

Text 4

The Nuclei of Atoms

In 1911 the British physicist Ernest Rutherford carried out some experiments which showed that every atom contains, in addition to one or more electrons, another particle, called the nucleus of the atom. Every nucleus has a positive electric charge. It is very small. It is about as big as an electron. It is very heavy.

There are many different kinds of nuclei. The nuclei of the atoms of one element are different from the nuclei of the atoms of every other element.

4. Choose the Ukrainian and English equivalents:

like	ретельно
because of	звертати увагу
closely	ядро
to result in	ядра

to pay attention

той же заряд

nucleus

подібний

the same charge

значення

nuclei

з-за

means

засіб

meaning

призводити

LIGHTNING

The lightning flash is certainly the earliest manifestation of electricity known to man, although for a long time nobody knew that lightning and atmospheric electricity are one and the same thing. Indeed, for thousands of years people knew nothing about thunderstorms. However, they saw long sparks falling from the dark sky and heard thunder. They knew that these sparkles could kill people or strike their houses and destroy them. Trying to understand that dangerous phenomenon, they imagined things and invented numerous stories.



Take the early Scandinavians as an example. They thought that thunderstorms were produced by Thor the god of thunder. Besides his throwing both thunder and lightning at some people he was a hammer-thrower. According to story, his powerful hammer had the property of always coming back to his hands after it had been thrown. The fifth day of the week, that is Thursday, was named after him. A story like that invented by those early Scandinavians could be also heard from other peoples.

However, time flies. Thunderstorms have long stopped being a problem that scientists tried to solve. Now everybody knows that lightning is a very great flash of light resulting from a discharge of atmospheric electricity either between a charged cloud and the earth or between charged clouds.

Even now some people do not like being out during a thunderstorm. Dark clouds cover the sky, turning day into night. There are lightning flashes followed by thunder which can be heard for kilometers around. Needless to say, there is always some danger in a thunderstorm for a very high building or a man standing in the open field.

Many years ago people learned to protect their houses from thunderstorms. Coming down from a charged cloud to the earth, lightning usually strikes the nearest conductor. Therefore, it is necessary to provide an easy path along which electrons are conducted to the earth. That Benjamin Franklin invented the lightning conductor is a well-known fact. The lightning conductor, familiar to everybody at present, is a metal device protecting buildings from strokes of lightning by conducting the electrical charges to the earth.

Franklin's achievements in the field of electricity were known to Lomonosov who, in his turn, made experiments of his own. Along with other scientific problems that Lomonosov studied was that of atmospheric electricity. Both Lomonosov and his friend Professor Rihman took great interest in it. Both of them tried to solve the problem



in question. They made numerous experiments and observations without thinking of the possible danger. The first electrical measuring device in the world was constructed by Rihman. Making experiments of that kind was dangerous and Professor Rihman was killed by a stroke of lightning while he was making one of his experiments.

Active Words and Expressions

charge – заряд	electron – електрон
to name after – назвати на честь	property – властивість
to conduct – проводити	experiment – дослід
observation – спостереження	provide – забезпечувати
to destroy – руйнувати	to invent – винаходити
path – шлях	scientific – науковий
discharge – розряджений	lightning – блискавка
phenomenon – феномен	solve a problem – вирішувати проблему

Exercises

1. Translate the following sentences, paying attention to the gerund:

1. Learning English is not an easy thing. 2. His friend began learning the English language. 3. Studying natural phenomena without making observations is useless. 4. There are many methods of solving this problem. 5. On coming home, my father began watching television. 6. Scientists played an important part in solving the problem of atmospheric electricity. 7. Heat is developed on splitting atoms in the reactor. 8. Seeing is believing.

2. Translate the following sentences paying attention to the gerundial construction:

1. We didn't know about his being sent to the power station. 2. I remember my having told her about the experiment. 3. His

having asked such a question shows that he did not prepare the text. 4. We know of different experiments being made in this laboratory. 5. Your having been sent to Leningrad was known to everybody. 6. Everybody knows about your having worked at the nuclear power plant. 7. The professor knew about the students' going to the power station. 8. The students read about the new achievements having been made in the field of nuclear physics. 9. Thanks to the lightning conductor being invented, it is possible to protect buildings from strokes of lightning.

3. Put questions to the words in bold type:

1. For thousands of years *people* knew nothing about *thunderstorms*. 2. The fifth day of the week was *named after Thor*. 3. *Lightning* is a discharge of atmospheric electricity. 4. The *lightning conductor* provides an easy *path* for conducting electric charges to the earth. 5. *Rihman* constructed the first electrical measuring device. 6. *Experiments* on atmospheric electricity were made by *Lomonosov*. 7. Many years ago *people* learned to protect their houses from *thunderstorms*. 8. *We* use atomic energy for *peaceful purposes*.

4. Form verbs from the following nouns:

observation, achievement, protection, production, installation, operation, application, development, heat, generator, inventor, reader.

5. Translate the following sentences paying attention to the words in bold type:

A. 1. My friend's son looks **like** his father. 2. You may take any device you **like**. 3. Some liquids have **like** properties. 4. Steel **like** iron is widely used in industry. 5. A steam turbine is **like** any other turbine but it is turned by steam. 6. We did not **like** the **film** that we saw yesterday. 7. **Did** you **like** the story that you

heard at the lesson yesterday? 8. Lightning is an atmospheric phenomenon **that** greatly interested some scientists of the past.

B. 1. **That** the earth revolves about the sun **is** known to everybody. 2. It is quite possible **that** in future coal may **be** replaced by nuclear fuel. 3. Atomic energy can serve people but **we** must never forget **that that** energy can also destroy the world. 4. **When** an object loses its potential energy **that** energy is turned into kinetic energy. 5. The operation of the motor **is** quite different from **that** of the generator. 6. Everybody knows **that** the earth **is** round. 7. The climate **in** Kiev **is** better than **that** in London. 8. The film **that** we saw yesterday was very interesting.