通俗科技英语

文选

南京大学外文系、公共英语教研室编

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第十三辑

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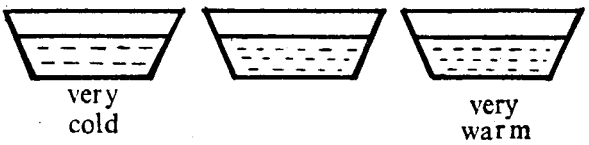
Man's Senses

Seeing, hearing, touch, taste, and smell are "the five senses." But we have more than five senses. Which are some of the other senses?

Our sense of how warm or how cold things are① is another.

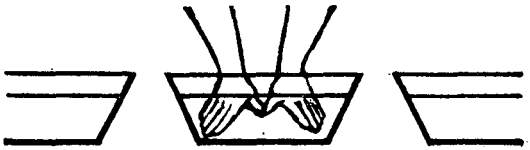
Here are three basins. The basin to the right② has very warm water in it. The basin to the left has cold water in it. The basin in the middle has water which is not cold and not warm in it.③



I put my hands in the basins at the sides.④ One of my hands is in the cold water; the other is in the warm water.

I keep them there for a time.

Now I am putting them together into the middle basin where the water is not cold and not warm.⑤



What is this?⑥

This water seems warm to one hand and it seems cold to the other! It is the same water. But it seems cold and warm at the same time.

Why is this?

It is because one hand was in warm water and the other in cold water⑦ before I put them in this middle basin.

词　汇

basin ['beisn] *n.* 盆,水盆

短　语

more than 多于...;超过...　　***at the same time*** 同时
for a time 一些时候;一度;暂时

注　释

① how warm or how cold things are: 是名词从句，作介词 of 的宾语。
② to the right (left): 介词短语作定语，修饰 basin. 作“靠右(左)边的”讲。
③ which is not cold and not warm in it: 是定语从句,修饰 water.
④ at the sides: 介词短语作定语,修饰 basins. 作“在两边的”讲。
⑤ where the water is not cold and not warm: 是定语从句,修饰 basin.

⑥ What is this? 这儿作"对这盆里的水感觉如何呢?"讲。本文下面还有一句类似的句子结构 Why is this? 作"为什么会有这种感觉呢?"讲。

⑦ the other in cold water = the other hand was in cold water.

参考译文

人的感官

视,听,触,味,嗅是人的五种感官。但我们的感官不止这五种。其他感官是什么呢?

感到东西的冷热,就是另一种官能。

这里有三只盆。右边盆里是热水,左边盆里是凉水。中间盆里的水既不热又不凉。

我把双手分别放入两边的盆里。一只放在凉水里,另一只放在热水里。

我把手在盆里放一会儿。

现在我把两只手一起放入当中那只盛有不冷也不热的水的盆里。

这是怎么回事儿?

一只手似乎感到盆里的水是热的,另一只手则感到是凉的。都是一种水,却同时感到有冷有热。

什么原故呢?

这是因为我把双手放入中间这只盆里以前,一只手曾浸在热水中,而另一只则浸在凉水中。

(宁)

Archimedes and the Crown

— A Story about Archimedes

One day the King of Syracuse called Archimedes to him.

'Look at this crown, please,' he said. 'Is it made of gold? Or is it made of different metals? I want to know, because I paid a lot of money for it.'

Archimedes picked up the crown. It appeared to be made of gold. But perhaps there was a different metal inside the gold. How could he find out? 'Go home and think,' said the King. 'Make some experiments. People say that your experiments are very clever.'

He went home, and he thought very hard; but he could not find the answer. At last he was tired, so he went to the public baths. He stood beside his bath and looked at it. It was not quite full. Then he got into it, and the water came up to the top.

While he was sitting in it, he suddenly had an idea. 'Eureka!①" he cried in Greek. 'I've found it!'

He ran out into the street and went quickly home. The people in the street were surprised, because he was not wearing any clothes. His thoughts were full of this wonderful idea, so he forgot to dress.

He made a few short experiments in his house, then he went straight to the King. 'Sir,' he said, 'I've found the answer to your question. Allow me to show you an experiment.'

He put some gold and silver on the table, beside two pots. Then he began: 'Your crown weighs four pounds. This bar of gold also weighs four pounds, and this bar of silver weighs the same amount. But gold is heavier than silver, so the bar of silver must be larger②. Is that correct?'

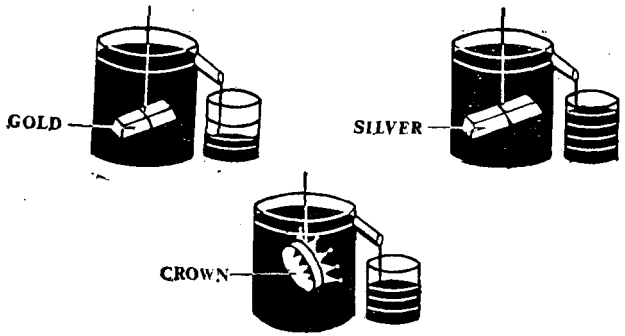
'Yes,' said the King.

'Good. Would you like to help me?' asked Archimedes. 'This big pot is full of water. If you put the gold in, some

water will go out into the small pot. Measure this amount of water. A mark inside the pot will be enough. That's right.'

Archimedes took out the gold. Then he filled the big pot again and emptied the small one. 'Next, put the silver in. When some water goes out, measure it in the same way.'

The King did this. 'And now,' Archimedes continued. 'We shall put the crown in. If it is completely made of gold, the water will reach the first mark. If it is made of silver, the water will reach the second mark.'



They watched, and the water came between the two marks.

'There!' cried Archimedes. 'There is the answer to your question. Your crown is not completely made of gold. There is silver in it also.'

词　汇

Archimedes [ˌɑ:kiˈmi:di:z] 阿基米德（人名）（公元前287—212），希腊大数学家

crown [kraun] *n.* 王冠

Syracuse [ˈsaiərəkju:z] 锡拉丘兹（地名）西西里岛一港口，曾为古希腊的一个重要城市

Greek [gri:k] *n.* 希腊语；*a.* 希

腊的

pot [pɔt] *n.* 罐；壶；锅

bar [bɑ:] *n.* 条，棒

amount [ə'maunt] *n.* 数量；总数

短　语

(to) make experiments 做实验　　***(to) go straight to*** 直接到...去

注　释

① Eureka! [juə'ri:kə] 感叹词(希腊语)，意思是：我想出了！我找到了！

② so the bar of silver must be larger: 这句中的情态动词 must 表示"推定"或"具有较大可能性"，作"谅必"，"一定"讲。

参考译文

阿基米德和王冠

一天，锡拉丘兹王把阿基米德叫去。"请看看这顶王冠"，国王说。"它是金子制作的？还是其他金属制作的？我想弄明白，因为我为它付了一大笔钱。"

阿基米德拿起王冠。王冠看起来象是金子做的。但也许金子里掺有其他金属。他怎样才能搞清楚呢？"拿回家去想想"，国王说。"做些实验看看。人们说你的实验挺巧妙的。"

阿基米德回家后冥思苦想，可仍找不到答案。后来他累了，就去澡堂洗澡。他站在浴缸旁，看了看浴缸。缸内水并不很满。接着，他跨进浴缸，水就满到缸沿了。

当他正在缸里坐着时，他突然灵机一动。

"啊，有了！"他用希腊语叫了起来。"我有办法了！"

他跑上街，赶快往家里走。街上的人都很吃惊，因为阿基米德身上什么也没有穿。他脑子里想的全是这个妙主意，所以忘了穿衣服。

在家里做了几个简单的实验后，阿基米德就直接去见国王。"阁

下，"他说，"我已找到问题的答案了。请让我做个实验给你看。"

他在桌上放上金子和银子，摆在两只缸子旁边。然后他说："您的王冠4磅重。这条金子也是4磅重，这条银子也是同样重。但是，金子比银子重，因此银条一定比金条大，对不对？"

"对的，"国王说。

"好，请您帮帮忙，"阿基米德说。"这个大缸子的水是满的。如果您把金条放进去，就会有水溢出流到小缸子里去。量一下流到小缸子里的水有多少。在缸里作个记号就行了。就这样。"

阿基米德把金条从大缸子中取出来。再把水加满，同时把小缸子里的水倒掉。"然后，把银条放进去。当水溢出来时，用同样的方法量一量。"

国王照他的话做了。"现在，"阿基米德接着说。"我们要把王冠放进去了。如果王冠完全是金子做的，水就会到达第一次所作的记号上。如果是银子做的，水便会到达第二次所作的记号上。"

他们观察着，而水却在两个记号之间。

"瞧！"阿基米德叫了起来。"这就是您的问题的答案。您这顶王冠不全是金子制作的。里面还搀了银子。"

（苏蔚）

The Weight of a Bird and a Cage

Suppose that a bird weighing one pound is flying around in a five-pound cage. If you hung the cage on a spring balance, would the scales record the weight of the cage alone, or the weight of the cage plus the bird?① There is a story connected with this problem.

Some years ago, a postgraduate student in physics at a large university decided to have some fun at the expense of two of his professors. A newspaper reporter was made a

party to the scheme, and was persuaded to call each of the two professors on the telephone in order to ask his expert opinion on a scientific question.

Professor A was asked the following question: If a one-pound bird is flying in a five-pound cage made of thin wire, how much will the combination weigh?

"Five pounds," Professor A told the reporter.

Professor B was then called, and a similar, but slightly different question was put to him: If a one-pound bird is flying in a five-pound cage made entirely of glass, how much will the combination weigh?

"Six pounds," replied Professor B without hesitation.

The next day, much to the embarrassment of the two prominent professors, headlines appeared in the local paper: UNIVERSITY PROFS DISAGREE ON SCIENTIFIC QUESTION. A carefully misworded account of the questions and answers followed, with the words *wire* and *glass* omitted.②

No doubt everyone would agree that the bird and cage together would weigh six pounds, provided the bird were③ sitting stationary on its perch. But which of the professors was right in the case of the flying bird? The answer is that they were both right.

Since the bird is not falling, it must be supported by something. That something is the air. Because of the flapping of the bird's wings, the air pushes up on the bird with a force of one pound. The bird must then push down on the air with an equal and opposite force.

This downward force of one pound is transmitted through the air to the first solid surface available④. Since the wire cage would not have solid walls or floor, the air would push

down, not on the cage, but on the ground below. Therefore, as Professor A said, the wire cage plus the bird would weigh only five pounds. On the other hand, the glass-cage would be impermeable to air, and in this case the weight of the bird must be borne by the cage. Professor B was absolutely correct when he said that the combination would weigh six pounds.

There is a moral to this story about the bird in the cage. It illustrates the necessity for precise statement in a scientific problem. The question as we originally stated it had little meaning because it failed to specify the nature of the cage. The scales might read anything from five pounds, for a cage constructed of fine wire, up to six pounds for a cage made of⑤ some impermeable material like glass or tin. If the cage had holes in it, the weight would be something between five and six pounds: but the exact weight would be very difficult to calculate.

词　汇

cage [keidʒ] *n.* 笼；鸟笼
spring [spriŋ] *n.* 弹簧；春天
balance ['bæləns] *n.* 天平，秤
　spring balance 弹簧秤
plus [plʌs] *prep.* 加，加上
postgraduate [pəust'grædjuit] *a.* 大学毕业的
　postgraduate student 研究生
fun [fʌn] *n.* 玩笑，乐趣
reporter [ri'pɔ:tə] *n.* 记者，通讯员
party ['pɑ:ti] *n.* 参与者；党派
scheme [ski:m] *n.* 圈套，诡计；计划
persuade [pə(:)'sweid] *v.* 说服，劝
expert ['ekspə:t] *n.* 专家
wire [waiə] *n.* 金属丝
hesitation [hezi'teiʃən] *n.* 犹豫
embarrassment [im'bærəsmənt] *n.* 窘迫；使人为难的事物
prominent ['prɔminənt] *a.* 著名的；卓越的，重要的
headline ['hedlain] *n.* (报刊的)大字标题
profs = professors

misworded [mis'wə:did] *a.* 措词不当的
account [ə'kaunt] *n.* (关于事件、人物等的)报导,叙述
omit [əu'mit] *v.* 删去,省略
provided [prə'vaidid] *conj.* 假如;以...为条件
stationary ['steiʃənəri] *a.* 固定的;静止不动的
perch [pə:tʃ] *n.* (禽鸟的)栖木
flap [flæp] *v.* (上下)拍动;振动
available [ə'veiləbl] *a.* 可达到的;可用的;能得到的
impermeable [im'pə:mjəbl] *a.* 不可渗透的,透不过的
borne [bɔ:n] *v.* (bear 的过去分词)负荷;承受;容忍
moral ['mɔrəl] *n.* 寓意;教训
illustrate ['iləstreit] *v.* 说明,阐明
precise [pri'sais] *n.* 精确的,准确的
specify ['spesifai] *v.* 详细说明
tin [tin] *n.* 锡;镀锡铁皮,马口铁
calculate ['kælkjuleit] *v.* 计算

短　语

at the expense of 在损害...情况下,以...为代价,牺牲
to the embarrassment of (to one's embarrassment) 令...为难(的是)
no doubt 无疑地
in the case of 就...来说;至于
on the other hand 另一方面
(to) fail to (do) 没有,没能
up to 直到,直至

注　释

① 本句是虚拟语气,表示一种不大可能实现的设想。所以从句中谓语动词用过去式,主句中的谓语动词用 would + 动词原形。(本文中,还有一些这类用法)

② with the words wire and glass omitted: 介词短语,作状语。omitted 是过去分词,作介词宾语 wire 和 glass 的补足语。

③ provided the bird were: provided (that) = on condition (that): 作"如果","在...条件下,"讲,也是一种假说,所以是虚拟语气。句中谓语动词如果是 be,各人称一律用 were.

④ available: 是形容词,修饰 surface. 这个形容词作定语,修饰名词时,有时是放在被修饰的名词后面的。如: We hope to see as much as possible in the short time available.

⑤ The scales might read anything from five pounds, for a cage constructed of fine wire, up to six pounds for a cage made of: constructed of ... 和 made of ... 是两个过去分词短语，作定语，分别修饰两个 cage.

参考译文

鸟和鸟笼的重量

假设有一只 1 磅重的鸟在一只 5 磅重的鸟笼中飞来飞去。如果把鸟笼挂在弹簧秤上，秤出的只是鸟笼的重量呢，还是鸟笼加上鸟的重量？关于这个问题，还有个故事呢。

很多年前，某大学的一个物理系研究生，决定对两位教授开一次玩笑。一位记者参预了这个计划。他被说服分别给这两位教授打电话，请他们对一个科学问题发表权威意见。

甲教授被问到的问题是：如果有一只 1 磅重的鸟在一只细金属丝编制的 5 磅重的鸟笼里飞，两者加在一起会有多重？

“5 磅，”甲教授回答记者说。

然后又给乙教授挂了个电话，向他提了一个类似而又稍有不同的问题：假如有一只 1 磅重的鸟在一只完全是玻璃做的 5 磅重的鸟笼里飞，两者加在一起会有多重？

“6 磅”，乙教授毫不迟疑地回答道。

第二天，使这两位著名教授大为不安的是，当地报纸上出现了这样一个标题：“在科学问题上，大学教授意见不一。”接着是有意闪烁其辞地登出了问题和答案，没把“金属丝”和“玻璃”这两个词登出来。

毫无疑问，大家都同意，如果鸟停在笼内栖木上不动的话，两者一起会有 6 磅重。但是在鸟处于飞翔的情况下，哪个教授对呢？答案是，两个人都对。

既然鸟没有落下，就一定有什么东西在支撑着它。这东西就是空气。因为鸟的翅膀在扑打，空气就以 1 磅的力把鸟往上推。而鸟必定以相等的力朝相反方向把空气向下压。

这1磅向下的力，通过空气传到首先接触到的固体面上。由于金属丝鸟笼没有固体的四壁和底面，空气就继续往下压，不是压在鸟笼上，而是压在鸟笼下面的地面上。因此，正如甲教授所说，金属丝鸟笼和鸟一起只有5磅。另一方面，玻璃鸟笼是不透空气的，这样，鸟的重量必须由鸟笼来承受。所以乙教授说鸟和鸟笼加在一起的重量是6磅，也是完全正确的。

关于鸟和鸟笼的这个故事有一定的教益。它说明陈述一个科学问题时必须精确。象我们开始提出的那个问题，是没有意义的。因为它没有确切说明鸟笼的性质。秤上的读数可能是5磅（使用细金属丝做的鸟笼），也可能是6磅（使用玻璃或铁皮等不透气材料做的鸟笼）。如果鸟笼有洞，重量就可能在5磅与6磅之间；但其确切重量就很难计算了。

（俞宁）

"Seeing" Atoms in Molecules

A man who directs the players in a game or sport cannot do much to help his team win if he cannot see his players. Neither can a chemist do much to control or manage a chemical reaction unless he can "see" the atoms he hopes will be rearranged from one molecule to another①. But there is no device known that will enable him actually to see his very small "players."② This is why chemists must imagine what atoms and molecules are like.

Sometimes chemists use their hands to convert what their mind imagines③ into models their eyes can see. Such visible models can help the chemist imagine what atoms and molecules really are and how they react when they contact millions of other atoms and molecules during chemical reactions.

To construct models of atoms and molecules, we must

rely on the ideas and theories about their structure and behavior that other chemists have developed. One very valuable idea is to express the comparative weights of the atoms in easily used numbers. Atomic weight lists inform us, for example, that 1 oxygen atom is as heavy as 16 hydrogen atoms and that 1 gold atom is as heavy as 197 hydrogen atoms. It has been determined that there are approximately 600,000,000,000,000,000,000,000(6×10^{23}) atoms in a gram of hydrogen. This number is called the Avogadro number. It is named for the scientist who discovered it. Because we know this number, it is possible, using mathematics, to figure the weight of 1 hydrogen atom. Because it is possible to determine the weight of one kind of atom, it is possible to calculate the weight of all atoms. And because it is possible to measure a piece of the substance and figure its volume, or the space it occupies, the volume or size of single atoms can also be derived. To understand why this is so,④ remember that sulphur atoms are 32 times as heavy as hydrogen atoms. Therefore, 32 grams of sulphur will contain as many atoms of sulphur as there are atoms of hydrogen in 1 gram of hydrogen. By remembering how many atoms there are in 1 gram of hydrogen, we can figure how many atoms there are in our 32-gram piece of sulphur. This amount of sulphur occupies approximately 16 milliliters; therefore the size of a single sulphur atom is 16 milliliters divided by 600,000,000,000,000,000,000,000.

Unfortunately, few people can really understand or appreciate numbers that are so long. You may want to do some calculating to help you realize how large or small such numbers are. Measure how wide a small coin is, for example. Figure how wide a line of these coins could be made between