科技英語通俗讀物

英语通俗科技文选

〔苏联〕雅科夫列夫　卡秋芭編

商务印書館

科技英語通俗讀物

英語通俗科技文选

〔苏联〕雅科夫列夫
卡秋芭 編

陈淑英 譯

В. Н. Яковлев и А. В. Кацюба

**СБОРНИК
НАУЧНО-ПОПУЛЯРНЫХ И
ТЕХНИЧЕСКИХ СТАТЕЙ
НА АНГЛИЙСКОМ ЯЗЫКЕ**

內 容 提 要

本書是苏联俄罗斯苏維埃联邦社会主义共和国中学九至十年級用的英語通俗科技文选，包括原子能、太阳能、化学、物理学、航空学和星际航行等方面的課文52篇，并在課文后面附有語法注释和詞汇表，可以帮助讀者了解課文。

本書适于用作工业大学低年級学生或自修英語的科技工作人員培养閱讀和翻譯英語科技書刊能力的輔助讀物。

科技英語通俗讀物

英語通俗科技文選

〔苏联〕雅科夫列夫　卡秋芭編

陈　淑　英　譯

商　务　印　書　館　出　版

北京东总布胡同10号

（北京市書刊出版业营业許可証出字第107号）

新华書店北京发行所发行　各地新华書店經售

京华印书局印刷　紅旗裝訂厂裝訂

統一書号 9017·235

1960年4月初版　　开本 787×1092 1/32

1960年4月北京第1次印刷　　字数 53 千字

印张 2—8/16　　印数 1—5,000 册

定价 (10) 0.34 元

譯者前言

自从苏联頒布了“关于加强学校同生活的联系和进一步发展苏联国民教育制度的法律”以后，对于外語教学的改进也引起了足够的重視，各有关部門采取了一系列的革新措施，修訂和出版了許多教学用書，新訂的中学外語教学大綱草案規定中学教学的第二阶段的任务，除了要进一步发展口語熟巧外，另一方面要特别着重閱讀能力的培养，而閱讀能力的培养，除了通过教师指导下进行的分析性閱讀外，还必須有学生独立的綜合性閱讀予以配合，这本通俗科技文选就是应学生独立閱讀的需要而編选的．

本書有下面几个特点：

1．本書是通俗科技文章的选集，共选各种题材的課文52篇，代表了科技文章的风格特点，書中包含一定量的科技詞汇，所以本書可以作为閱讀英語專业文献的基础讀物，适合工业大学低年級学生或自修英語的科技工作人員应用．

2．內容反映了現代科技方面的最新成就，課文富有兴趣，文章生动活泼，通俗易懂．

3．本書課文虽然都是从科技文章中选录下来的片断，但都能独立成章，每篇課文都短小精悍，最适合作为翻譯科技文章的練习之用．

4．本書不采用就难句逐句注释的方式，而是把課文中比較困难的語法現象予以集中注释，这样可以避免学生完全依賴注解，因而有利于独立閱讀能力的培养．語法注释的編排以翻譯法为标准，充分利用本族語作为对比，以利閱讀（原書以英俄語作为对比，譯本已全部改为英汉語对比）．

5．本書課文中所出現的詞汇除了一些極簡单的輔助詞以外，全部列入書后的英汉小辞典中，因此一些基础詞汇在小辞典中也都可以查到，所以讀者不需任何其他辞典，即可順利地閱讀課文．

本書有以上几个特点，所以是一本比較好的課外讀物，原書供苏联中学九、十年級学生之用，譯本适合于我国大学低年級学生閱讀．

1959年12月

原編者的話

本書是供中学高年級学生用的实用英語教材，書中所輯录的課文能帮助学生熟悉科学文章的风格特点，并能培养学生閱讀和翻譯英美技术文献的能力.

本書書后附有語法注释和小辞典.

本書的全部材料均选自英美的科技文献，每篇課文都注明出处. 課文按照九年級学生的知識水平，經过节写和改編. 本書包含下列几个題材：

1. 原子能
2. 太阳能
3. 化学
4. 物理学
5. 航空，星际航行
6. 其他

虽然課文中所出現的全部語法現象都是学生已学过的，但是对于通常学生可能发生困难的部分，仍在"語法注释"中予以解释.

"語法注释"不是詳尽的語法教材或語法参考資料，它的作用仅在于使学生能回忆起已往学过的那些語法內容，从而帮助学生了解課文. 为了使"語法注释"尽量实用，所以注释內容与其說是按語言現象的語法作用分类，还不如說是以它們的俄譯法为标准.

"語法注释"中所采用的例句基本上都是本書課文中的句子，但并不包含課文中全部难点的翻譯法"語法注释"仅說明如何較好地翻譯一些类似的句子，并举出了一些典型的例子.

本書全部詞汇除了学生从五年級起就已学到的一些輔助詞（如連接詞 and, but, or，前置詞 in, on, at, under，助动詞 be, shall, will 等）以外，都已完全列入書后的小辞典中，所以学生不必借助任何其他补充参考書，就可以进行課文的閱讀或翻譯. 小辞典內的生詞都注有語

音音标．为了簡明起見，所注生詞的意义仅以課文中所使用的为限，例如 tank 一詞仅注“水箱，油槽”，而不注“坦克車”。

本書可以供課內和課外应用，但是由于科技文章和文艺語言不同，它有它自己的特点，所以編者建議在开始使用本書时，应在教师的指導下，經过預习，在課堂內进行．

翻譯技术文章时全部注意力应該集中在如何把原意正确和通順地表达出来，为了达到正确通順，有时甚至必須把整个句子予以改写，这时原作的語言和风格都不是主要考慮的問題．显然，要翻譯得正确，必須具备良好的語法知識．所以在使用本書以前最好先复习一下科技文章中常用的而且在翻譯时常常会引起困难的那些語法內容，这些部分首先是被动語态的时式，动詞的非人称形式（分詞，动名詞和不定式），作定語用的名詞和作語法上的主語用的 it 等．

編　者

目　　錄

課文部分

ATOMIC ENERGY

RADIOACTIVITY

The discovery of radioactivity is the beginning of one of the most fruitful and important achievements of modern physics. It was noticed that a uranium salt which was wrapped in paper and remained in it for a long time, emitted penetrating radiations which affected a photographic plate. The photographic action was very weak, but investigation showed that the radiations produced ionization in the gases through which they passed. A series of investigations proved that the radiations emitted by the uranium salt were of two kinds. They were α-radiation and β-radiation. Beta-radiation was more penetrating than α-radiation, but produced less ionization. Later a third radiation, γ-rays, was discovered. It was still more penetrating. This property of emitting radiations is an atomic property and is called radioactivity.

Introduction to Atomic Physics
by S. Tolansky.

WHAT IS AN ISOTOPE?

An isotope is a species of an element. It occupies the same position in the periodical table and is identical in chemical behaviour, the difference is only in atomic weight or in radioactivity.

For example, the element carbon has several isotopes. All have the same atomic number but different atomic weights. Carbon found in nature has atomic weights of 12 and 13. It can also be produced artificially with weights of 10, 11 and 14. These isotopes are named Carbon 10, Carbon 11, etc.

There are two types of isotopes: stable and radioactive. Most elements occur in their stable form, except the elements which are heavier than lead.

Radioactive isotopes decay or disintegrate emitting three kinds of radiation: 1) alpha particles which are nuclei of helium atoms; 2) beta particles which are positively or negatively charged electrons; 3) gamma rays or X-rays. Each radioisotope emits a fixed type of radiation. Each decays or disintegrates at a fixed rate. The measure of this decay is the half-life or the period during which the radioisotope loses half of its radiation activity. The half-life of radioisotopes of carbon, for instance, varies from 8.8 seconds to 5,000 years.

Oil and Gas Journal
October, 1955.

FUTURE USES OF ATOMIC ENERGY

Scientists believe that in the near future the atom will be able to do the following things.

To control and perhaps cure cancer of the brain without surgery. To provide X-ray treatment of the inner parts of the body with the help of radioactive cobalt.

To heat and light whole towns. To supply air cooling for homes in summer, and heat in winter.

To move ships, locomotives and aeroplanes.

cover petroleum in the earth.
erilize meat without refrigiration.
ntrol forest-tree diseases.
evelop better varieties of plants and to increase farm production; to change the size and colour of flowers; to change and control the growth of grass.

Atomics Engineering and Technology
February, 1956.

FIRST ATOMIC POWER STATION OF THE U.S.S.R.

The first industrial atomic power station was built in the U.S.S.R. in 1954. Its output is 5,000 kw.

The heart of the atomic power station is a thermal uranium-graphite reactor. The atomic fuel is uranium and its total charge is 550 kg.

The chain reaction takes place in the reactor and produces heat which is given up to the water that passes through the reactor under a pressure of 100 atm. This water gives up its heat to the water in the second circuit which is transformed into steam. The steam drives a 5,000 kw turbine.

The use of this two-circuit system protects the turbine and the workers from the radioactive radiations.

Chemical Engineering Progress
October, 1955.

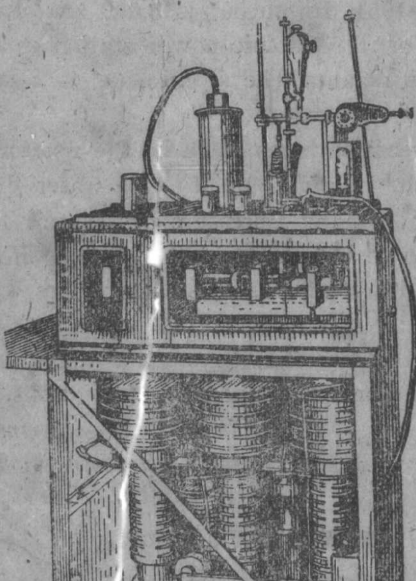
NEW ATOMIC LAMP

A new type of lamp is installed in some American ships. The lamp glows continuously, does not use electric current, has no wires, and will last several years.

The lamp takes its light from atomic radiation. It works on the same principle as the luminous dials on some watches, but is much more powerful. When radioactive strontium or other radioisotopes are mixed with zinc sulfide, the latter emits visible light. This light is not very bright and is not seen at a distance greater than 1,000 ft, but the new atomic lamp is very convenient for lighting small areas.

Atomics Engineering and Technology
April, 1956.

ATOMIC CLOCK



Atomic Clock.

A British physical laboratory has developed an atomic clock. It broadcasts daily time signals to other countries.

The clock measures time by recording the atomic frequency, of the caesium atom. The performance of the clock remains constant under all conditions of temperature, pressure and mechanical vibration, and is accurate to one hundredth of a second within a year. This means that the time it shows is thirty times more accurate than the time measured astronomically.

Now the clock is used for research work as well as for a basic standard of time. For example, it measures variations in the rotation of the earth and the variation of the lengths of days and years.

Atomics Engineering and Technology
July, 1956.

ATOMIC MEDICAL REACTOR

An atomic-energy reactor for medical treatment and research will be built for the University of California at Los Angeles. The new reactor will produce gamma rays and neutrons for cancer therapy. Gamma rays destroy cancer cells like it is done by X-rays, but gamma rays penetrate deeper through tissue and are much stronger than X-rays.

A solution containing the element boron is injected into a tumour. The cancerous tissue absorbs the boron more quickly and in greater amounts than healthy tissue does. When cancer area is bombarded by a stream of neutrons, the boron atoms in the cancer cells release alpha particles. These particles are tiny masses carrying an electrical charge. They weigh about four times more than neutrons and are effective cancer-cell killers. Alpha particles destroy only cancer cells and do little harm to healthy tissue.

Mechanical Engineering
September, 1955.

IRRADIATED FOODS

A new interesting method of processing and preserving foods has been tested in America. This method is called "cold sterilization". Foods are exposed to the rays of radioactive elements. This ionizing radiation completely destroys all bacteria that spoil foods.

Before these foods can be widely used it is necessary to make sure that no toxic by-products are produced by radiation sterilization and that the irradiated foods can be eaten safely.

Laboratories reported that in the cold sterilization vitamins were partly destroyed, but no toxic by-products were discovered.

The University of Colorado tested irradiated foods on experimental rats for a period of nine months. During this period the growth, reproduction and behaviour of the animals were quite satisfactory. These tests have proved that irradiated foods are not harmful and can be widely used.

Atomics Engineering and Technology
April, 1956.

PHOTOGRAPHING THE ATOM

Atoms have been photographed for the first time by Dr. Erwin Muller, physics professor at Pennsylvania State University. This photographic achievement is very important in the study of chemical reactions between solids and gases.

It has given scientists a clear view of atoms magnified 2,750,000 times.

The instrument used to make the photograph is an ion microscope, which was developed by Dr. Muller after nineteen years' research.

In order to make the picture of an atom, the tip of a tungsten wire one thousand times sharper than the point of a pin was inserted in the microscope, where liquid nitrogen reduced the temperature to 300° below zero.

Helium gas was used to make the necessary ions and the tungsten tip produced a magnified picture on a fluorescent screen. A special camera photographed the screen, giving the picture of the atomic structure of tungsten.

Atomics Engineering and Technology
September, 1956.

A NEW APPLICATION OF ISOTOPES

An interesting application of radioisotopes was reported by petroleum engineers.

A pipeline passes between the oil field and the tanks which are a hundred miles away. Different sorts of oil pass through the pipeline. Each sort has to be piped into a separate tank, so it is necessary to know when the change in the sorts takes place. Radioisotopes are used to signal this change. A small quantity of radioactive isotopes is inserted into the oil at the oil field when a new sort is piped. When the isotopes approach the tanks, they are "detected" by a monitor which is installed at some distance from the tanks. The monitor gives a signal to the operator and he directs the oil to another tank.

Chemical and Process Engineering
February, 1956.

MODERN ALCHEMY

Ancient alchemists tried for hundreds of years to turn mercury into gold by chemical means. Some men devoted all their lives to this impossible task. Today this classic reaction has been performed in reverse, not by chemical means but through atomic radiation. Scientists have made mercury from gold with the help of atomic reactor. The result is superpure mercury containing one isotope 198.

Mercury has seven stable isotopes, therefore its spectral lines are not clear. Mercury-198 has unusually fine and sharp spectral lines and the scientists wanted to use it in an important optical instrument. They needed about a gram of mercury-198.

Gold decays to mercury when it is bombarded with neutrons. The process is simple: gold picks up one neutron and forms radioactive gold which decays to mercury. Since gold has only one isotope, gold-197, only one isotope of mercury is formed -- mercury-198.

The scientists took 600 grams of pure gold powder, placed it in an atomic reactor and left it there for 10 months. Then the gold was taken out and left in a special container for another 2 months, so that all the radioactive material could decay. Then the gold was removed from its container and distilled. Of the 600 grams of gold powder 1 gram of mercury-198 was received. Its value is 3,000 dollars. (One gram of gold costs a little over one dollar.)

This method of getting the pure isotope is not practical and will not be used on a large-scale, but the alchemists of old tines can be a little happier in their graves knowing that their task has been accomplished even if in reverse.

Industrial and Engineering Chemistry
November, 1957.