial concepts of lens diffraction!

Lens diffraction.

This is a very elastic field.

It could be unnoticed, or it could have an extremely profound impact.

Xu Yun doesn't know what impact it will have on Huaxia's history in this timeline, but at least he is sure.....

Telescope and microscope, can now start preparing.

....

Note:

More to come later, asking for monthly votes!!!!

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[856 words]

Two days later.

The courtyard where Old Su's study was located remained unchanged.

At this very moment.

All the decorations in the courtyard had been removed completely.

In the entire yard, there was only a piece of open ground, a stone table, and a few trees left.

Xu Yun stood in the very center of the courtyard, accompanied by Old Su, Old Jia, Xiaoli, and seven or eight others.

Surrounding them were numerous exposed or sealed items, and...

A donkey.

Once everyone had gathered.

Old Su's eyes gleamed with anticipation, as he gently patted a box containing goods and said to Xu Yun:

"Xiaowang, everything you asked for is here."

Upon hearing, Xu Yun opened a box, took out a piece of coarse glass from inside.

He inspected the glass in front of his eyes and nodded with satisfaction, saying:

"No problem, the quality of the raw materials is excellent."

As a seasoned veteran in the DIY community of later generations, Xu Yun had crafted over three hundred lenses in two lifetimes.

Judging the quality of glass by touch had become a skill ingrained in his soul.

Then Old Su cautiously took a box from Mr. Xie's hands and handed it carefully to Xu Yun, advising:

"Xiaowang, this item is somewhat dangerous, so hold it well."

Xu Yun carefully received the box and placed it stably on the stone table.

Seeing this, Xiaoli couldn't help but ask curiously:

"Wang Lin, what's inside the box?"

Xu Yun glanced at her, and without beating around the bush, said directly:

"Mercury."

Xiaoli blinked her eyes, instinctively stepping back:

"Mercury, that's poisonous. What do you want to do with it?"

Xu Yun chuckled lightly at this, this renowned toxic substance in the Song Dynasty was an indispensable key item for this lens-making stage.

He raised his head, glanced at the sky, and took a deep breath:

"It's certainly for making..... a parabolic surface."

Mentioned earlier.

In the DIY field of later generations, Newton reflector telescopes are generally among the most common types.

Because compared to refractor telescopes, the optical system of the Newtonian reflector is simpler and easier to handle.

Furthermore, the Newtonian reflector has no chromatic aberration, offering greater convenience than refracting telescopes.

By convenience, it means that only one reflective concave surface of the Newtonian reflector is actually involved in imaging.

However, even the most convenient thing, when it comes to optics, often becomes complex.

For instance, in later generations.

The choice of this single concave surface has always been quite debatable.

To be exact.

It's the debate over whether to choose a spherical or parabolic surface.

Fermat's principle in later generations can prove that a parabolic surface perfectly meets the equal optical path conditions for parallel light incidence, hence provides perfect imaging for parallel light.

But on the other hand.

A parabolic surface has only one symmetrical axis and does not fulfill the Abbe sine condition.

So a parabolic surface has obvious coma.

It cannot perfectly image parallel rays that do not enter along the symmetrical axis.

Even if the angle of incidence is very small, the image quality rapidly declines.

Though spherical surfaces have spherical aberration, comparatively, they have an unmatched advantage—they have infinite symmetrical axes.

For a single sphere, there is no concept of light off the axis.

In the telescope scenario.

Although a spherical surface cannot perfectly image star points, the imaging quality across the entire field of view can ensure uniformity.

Considering cost issues, many can't afford the price of parabolic surfaces.

Hence, in later generations, quite a number of people chose spherical surfaces for the single concave.

But don't forget.

The premise for this choice is...in later generations.

The timeline Xu Yun is in now, however, is ancient Song Dynasty.

Therefore, crafting a spherical lens by hand involves an unavoidable challenge:

Xu Yun could not make a Knife Edge Instrument or an Interferometer.

Actually, the Knife Edge Instrument is more manageable; really wanting to craft it by hand still allows for two or three dozen simple prototypes.

But the Interferometer is quite difficult because it requires lasers....

And these two instruments are pivotal, perhaps even the core aspect, in crafting spherical mirrors by hand:

Why can skilled DIY spherical mirrors in later generations completely surpass machine-made ones?

The reason is that these two machines provide extremely precise inspection.

Whenever a deviation is detected, just scrub with a soft asphalt coated in polishing powder.

For example, Canon lenses—especially the high-end L lenses—still have many hand-polished lenses nowadays.

As for the remaining Rotating Instrument Clock and such, they're more straightforward:

Old Su's Water Transporting Celestial Observation Platform is actually the earliest Rotating Instrument Clock, directly connecting to the ancestors' head...

Considering this is a documentary... uh-uh, rigorous novel.

Therefore, from the start, Xu Yun had prepared a plan:

Utilizing rotating mercury to achieve a parabolic surface, and hand grinding a spherical mirror that doesn't require excessive precision as a critical focal point auxiliary, resembling an RC structure. (It was hinted when discussing mercury thermometers, but no one noticed, disappointed.....)

Actually.

The idea of applying liquids in optical devices can always be traced back to Little Niu... or rather Old Niu's era.

But due to numerous engineering and technical difficulties, not until the 19th century did later generations begin attempts at developing reflective liquid components.

So-called reflective liquid paraboloid refers to using highly reflective mercury as the mirror material to create a liquid mirror surface.

By placing it in a container rotating steadily at a constant speed of 8.5 rpm, a parabolic surface can be formed.

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Chapter 193 145 Donkey: &% ¥#@ ! _2

[1,485 words]

Due to the absence of glass casting, grinding, and polishing processes, its production cost has always been very low.

The most famous example in the future would be the LZT large telescope at the University of British Columbia:

It possesses a super large 6m diameter liquid mirror, currently the largest in the world.

In his past life, before Xu Yun ventured into writing, he had participated in the design of a certain domestic liquid parabolic mirror, which at that time was considered a national-level project.

The mirror, with a diameter of several meters, cost less than fifty thousand US dollars.

However, compared to telescopes.

The more famous liquid lens in the future would actually be from a certain phone's advertisement, which once dominated trending searches.

But that device was actually a refractive liquid lens, quite different from a reflective one.

Returning the focus to the present.

After preparing various items, Xu Yun began to allocate tasks:

"Master, mercury evaporation is toxic, and since it needs to be combined with the Rotating Instrument Clock, it must be supervised by a professional.

Thus, I will take charge of the liquid parabolic surface, do you think that works?"

Over the past few days.

The relationship between Xu Yun and Old Su had developed to something akin to mentor and friend, far beyond the ordinary master-servant relationship.

Therefore, Xu Yun's request was mostly procedural, and Old Su naturally would not give arbitrary orders:

"As you suggested, Xiaowang, what other assistance do you need?"

Xu Yun thought for a moment, pointed at Wang Bing and another man, saying:

"I only need Captain and Zhang Qijian."

Old Wang was an officer in the army and had experience in grain transportation; his oversight and precision were unquestionable.

As for Zhang Qijian, he was a Junior Eighth Grade Instrument Inspector from the Artifact Bureau.

His full name was Zhang Jiabao, somewhat like those workshop supervisors elevated from the front lines in later times.

Zhang Jiabao had been temporarily assigned to the Old Su Mansion a week ago for use, and Xu Yun had seen his technical skills several times, which were quite reliable.

With the assistance of these two supervisors, the liquid parabolic surface should proceed without significant mishaps.

Old Su remained silent for a moment, agreed to Xu Yun's request, and turned to Wang Bing and Zhang Jiabao, saying:

"Zheng Chen, Zhang Qijian, you two will assist Xiaowang."

Wang Bing and Zhang Jiabao accepted the orders.

Afterward, Xu Yun thought for a moment and said:

"As for the secondary mirror... I'm afraid you, Master, will need to lead the team."

In this mirror-making plan, Xu Yun designed a telescope structure similar to the RC system.

It's an advanced Newtonian reflector optimized from the classical Cassegrain system according to primary aberration theory.

Telescopes like the Keck Observatory and the Gemini Observatory in later times use this structure.

However, these telescopes' secondary mirrors are ground and tested, with extremely high costs, something Xu Yun clearly couldn't achieve due to industrial limitations.

Thus, he had no choice but to opt for a spherical mirror similar to the Dall-Kirkham system.

A combination structure with a mercury liquid parabolic surface as the primary and a spherical mirror as the secondary.

Based on observational data.

Xu Yun designed an effective field angle of about 1.3° , which translates to a half-field angle of 0.65° .

For the photosensitive element, Xu Yun used fluorite, with a diagonal length of approximately 74mm.

Therefore, when observing Jupiter, assuming the apparent diameter of Jupiter is 40 arcseconds.

Its size on the focal plane would be: $40 \times 1800 / 206264 = 0.776\text{mm}$.

After being magnified by the eyepiece, it would be about 27.4mm at the 250mm distinct vision distance.

This way.

It ensures Jupiter's bright and dark cloud bands are visible, Saturn's rings can be seen, and Venus's phases observed.

This kind of imaging quality should adequately meet Old Su's needs.

Indeed.

27.4mm.

Seeing this.

Some students might already have realized:

Based on the effective field angle, Xu Yun was planning on creating a 4000mm focal length behemoth! (See note)

What concept does a 4000mm focal length entail?

To put it simply.

Its diameter is nearly one meter, roughly the height of Pandora minus the head.

As for its length...

No less than ten meters.

Similar to William Herschel's reflective telescope that defined the Milky Way Galaxy.

Faced with such a colossal entity, even if the auxiliary secondary mirror doesn't require overly precise data, its fabrication is still tremendously cumbersome.

The foremost issue is the curvature of the secondary mirror, something Xu Yun could only personally undertake.

No way.

Spherical aberration is a third-order aberration, which cannot be expressed within the scope of Gaussian optics, let alone by Old Jia, who hasn't even touched much of Gaussian optics yet.

The calculation plan from Xu Yun is as follows:

According to the spherical aberration part in the Seidel aberration polynomial, the spherical aberration coefficient of a single thin lens can be written as:

$$S = ((c_1 - c_2)^2 n^3 s + 2(c_1 - 1/s)^2 - (c_1 - c_2)^2 n^2 (2c_1 - 3/s) + n(c_1 - 1/s)(c_2 - 3/s)) + (y^3(1-n)/n)$$

Here, c_1 and c_2 are the curvatures of the two surfaces of the thin lens, s is the object distance, and y is the height of the light ray.

As for Xu Yun's secondary mirror group.

Since the thin lens assumption is used, the height of the rays on the two spherical lenses is the same.

Therefore, this height can be canceled out in the final result.

And the object of the first spherical mirror A is at infinity, the object for the second spherical mirror B is the image of the first lens.

So $S_a = \infty$, $S_b = f_a$.

Previously, Xu Yun specially asked Old Su to collect flint glass (see Chapter 125), which, when treated through the electrolytic cell for preparing allixin, can yield standard glass with a refractive index n of 1.51680.

Yes.

Earlier, when Xu Yun was preparing to make allixin, he was already considering this step for the telescope, and even further ahead.

By substituting the actual parameters to solve, two feasible solutions can be obtained.

One set is $c_1=0.000494801\text{mm}^{-1}$, $c_2=-0.00173844\text{mm}^{-1}$

The other set is $c_1=0.00107834\text{mm}^{-1}$, $c_2=-0.0011155\text{mm}^{-1}$ (no errors were calculated, but if there are errors, please feel free to correct them)

In other words.

There are two suitable glass curvatures.

Next, by transferring and applying these two sets of data to the formula previously calculated by Old Jia and the others that is close to 1.3.

Theoretically, the optimal template of the curve library can be determined without needing an interferometer.

Then Xu Yun thought for a while and continued to say to Old Su:

"Sir, according to our estimation, grinding the secondary mirror may take about a month.

Therefore, in the coming days, we might need you and Master Qi to work a bit harder."

Old Su, hearing this, smiled with some emotion:

"A mere month; if I can see the stars clearly, even if it's a month, a year, I can still hold on!"

Then he turned around and cupped his hands towards another small old man in his fifties or sixties:

"But it's Master Qi, I'm afraid I have to trouble you this time."

The small old man quickly returned the courtesy:

"I dare not, I dare not. If it wasn't for your help back then, I'm afraid my entire family would've perished long ago. How could we enjoy today's blessings?"

Please, sir, don't say more, otherwise, it truly embarrasses this old man."

Old Su stopped speaking upon hearing this, and warmly patted the small old man's shoulder.

This small old man is also a master at the Artifact Bureau, named Siegfried, who is said to be the best craftsman in forging techniques in the Northern Song dynasty right now.

Back then, when Old Su went to Lu Dong to check accounts, he happened to encounter Siegfried, who was fleeing due to a famine, by the roadside.

Old Su, seeing him pitiful, brought him along out of kindness.

Just like he did with Xu Yun, he planned to arrange a servant job for him once returning to the capital.

However, by coincidence, Old Su discovered that Siegfried possessed quite exceptional craftsmanship skills, even surpassing many artisans in the capital.

Thus, Old Su changed his mind and introduced him to work at the Artifact Bureau, taking care of him during this period.

Later, Siegfried got married and started a family in the capital, treating Old Su as a benefactor.

Whenever Old Su required something achievable by him, Siegfried never refused, always doing his utmost.

For instance, the balance spring in Old Su's self-suction pump was crafted by this person.

Also, the capillary tube of Xu Yun's mercury thermometer was made by this person.

In Xu Yun's judgment through the naked eye.

This Master Qi's level of precision is probably comparable to the legendary eighth-grade technical workers of later ages; he is a human precision machine.

Of course.

In addition to needing manpower for lens grinding, grinding equipment is also necessary.

In 1671.

Huygens once made a machine tool capable of processing lenses, which was very simple to assemble, so Xu Yun replicated it.

At that time, the power Huygens used was manpower, meaning he paid people to drive the equipment operation.

But now....

Xu Yun raised his head and looked at the courtyard...

At that donkey.

.....

Note:

In reality, it's not too suitable to simply discuss focal lengths concerning astronomical telescopes, but for the sake of providing an intuitive concept for general readers, a rough equivalency was made; optics professionals need not delve too deeply into this~

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Tip: You can use left, right keyboard keys to browse between chapters.

Chapter 194 146: Historical Cell Observation (6.2k)

[910 words]

Based on some existing manuscripts.

The mirror polishing tool designed by Huygens looks somewhat similar to the ancient execution guillotine, which is also known as the guillotine of Louis XVI:

A small ball hangs on the 'guillotine', which is rotated by external force to process the glass.

This set of tools is not particularly difficult to prepare and doesn't require very high precision.

After all, in the original 17th century, Europe hadn't started the industrial revolution yet.

However, Xu Yun made some optimizations on the torque compared to Huygens' design:

First, two auxiliary ropes were added to shorten the left-side deflection force.

Secondly, the donkey was used to wind up the spring, which then provided the thrust, saving on manpower costs.

The energy generated by the deformation of the spring lasts for a short time, but the instantaneous magnitude is quite large, which is quite suitable for finishing work.

Anyway, the donkey is already an old laborer, so let it work hard.

After all, it doesn't concern Xu Yun if the donkey gets tired, does it?

In summary.

According to Xu Yun's plan.

The entire telescope manufacturing process takes about a month.

It is expected that the first stargazing can be conducted around mid-August.

As for the microscope..... it's a bit simpler.

After all, the most difficult hurdle in the entire process was solved by Old Jia and his team not long ago.

Even without the aid of an interferometer, it is not difficult to prepare small-aperture lenses for microscopes.

In fact, long ago, the ancient technique of jade processing was somewhat similar to lens preparation and had become an industry.

The nature of this technique had even surpassed the concept of a 'prototype', and it could be categorized under early applications.

It's just that at the time, without a detailed concept of optics, the ancients couldn't calculate the function of $K(\theta)$.

Therefore, with relevant curvature data now available, within less than five days of Xu Yun presenting the curvature design drawing, Siegfried brought good news.

"Mr. Wang, thankfully, I have not let you down."

In the courtyard.

Siegfried pointed to the three small boxes on the stone table and said with a smile:

"The two types of lenses that Mr. requested have been completed and are in these boxes.

The lenses in the box on the left have the lowest magnification, the middle box has the next, and the box on the right has the highest."

Xu Yun thanked him, not rushing to inspect them, but first took out a pair of gloves made from sheep gut from his sleeve.

Sheep gut, in ancient times, wasn't considered part of the culinary "sheep offal," but was used for other purposes:

It was often used as a small umbrella, and even from the Tang Dynasty, there were official shops selling sheep gut condoms.

Therefore, in ancient times when the rubber industry was nearly non-existent, it was actually a very good glove material.

With the odor removed by soaking in high-concentration alcohol prepared earlier, it was basically no different from rubber gloves of later times.

At least sufficient for conducting basic experiments.

After putting on the gloves.

Xu Yun pressed the switch and opened the three boxes.

Inside, each box had a delicate little lens placed at its center.

According to what Siegfried said earlier.

The one on the left is a 10x eyepiece, while those in the middle and on the right are 40x and 100x objective lenses, respectively.

Friends with basic knowledge of microscopes should know.

The eyepiece magnification x objective lens magnification is the magnification of the microscope.

But although both 10X100 and 25X40 have a magnification that appears to be 1000x, in reality, their imaging effects differ greatly.

Because the eyepiece reflects a virtual image, the magnification doesn't need to be too high,

the lens that truly determines the resolution of the microscope mainly lies in the objective lens.

However, a high-magnification objective lens is good but it also has many tedious usage requirements.

For instance, it requires oil to be used, which, in technical terms, is known as an oil immersion lens.

The oil used here is usually cedar oil, extracted from cedar wood, and under special circumstances, water can barely suffice.

This oil needs to be applied not only between the objective lens and cover glass but also between the condenser and the slide.

If oil is not applied.

The image can still be visible, but the image quality will significantly deteriorate, severely interfering with observation.

Those who regularly watch low-quality movies should better understand what image quality deterioration means.

So, two days ago.

Xu Yun used the apparatus designed for distilling alcohol, along with an improvised electrolytic cell, to distill cedar wood once more.

Remember why Xu Yun specifically instructed the use of bent copper tubes back then, it was for this purpose.

It's just a pity that Xu Yun's companions around him couldn't understand his painstaking efforts, wasting his interconnected operations.

Disappointed.JPG.

Of course.

Even with the aid of cedar oil.

Due to limitations in equipment, the lenses ground by Siegfried can't truly reach the level of a 100x objective lens, which is NA1.25.

According to Xu Yun's judgment.

This objective lens' NA is approximately between 1.10-1.15, which is about 0.28 micrometers.

This resolution is higher than the 40x's 0.42 micrometers, but lower than the 100x objective lens' 0.22 micrometers,

Xu Yun then carefully picked up the lenses and approached a vacant microscope beside him.

This microscope is made entirely of fine iron, much more delicate than the roughly made one before, and has been meticulously plated with silver.

From its appearance, it outshines the microscopes of Hook and Levin Hook.

At the base of the microscope is a seal, Siegfried's personal stamp, representing a work of craftsmanship.

Additionally worth mentioning is.

This microscope uses a mortise and tenon-like structure.

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Tip: You can use left, right keyboard keys to browse between chapters.

Chapter 195 146: Historical Cell Observation (6.2k)_2

[846 words]

Throughout the entire assembly no nails were used, yet the assembled microscope was incredibly stable, even vigorous shaking wouldn't cause it to disassemble.

A quarter of an hour later.

Ka-ka-ka—

Xu Yun closed several knobs, clapped his hands heavily, and said to the people around:

"Done, both the eyepiece and objective lens are installed, who wants to try it?"

Xiaoli next to him heard this, instantly stood on tiptoe and waved his hand:

"Me, me, me!"

Xu Yun glanced at this exuberant Little Doudou.

Xiaoli's expression reminded him of some people on the day Elder Ring was released in the future:

"Alright, Miss Li, the task is yours."

In the past little half month.

Xiaoli has been handling the microscope almost daily, her proficiency has surpassed Old Su, almost the top person of this era under Xu Yun.

However, even she had never encountered such a high magnification microscope before.

Just a 10X40 magnification was enough to give the girl a whole new perspective.

But considering Xiaoli's main task was to verify the combination effect of the dual lenses, the core was to assess the clarity of the two lenses, observation came second.

Therefore, Xu Yun didn't rush to use valuable samples and still chose the old standby...

American cockroach slides.

In terms of observation, the American cockroach was indeed one of the prime choices for specimens.

Even in the future, many science museums would use the American cockroach's hind legs as the first slide sample for enthusiasts to experience or even purchase.

For instance, the Science Museum in Xiangjiang Tsim Sha Tsui sells cockroach leg slides externally, each costing nearly two hundred Huaxia Coins.

Selling cockroaches, indeed a spectacle.

The sight returns to its original place.

Then continued with adjusting the light, twisting fine and coarse focus knobs.

Not a moment later.

Xiaoli lifted her head from the microscope, and said to Xu Yun, astonished:

"Wang Lin, this microscope is truly a divine object, every hair on the cockroach's leg is visible with utmost clarity!"

Xu Yun stepped forward upon hearing this, relieved Xiaoli to personally experience the observation effect.

Sure enough.

Just as Xiaoli said.

In the high-magnification lens, the leg hairs on the American cockroach's hind leg sample are as clear as fleas on Guo Donglin's head.

The eyes, with no effort, could see everything distinctly.

Subsequently, Xu Yun tried the 100 times objective lens, performing oil immersion observation.

After several seconds.

He lifted his head, looked at Old Su beside him, trying to keep his tone calm:

"Sir, there's no issue with the lens, we can start observing the cells."

Upon hearing this.

Old Su, who was standing by, suddenly found his breath slightly arrested.

To speak frankly.

As a contemporary master who had created numerous miracles, Old Su's emotional resilience far exceeded that of ordinary people.

After all, in projects, failure is actually more common.

Old Su had no less than twenty significant achievements, which meant his failures were far greater than that number.

Through each of those failures, Old Su's heart was forged solidly, theoretically not prone to casual perturbations.

But this time.

His heart skipped heavily in beats.

Anxiety.

This emotion, having been absent for a long time, reappeared in his heart after many years.

Although in recent days, he had accepted the microconcept proposed by Xu Yun.

He even provided tips while Old Jia and others were calculating refracted light, solving a major difficulty.

But theory is one thing, witnessing firsthand is another.

After all, he only provided Old Jia with a concept, entirely different from a theorem, it costs nothing, just calculate freely.

Among those present today, each specialized in different fields.

For example, Siegfried had better craftsmanship than him.

Wang Bing's martial prowess surpassed him.

Xiaoli had higher literary cultivation than him.

Old Jia's mathematical level exceeds his by miles.

But when it comes to vision, the word.

Aside from Xu Yun, the time-traveler, Old Su on site... not just here, in the entire Great Song, could be ranked in the top three, perhaps simply first.

Therefore, no one understood better than him the grand undertaking they were involved in.

The microscopic world ah...

If everything is as Xu Yun says.

Then this would be a new frontier across ancient and modern times never ventured before!

The value it could bring is far beyond just 'observation' to interpret or cover the past.

Not to mention, concerning the human body.

If it can observe human secrets, medicine is bound to undergo enormous development!

Vitality, evil energy, these terms may be truly distinguished by the naked eye!

Just like Xu Yun did previously.

By processing common garlic with some special instruments, nearly certain death diseases can be cured!

Let alone other derivative fields, this is a discovery that could be called a dividing line of the era!

Upon this thought.

Old Su couldn't help but take a deep breath, and said to Mr. Xie:

"First Year, go fetch the items."

Mr. Xie responded respectfully and took out a slide carefully from the small box beside him, handing it to Xu Yun.

Xu Yun received the slide and installed it onto the microscope,

Then stepped back, cupped his hands towards Old Su, and solemnly said:

"Sir, please."

As a late-stage compulsive patient, Xu Yun has a strong sense of ceremony.

Given Old Su's contribution and status, no one is more suitable to make this observation than him, not even Xiaoli.

Old Su nodded at him, secretly clenched his left hand, and slowly walked to the microscope.

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Tip: You can use left, right keyboard keys to browse between chapters.

Chapter 196 146: Historical Cell Observation (6.2k)_3

[543 words]

Although in the past days, the microscope has mostly been tinkered with by Xiaoli.

But this doesn't mean that Old Su isn't interested in biology, nor does it mean he doesn't know how to operate a microscope.

Quite the opposite.

When he first used a microscope, Old Su easily grasped the essentials, he just wasn't as deeply curious as Xiaoli.

You could see Old Su placing his eyes on the eyepiece, slowly adjusting the spiral knob...

At first, his vision was still a gray blur.

But gradually.

With a series of adjustments, the image became clearer.

About a minute later.

A suddenly appeared in Old Su's eyes a swarm...

Lively tadpoles.

That's right.

Lively tadpoles.

Seeing this, some of you might have figured it out:

The reason Xu Yun didn't stain the glass slides was because what he was showing Old Su was...

Sperm cells!

No choice.

As mentioned before, Xu Yun is someone who values a sense of ceremony.

So when observing live cells, he chose to respect history:

As everyone knows.

Hook discovered and named the cell structure, but what he saw were dead cell walls.

The one who truly observed living cells and started microbiology was Levin Hook.

However, in 99% of textbooks, after discussing Levin Hook's contributions, they won't go into detail about the cell names he discovered.

Because the process of Levin Hook discovering cells is somewhat 18X-rated:

On an autumn night in 1677, Levin Hook and his wife were engaged in the marital act, at one point ****.

But soon, Levin Hook's bold move appeared:

According to a letter Levin Hook sent to the Royal Society of the United Kingdom two years later.

He "jumped up immediately just a few seconds after climax," carrying the sperm sample straight to his microscope.

Under the microscope, Levin Hook saw "thousands of living tiny animals swimming around, as small as grains of sand".

Since then.

He called these things "animalcules".

Additionally, Levin Hook specifically pointed out.

This experiment sample was obtained through "normal marital intercourse," rather than "immoral purple granules".

He even went through the trouble of having the letter translated into Latin, though he didn't mention what his wife thought of this astonishing discovery.

This was not a fabrication, but a true story.

It is mentioned in the curriculum beyond high school level.

Actually.

In contemporary labs, almost every biology enthusiast has observed their own sperm cells.

Some female classmates even enjoy egging on the most handsome boy in class to donate a sample for everyone to observe, after all, a drop or two is enough for over 30 people.

Back when Xu Yun was a second-year grad student, he heard about a legendary person who operated like this, and was then publicly "commended" by the whole school.

As for the reason he got caught.....

To be honest.

Except for the final zombie method, observing one's own sperm is not particularly embarrassing.

After all, how many can resist such a temptation when faced with the might of Olympus?

The liquefied sperm cells are actually quite interesting, lively and swimming around.

This thrill is quite similar to those cliffhangers written by authors at Qidian...

Of course.

Xu Yun never did such a thing, it was something he heard from his friend Qiu Sheng.

As for the source of today's sample donation.....

Xu Yun lifted his head, looked at the donkey beside him, which was busy winding a clockwork toy, and sighed:

"Thanks for your hard work, Brother Lv....."

.....

Note:

There will be more tonight, asking for monthly votes!!!! Aiming to break 4000!!!!

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Tip: You can use left, right keyboard keys to browse between chapters.

After watching the scene of the little tadpoles.

Old Su slowly raised his head, his eyes displaying an extremely rare hint of daze.

Then, after a full half minute had passed.

He let out a long sigh, shook his head, and said with emotion:

"It's truly a miraculous skill... truly miraculous..."

Though he had not personally assisted in the process of extracting the donkey's essence, he had observed the entire procedure from the side:

Considering that Brother Lv had not been having an easy time these days, Xu Yun did not use the rather unpleasant piercing method, but instead humanely brought in a female donkey for Brother Lv.

In this lifetime as a biologist, Xu Yun had a fairly good understanding of some animals' traits.

Especially in matters of clapping, he could estimate the situation to some extent through detailed actions.

Therefore, when he saw that Brother Lv was nearly there, he had them separate the male and female donkeys and collected some X fluid.

Once the X fluid had liquified for half an hour, it was made into slides.

Thus, Old Su was confident that Xu Yun hadn't added any tricks afterward.

As for Siegfried, that was even simpler.

Having saved Siegfried's life, he definitely wouldn't, nor had the opportunity to, deceive him.

It was very clear.

At least the concept of 'microorganisms' described by Xu Yun, if not the entirety of the microscopic world, was largely confirmed.

At this moment.

Old Su, besides being surprised, couldn't help but feel a strong sense of regret:

You're born and I've grown old.... cough, cough, if only Xu Yun had appeared earlier.

After all.....

He was already eighty years old.

Granted, due to his high position and medical skills, his health was still quite well maintained.

But in the end, it's just a slight struggle of someone nearing the end of life.

Even with combined methods, it can only slightly delay aging, unable to defy life's cruel rules.

Judging by normal circumstances.

He might live another five or six years at most, and then it would be time to meet Emperor Shen Zong.

If anything slightly unexpected happened during this period.

The Empress Dowager in the palace nowadays was the best example.

Five or six years...

Such a short time, facing a newly discovered microscopic world, how many useful things could he do?

Not to mention if the telescope succeeds, the vast universe would be a field to explore for a lifetime.

His remaining years... really aren't enough.

Thinking of this,

Old Su couldn't help but slightly turn his head, using the corner of his eye to glance at Xu Yun.

In those incredibly wise eyes, there was an extremely rare hint of envy.

Although Xiaowang's past experiences weren't quite pleasant, the knowledge he had encountered was indeed too enviable, even to the point of jealousy.

If he could have been exposed to science at that age, how great it would have been...

His achievements would certainly surpass what they are now, perhaps even leading to a book written by future generations, maybe called "He Changed the Great Song"?

Of course.

At this moment, Xu Yun was unaware of Old Su's thoughts as he was explaining the origin of the slide samples to Xiaoli.

"Miss Li."

Xu Yun glanced at the Little Doudou in front of him, a bit hesitant as he said:

"This slide sample may be somewhat special, you'd better mentally prepare yourself..."

Xiaoli, who had just arrived at the Su Mansion not long ago and missed the essence extraction process, was immediately curious upon hearing this:

"Special? Could it be something dirty?"

If I remember correctly, you once said that the dirtier something is, the more microorganisms it might contain.

Like sewage, blood, and so on....."

Thinking of this, Xiaoli couldn't help but clench her little fist, as if cheering herself on:

"Wang Lin, don't worry, I'm prepared!"

Looking at the determined expression on this girl's face, she truly had a hint of the later Layman Yi'an who wrote 'To live as a hero among men, to die as a hero among spirits'.

"...How should I put it, this item is indeed somewhat dirty, but not like sewage..."

Xu Yun grinned, pondering for a moment, then tentatively asked:

"Miss Li, do you know about the eight branches, eight and a half branches?"

Xiaoli, upon hearing this, immediately raised a pure question mark on her face:

"Eight branches, eight and a half branches?"

Xu Yun inexplicably felt a sense of guilt as if driving a car, but he still gritted his teeth and explained:

"A woman alone is four branches, a man has one more in the middle, making it five branches, adding up to a total of nine branches.

During that time, the two become eight branches, and when things come out but not completely, it's eight and a half branches.

So the motion is eight branches, eight and a half branches... eight branches, eight and a half branches....

And the things on the slide are...."

During the Song Dynasty, known for its relatively open environment, women's understanding of the eight branches, eight and a half branches wasn't low.

Especially for a girl like Xiaoli who often went to brothels for drinks.

Although she protected herself well and was shielded by "literary aura."

By being immersed in it, related knowledge was still there.

Therefore, after Xu Yun informed her of the origin of the slide sample.

Though Xiaoli's face turned as red as an apple, in the end, her curiosity outweighed her shyness, and she decided to observe the X cells.

Actually.

This kind of thing was quite common in later generations as well.

Have you not seen many experienced film viewers who are, in reality, just single people without even a girlfriend?

Oh.

Xu Yun is too, well, that's okay then.

In any case.

After gathering her courage and putting her glasses to the eyepiece, Xiaoli once again looked at Xu Yun with a face full of amazement:

"There are really many tadpoles, some are moving, while others are still or even broken.

- Chapter 198 147: Have you heard of 8 teams and 8 and a half teams? (6K)_2 -

Chapter 198 147: Have you heard of 8 teams and 8 and a half teams? (6K)_2

[810 words]

Wang Lin, do you think there's something wrong with this donkey's health?"

Xu Yun: "..."

Why does it feel like this girl is on the path to becoming a female driver?

Then, Wang Bing, Old Jia, and Wang Yue, who had recovered some mobility and ended the long bed scene, all stepped forward in turn, curiously observing Brother Lv's slide sample.

About a quarter of an hour later.

Everyone present, except for a few servants, had basically looked through the eyepiece.

The atmosphere in the courtyard was undoubtedly much heavier than before the observation.

Astonishment, bewilderment, even panic.

These expressions appeared on everyone's face simultaneously.

The mathematician named Lin Huainan, after leaving the microscope, even collapsed onto the ground.

Looking as if his worldview had collapsed.

Xu Yun was not surprised by this, as it was expected; after all, not everyone has a strong heart.

According to the normal trajectory.

After Levin Hook discovered micro-organisms and announced it, likewise many cried out 'the death of truth,' and a few broke down, going mad or choosing suicide.

For people of that time, after learning the truth that ants, insects, and even themselves were composed of countless tiny particles, only a minority could accept it calmly.

In a period when macroscopic cognition was still unclear, telling them microscopic concepts was entirely a bit beyond the syllabus.

It's like in the 21st century.

You suddenly find out that a good friend around you is actually a high-dimensional digital person, and he disintegrates into data fragments right in front of you and disappears.

How many can withstand such a shock?

In Levin Hook's time, it was even thanks to the Protestant Church stepping in and using its authority to stabilize the public's emotions.

Otherwise, according to trends, the shock caused by microbiology would be greater.

Of course.

Some students might ask:

Isn't it wrong?

How could the Protestant Church be so enlightened? Aren't they the ones who burn people?

Dun dun dun dun.

It's time for a science popularization.

To be honest.

In the early stages of modern scientific development, the Protestant Church, or the Holy See, actually did quite a bit.

Many might have heard the story of Galileo's persecution or Copernicus being burned to death, but the real reasons have little to do with science.

First, let's talk about Copernicus being burned to death.

Firstly.

This is completely a fabrication:

Copernicus historically died a natural death; the one who was burned was Bruno.

Furthermore, Bruno's death had little to do with sacrificing himself for science—he wasn't even a scientist, and he only heard of heliocentrism while on the run.

In fact.

Bruno was still a priest, but he believed in the Hermes Sect.

His support for the heliocentric system was due to the profound influence of Hermesism.

Hermesism is an ancient religion with strong mystical, pantheistic, and magical hues.

This religion opposed the Trinity, so in the Holy See's judgment, it was considered a heretical cult.

This religion worshiped the Sun, and the Copernican system happened to meet this requirement.

So by chance, Bruno became entangled with it.

Apart from this.

Bruno had never studied any astronomy, not even knowing some basic knowledge.

For example, Copernicus's cosmology had two orbital motions:

One was the stars orbiting the Sun, the other the Moon orbiting the Earth.

This was a major point of contention in the astronomical circles at the time.

Bruno only accepted the former and not the Moon orbiting the Earth.

In his view, all satellites also orbited the Sun.

He was later arrested in 1592 and burned to death in 1600, with a full eight years passing in between.

The Holy See convicted him of eight charges, all related to promoting heresy, with little connection to science.

Instead, due to his involvement, the Copernican heliocentric theory later also got tagged, making its propagation exceptionally difficult.

As for Galileo.....

Those who know should be more.

Galileo was actually always sponsored by the Holy See, and he was good friends with the Pope of the time, Urban VIII.

How good were these two? You ask.

They were not only from the same hometown but also alumni.

Urban VIII once sent his nephew to Galileo to pursue a doctorate, while Galileo's two daughters were entrusted to Urban VIII to find a way out, later becoming nuns.

So you see.

They were not only friends but also family friends.

In 1616.

At that time, the religious court—namely the Pope, disliking Galileo, passed a decree known as the 1616 injunction.

It warned Galileo not to proclaim heliocentrism as the truth anymore, at most it's a hypothesis, got it?

Galileo said, "Okey dokey," and accepted it at the time.

However, Urban VIII, who was then a cardinal, was very dissatisfied with the injunction.

In a letter to Galileo, he stated that if he ever became Pope, he would definitely not let it come to light.

This flag, which would surely doom a character if placed in a movie or anime, did not affect Urban VIII; he indeed became Pope in 1623.....

And seeing Urban VIII as Pope, Galileo got excited:

"My old buddy has become Pope; can't I bring up heliocentrism again?"

So in 1624.

He made a special trip to Rome to persuade his good friend.

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Tip: You can use left, right keyboard keys to browse between chapters.

Chapter 199 147 Have you heard of 8 and 8 and a half? (6K)_3

[620 words]

He went to the Vatican six times before and after, and Urban VIII finally said that lifting the ban was no problem, but you should still treat it as a hypothesis.

At the same time, when writing the book, two requirements must be met:

1. Fairly describe the opinions of both sides, especially reminding Galileo not to lean towards the heliocentric theory.
2. Hope to include his own words.

Then Urban VIII joyfully took his hands off the keyboard and happily awaited the publication of the book in Rome.

For this, he also persuaded both the heliocentric and geocentric factions not to express any stance.

Mainly to highlight the impartial authority of the Holy See and also to include his words into this monumental work.

1632.

Galileo completed "Dialogue Concerning the Two Chief World Systems: Ptolemaic and Copernican."

But here's the cheeky bit:

In this book, he not only mocked the geocentric theory but also Urban VIII—pretty much portraying supporters of the geocentric theory as idiots, with intelligence as foolish as the villains in those war novels from ten years ago.

The worse part is...

Urban VIII is this idiot...

Consequently.

Galileo was sent to the Inquisition.

The Inquisition immediately sentenced him to lifelong imprisonment, but in reality, this sentence never even had a formal execution:

Within days, Galileo was sent to the home of a red-clothed archbishop in Rome.

This archbishop was wealthy, and the living conditions were even better than before, and there are still some ruins of Galileo's confinement estate in Rome.

This red-clothed archbishop was quite interesting, telling people he had a celebrity at home, and invited all kinds of friends to meet him,

many came to discuss mechanics and physics with Galileo, turning it into a fan meeting.

Using a local example to describe.

The relationship between Galileo and Urban VIII is somewhat similar to Chen Palace and Cao Cao from "Romance of the Three Kingdoms."

It's just this 'Chen Palace' is relatively less haughty, and 'Cao Cao' doesn't care as much about face.

Therefore, the story of Galileo's persecution is actually not very precise.

From an objective perspective.

Galileo's situation was relatively better, ambiguous between qualitative assessments; some think that restricting freedom still counts as persecution.

But Bruno's story is purely problematic.

Thus, in recent years, Bruno's story has been removed from textbooks.

But due to the spread, many were influenced by this early on.

Many may never realize they've been deceived by textbooks all their lives.....
(Previously some readers speculated about Bruno, here's a casual explanation, it's useless to guess, he's not even considered a scientist.)

Returning the view to reality.

After observing the X liquid slide.

Xu Yun replaced it with the second slide, the one with the most microorganisms—sewage.

Yes.

It was still provided by Brother Lv.

Friends who've smelled diluted sewage should know.

Diluted sewage doesn't smell that bad, and even has a bit of a floral countryside scent.

This is due to the presence of low concentrations of skatole:

Skatole is scientifically known as 3-methylindole, a derivative of indole.

And indole is the source of scents like narcissus and jasmine.

Not only that.

The most fascinating thing about indole and its derivatives is that they have a very unique dual olfactory magic:

At extremely low concentrations, they have a pleasant floral scent, while at extremely high concentrations, they have a stench that can knock you out.

By the way.

Butter also produces strongly pungent odor from 2-methylindole, so those with bad breath should eat less butter.

After securing the sewage slide.

Old Su approached to observe the eyepiece.

Compared to the first X liquid slide.

The field of view of the sewage slide showed a large number of microorganisms of varying shapes:

Long, short, round, irregular...

Although these little things aren't as lively as tadpoles.

But from their interactions, you can still tell these are lively micro-lifeforms.

Upon seeing this.

Old Su suddenly felt inspired and called out to Mr. Xie:

"First Year, quickly fetch paper and pen, prepare to make a drawing!"

.....

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Tip: You can use left, right keyboard keys to browse between chapters.

Chapter 200 148: Li Qingzhao's Style Completely Collapses (6000)

[916 words]

From a domain perspective.

Although the Song Dynasty in 1100 had yet to establish a complete scientific nurturing system, let alone the so-called scientific literacy.

But it was in such a relatively ignorant and chaotic historical context.

Old Su still made the most appropriate decision upon observing the cell surface for the first time:

Engraving the image.

No other choice.

After all, in the past few decades.

Whether drawing star maps, compiling the "Herbal Atlas" or writing the "New Astronomical Instrument Manual", illustrations were an indispensable core part.

To use a later JOJO meme... it's drawing.

This has become a natural instinct engraved in Old Su's DNA.

A quarter of an hour later.

The Old Chief Steward returned to the courtyard with a small box and handed it over to Old Su:

"Master, the paper and pen are here."

Old Su nodded and took the paper and pen.

While instructing the Old Chief Steward to grind ink, he spread the paper on the stone table.

Since the time was relatively tight, Xu Yun hadn't had the chance to make a ballpoint pen these days.

Therefore, Old Su could only use a fine-tipped brush this time, which was slightly more difficult to draw with compared to the ballpoint pen.

However, since Old Su could be promoted to Prime Minister, his literary cultivation was very solid.

For example, in the "New Astronomical Instrument Manual", there were many pictures drawn by him, far superior to Little Niu's soulful art.

He took a few glances through the magnifying glass, then withdrew from the eyepiece and began drawing on the paper with a fine brush.

After drawing a few strokes, he returned to the magnifying glass, repeating this process many times.

Seeing this, Xu Yun and the others didn't say much.

Nor did they complain about Old Su occupying the resource by himself, demanding him to make way or anything.

Given Old Su's status, even if he fiddled with the microscope all night long, it wouldn't matter.

Just like that.

Half an hour passed in the blink of an eye.

Half an hour later.

Old Su put down the brush, exhaled a breath of turbid air with some fatigue, and a few beads of sweat could faintly be seen on his forehead.

The paper in front of him was now filled with a large number of strange and peculiar shapes.

There were rectangles, squares, ovals.

And also long strips like tadpoles, triangles, and bizarre shapes reminiscent of mutated Neon People, etc....

Then Old Su calmed his breath and accepted a cup of tea from the Old Chief Steward by his side.

He took a light sip and gave the position to the impatient Xiaoli.

He himself picked up the paper and blew on it, then asked Xu Yun:

"Xiaowang, I've drawn all the particles within the microscope onto the paper. Are these particles perhaps microorganisms?"

Xu Yun thought for a moment and shook his head:

"Strictly speaking... you're about seventy percent correct."

He looked at Old Su, whose expression was 'only seventy percent', and continued to explain:

"Master, there are many types of particles in sewage, possibly hundreds or even thousands.

For instance, there are muscle fibers, red blood cells, white blood cells, Campylobacter, Escherichia coli, yeast, and so on."

As he spoke, he walked over to the drawing, pointing at one of the larger particles:

"This here is a starch granule. It is one of the normal metabolic products in feces, like muscle fibers and fats.

Hmm... though the number of granules in this sample seems a bit large.

It's likely that this donkey's stomach isn't quite healthy; it might benefit from more exercise to help its digestion.

In summary.

These starch granules cannot be considered life; they are merely material."

Old Su nodded somewhat in understanding, having heard Xu Yun introduce the concept of material when discussing allicin:

"I see."

Then Xu Yun moved his finger to point at another small dot.

Although Old Su's drawings weren't colored, the quantity and appearance made it easy to discern its origin:

"This is a white blood cell, a common type of cell in animal bodies.

According to the records of the Wind Spirit Moon Shadow Sect, this cell serves as a crucial defensive barrier in the human body, capable of devouring pathogens.

However, if the count is too large, it may cause a kind of blood syndrome.

People suffering from this disease often experience body heat; various body parts easily bleed, rendering medicine ineffective....."

Blood syndrome.

A term anciently used for leukemia.

Of course.

Due to the ancient understanding of medicine, conditions related to blood were basically all classified under blood syndrome.

Strictly speaking.

Leukemia and blood syndrome share a subset and set relationship and cannot be equated.

But Xu Yun didn't deliberately correct this point, as some concepts are best discovered by Old Su or his descendants themselves.

After all, with the miraculous tool of the microscope, the future development of medicine is foreseeable with the naked eye—at least in the short term.

The discovery and classification of symptoms like leukemia and bacteremia are merely a matter of time.

And while Old Su was working to grasp these concepts.

The ever-silent Wang Yue looked at the engravings, his cheeks twitching, unable to resist speaking:

"Xiaowang, according to what you've said, sewage contains a large number of path... pathogenic bacteria, right?"

Xu Yun nodded:

"That's correct, sewage is among the materials with the highest number of pathogenic bacteria."

Wang Yue asked further:

"Then Xiaowang, the illness Mr. Wang contracted back then, what kind of bacteria caused it? Is it on the drawing?"

During his questioning, Wang Yue never took his eyes off the paper, seemingly wanting to pull out the bacteria and fight it for three hundred rounds.

Seeing this, Xu Yun couldn't help but laugh and explained:

"Lord Middle Marquis, what you had was bacteremia, which can be caused by various pathogens."

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