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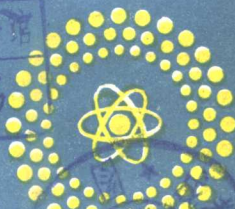
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遨游太空

杭宝桐 译

广西人民出版社

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广西人民出版社出版

(南宁市河堤路14号)

广西新华书店发行 百色右江日报印刷厂印刷

开本787×960 1/32 3.75印张 70千字

1983年4月第1版 1983年4月第1次印刷

印数1—5,630册

书号: 7113·454 定价: 0.32元

前 言

本书原文是 Ian Ridpath 所著麦克唐纳尔德的《宇宙探索》(Macdonald's *Discovering the Universe*, London, 1974) 中的遨游太空一章。主要内容是介绍火箭、人造卫星、天空实验室和太空旅行等方面的科普知识。原文语言简练生动, 浅显易懂, 趣味盎然。现加以注译以供广大中学生、知识青年阅读、学习。为便于读者掌握词汇、句型, 提高阅读和理解能力, 除对一些科技词汇、难句作了注解外, 附有参考译文。

上海师范大学外语系副教授吴棠为本书审校, 在此谨表谢意。

杭宝桐

1981年5月于上海

CAE77/1411

CONTENTS

目 录

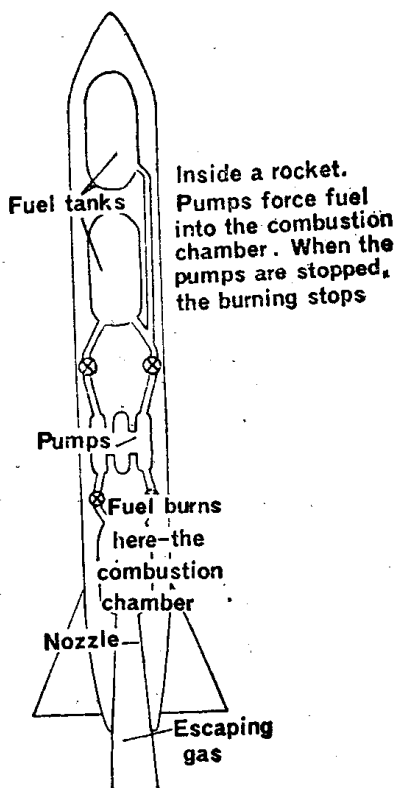
- I . ROCKETS(1)
火 箭
- II . ASTRONAUTS AND
COSMONAUTS(26)
宇宙航行人和宇宙飞行员
- III . A TRIP INTO SPACE.....(45)
太 空 航 行
- IV . JOURNEY TO THE MOON(72)
月 球 旅 行
- V . VISITING THE PLANETS (97)
游 览 行 星
- VI . VISITING THE STARS.....(107)
游 览 恒 星

I. ROCKETS

1. Rockets

As we go higher above the Earth, the air thins out. There is nothing to hold up an aeroplane. Its wings would¹ be useless in space, because there is no air. How can we get into space? And how do we move about once we are there?²

The answer is to build a rocket. A rocket does not need wings to fly. It can fly where there is no air.³ It can also travel much faster⁴ than an aeroplane. This helps us to get away from the Earth.



A rocket goes up on a cloud of fire.⁵ Where does this fire come from? Most of the rocket is made up of fuel tanks. When the rocket is started, the fuel begins to burn. As the fuel burns, hot gas is given off. The hot gas builds up inside the rocket, like steam in a kettle. The gas tries to get out.

It can only get out through a small nozzle at the bottom. So it comes rushing out⁶ and pushes the rocket upwards.

Wores and Expressions 单词和短语

rocket [ˈrɒkɪt] n. 火箭	make up of 组成
earth [ə:θ] n. 地球, 地面	fuel [fjuəl] n. 燃料
thin out 变稀薄	tank [ˈtæŋk] n. 箱, 罐
hold up 支持, 支撑	gas [gæs] n. 气体
aeroplane [ˈɛərəpleɪn] n. 飞机	give off 发出
wing [wɪŋ] n. 翅膀, 翼	build up 增大, 膨胀
space [speɪs] n. 太空, 空间	kettle [ˈkɛtl] n. 水壶
move about 移动	nozzle [ˈnɒzl] n. 喷嘴
once [wʌns] conj. 一旦...(就)...	bottom [ˈbɒtəm] n. 底部, 底
travel [ˈtrævl] vi. 旅行, 行进	rush [rʌʃ] vi. 冲, 奔
a cloud of 一团	push [puʃ] v. 推
	upwards [ˈʌpwədz] adv. 向上

Notes 注解

- (1) would 是情态动词，表示推测的意思。
- (2) once we are there 里的 once 是从属连接词，引导时间状语从句。
- (3) It can fly where there is no air. 本句中 where there is no air. 是地点状语从句，说明 fly。
- (4) much faster 比较级前常可用 much, ever, still, far, a bit 等状语来形容，说明比较级的程度。注意本书中这种用法很多。
- (5) on a cloud of fire 介词短语，在句中作状语，说明句中 goes up, on... 意为在...情况中。
- (6) rushing out 现在分词短语，作状语，说明 come, 表示发生的方式。

I. 火 箭

1. 火 箭

当我们从地球上升越来越高时，空气就逐渐稀薄。没有什么东西可以支撑飞机了。因为那里没有空气，机翼在太空中就会没有用处。我们怎么能进入太空呢？一旦我们到了那儿，我们又怎么动弹呢？

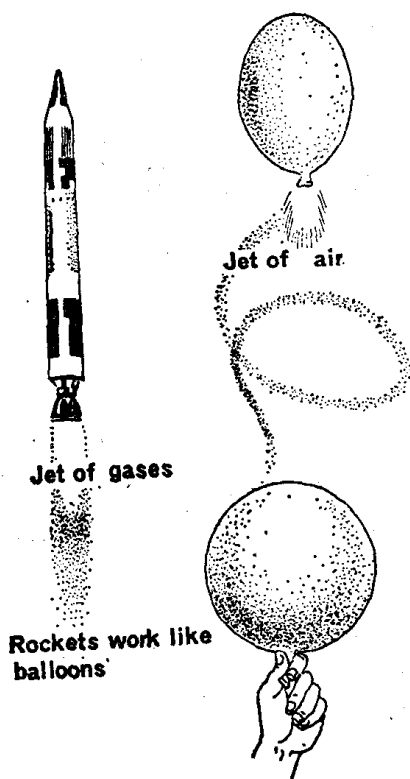
解决的办法是制造火箭。火箭不需要翅膀飞行。它可以在没有空气的地方飞行。它还可以比飞机飞得快得多。这就有助于我们离开地球了。

火箭在一团火焰中上升。这团火焰哪里来的？火箭的大部分由燃料箱组成。当火箭发动时，燃料开始燃烧。当燃料燃烧时，放出高热的气体。就象水壶里的蒸气一样，火箭内部的高热气体膨胀起来。这种气体尽量要向外跑。

高热气体只能从底部的小喷嘴里跑出来。所以，它是冲出来的，因此推动火箭向上。

2. How a rocket works

We can easily make a small model of a rocket.



Get a balloon. Blow it up, and hold the neck tightly. The balloon is full of gas. The gas pushes to get out. It can only get out when you let go of the balloon's neck. The balloon's neck is like the nozzle at the bottom of a rocket. When you let go the balloon zooms around as the gas squirts out.¹

Almost the same thing happens in a rocket. The gas that

builds up in the rocket² can only get out through a small nozzle. The force of that gas squeezing through the nozzle³ pushes the rocket up.

The same thing happens if you turn a hosepipe

on and let go of the hosepipe's end. The force of water squirting out of the pipe makes the pipe move about. The only difference is that the gases in a rocket are so hot that they give a much greater push.⁴

A rocket is pushed along by gas escaping from inside it. Therefore a rocket works in space where there is no air.⁵ A rocket does not need anything to push against.

Words and Expressions 单词和短语

model [ˈmɒdl] n. 模型	squirt [skwɜ:t] vi. 喷出
balloon [bəˈlu:n] n. 气球	almost [ˈɔ:lməʊst] adv. 几乎, 差不多
blow up 给...打气, 使充气	squeeze [skwi:z] v. 挤, 塞
neck [nek] n. (头)颈, 颈状部分	turn on 旋开, 开
tightly [ˈtaɪtli] adv. 紧紧地	hosepipe [ˈhəʊzpaɪp] n. 水龙软管
be full of 充满	
let go (of) 放开	
zoom [zu:m] vi. 陡直上升	

Notes 注解

- (1) When you let go the balloon zooms around as the gas squirts out. 本句是复杂句。the balloon zooms around 是主句。When...和as...

引导两个时间状语从句，同时说明主句的动词。

- (2) that builds up in the rocket 定语从句，说明句中gas。that 是一个连接代词，一方面起连接主句和从句的作用，一方面又是从句的主语。
- (3) squeezing through the nozzle 现在分词短语作定语，说明句中force，同样用法在本节中还有：the force of water squirting out of the pipe 和 by gas escaping from inside it。
- (4) The only difference is that the gases in a rocket are so hot that they give a much greater push. 本句是复杂句。that the gases...a much greater push 是表语从句。它又包含一个表示结果的状语从句so...that they give a much greater push.
- (5) where there is no air 是定语从句，说明space。where 意为“在那儿”，起连接副词的作用。

2. 火箭是怎样工作的

我们可以简易地制造一个小的火箭模型。拿一个气球，给它打足气，并且紧紧抓住气球的颈部。气球充满气体。气体向外扩展。气体只有在你放松气球颈部时才能跑出来。气球的颈部好象火箭底部的喷嘴。当你放手时，随着气体的喷发，气球陡直上升。

几乎同样的情况发生在火箭里。火箭里膨胀起来的气体只能从一个小喷嘴里喷出来。从小喷嘴挤压出来的气体所产生的力量推动火箭上升。

假使你拧开水龙软管的开关，并且打开水龙软管尽头的盖子，就会发生相同的情况。水喷出水管所产生的力量使得水管移动。所不同的是火箭里的气体热得能够发出更大的推力。

火箭被从里面逃出来的气体推动向前。所以，火箭能在没有空气的太空中飞行。火箭不需要任何东西推它前进。

3. How big is a rocket?

Big rockets are very heavy. They need many tonnes of fuel to push themselves up. The Saturn 5 is the biggest American rocket. It is about 111 metres high. That means it is longer than a football field. Less than four metres of the rocket will come back to Earth.

The rocket weighs about three thousand tonnes before it takes off. When it has burnt all its fuel, it only weighs about 200 tonnes.

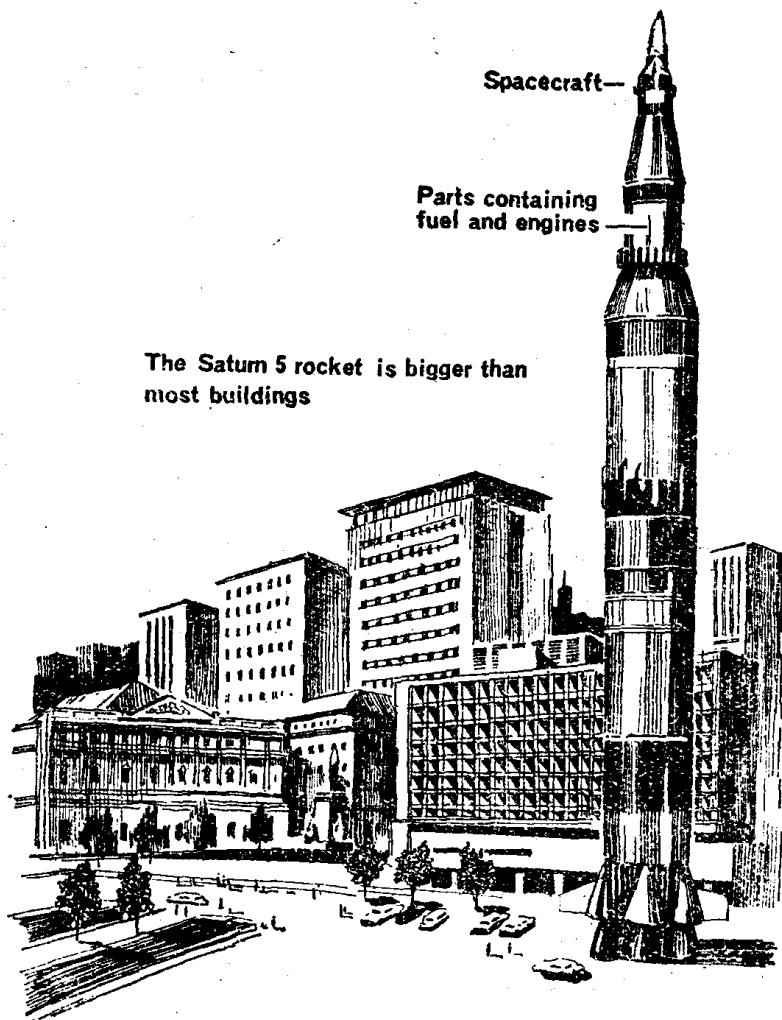
Words and Expressions 单词和短语

ton [tʌn] n. 吨	metre ['mi:tə] n. 米, 公尺
Saturn ['sætə(:)n] n. 土星	field [fi:ld] n. 球场
The Saturn 5 土星五号	weigh [wei] vi. 重(若干)
American [ə'merikən] a. 美国的	take off 起飞, 发射

Spacecraft—

Parts containing
fuel and engines

The Saturn 5 rocket is bigger than
most buildings



3. 火箭有多大？

大的火箭都很重。大的火箭需要很多吨数的燃料才能把自己推向天空。土星5号是美国最大的火箭，大约有一百一十一公尺高。那就是说，它比一个足球场还要长。火箭返回地面时，只剩下不到四公尺的长度。

火箭在发射前大约有三千吨重。当它烧完所有的燃料时，它仅重二百吨左右。

4. The stages of a rocket

Big rockets are built in several pieces.¹ These are called stages. Usually rockets have two or three stages. Rockets with more than one stage are called step rockets. They end up going much faster than rockets with only one stage.²

There are two ways of making step rockets. One is to put the stages one on top of the other. The stages get smaller towards the top. The biggest stage of all is at the bottom. It gives the first big push to get all the stages off the ground. It is thrown away only minutes after the rocket takes off. Most American rockets have their stages on top of each other.

The other way to make step rockets is to put

the stages side by side at the bottom. This makes the rocket short and wide.³ As the rocket goes up, some of the rockets at the side fall away. This is how Russian rockets work.

If the rocket is taking a satellite or people into space, they sit right on top of the rocket.⁴ Their part is much smaller than the other stages. But the big stages are only there to get the tiny top part into space.

Words and Expressions 单词和短语

stage [steɪdʒ] n. (火箭)级	work v. 运转, 活动
step rocket 多级火箭	satellite ['sætəlaɪt] n.
end up 结束, 告终	(人造)卫星
put [pʊt] v. 放, 装	sit [sɪt] vi. 坐落, 位于
top [tɒp] n. 顶, 顶部	right [raɪt] adv.
throw away 丢弃	(加强语气)正好, 就,
side by side 肩并肩, 并排	恰恰, 完全
fall away 抛弃	tiny ['taɪni] a. 微小的,
at the side 在边上的	极小的

Notes 注解

- (1) in several pieces 介词短语作状语, 说明 are built. in... 表示数量, 按…。
- (2) They end up going much faster than rockets

with only one stage. going... 现在分词短语, 作状语, 说明 end up.

- (3) short and wide 是句中宾语 rocket 的补足语, 与 rocket 合起来成为 make 的复合宾语。
- (4) If the rocket is taking a satellite or people into space, they... taking a satellite or people into space 是动名词短语, 在句中作表语, 说明主语是干什么的。注意它不是一般现在进行时态, they 代表 satellite or people.

4. 火箭的级

大的火箭由几部分建成。这些部分称为“级”。火箭一般有两或三级。一级以上的火箭称为“多级火箭”。多级火箭最后比只有一级的火箭运行得更为快速。

有两种方法制造多级火箭。一种方法是一级接一级地装上去。越到顶部, 级就变得越小。最大的一级是在底部。它用最大的推力将火箭的各级推离地面。火箭起飞仅仅数分钟以后, 它就被扔掉。大多数的美国火箭是一级连接一级的。

另一种制造多级火箭的方法是把几级并排装在底部。这就使得火箭短而宽。当火箭上升时, 火箭旁边的一些级就脱落。这是俄国火箭脱落的方式。

假使火箭装载卫星或者人进入太空, 安置卫星或者载人的部分就装在火箭的顶部。这个部分比其他的级要小得多。但是, 大的几级装在那儿不过是使这个极小的顶部进入太空罢了。