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Пособие ставит целью развитие навыков чтения литературы по основным темам специальности «Электросвязь» (электросвязение, электрокабели, телефон, радио, телевидение, телеграфия). Тексты пособия направлены в основном на современную оригинальную литературу. Тренировочные упражнения помогают овладеть базовым словарем данной специальности. Пособие построено таким образом, чтобы в соответствии с установкой программы подготовить учащихся к чтению спецификаций, паспортов и другой документации, прилагаемой к рабочему оборудованию.

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## ПРЕДИСЛОВИЕ

Пособие предназначено для учащихся техникумов связи второго этапа обучения и соответствует программе по английскому языку для средних специальных учебных заведений. Цель пособия — развитие навыков чтения литературы по специальности.

В соответствии с установкой программы, пособие готовит будущих специалистов к чтению спецификаций, паспортов и другой документации, прилагаемой к аппаратуре и оборудованию.

Тексты пособия заимствованы из современной научной советской и зарубежной литературы.

Пособие включает три части. Первая часть состоит из текстов и тренировочных упражнений по основным темам специальности электросвязь (электроснабжение, электрокабели, телефон, радио, телевидение, телеграфия). Эта часть дает возможность учащимся овладеть базовым словарем своей специальности. Главы части начинаются с краткого изложения темы, что помогает создать у учащихся предварительную смысловую установку и связать работу над отдельными элементами с общим содержанием.

Слова в каждом параграфе объединены по частям речи, что способствует запоминанию. Их активизация строится в следующей последовательности: слово — словосочетание — предложение (утвердительное, вопросительное) — текст. Такая схема обеспечивает первичное закрепление слов в микроконтексте.

Для стимулирования языковой догадки не дается перевод к интернациональным словам; рекомендуется обращаться внимание на перевод так называемых «ложных друзей».

Предтекстовые вопросы выполняются две функции: служат как тренировочный материал и ориентируют учащихся на содержание текста.

Особое внимание уделено отработке сложных атрибутивных комплексов. Эти комплексы, как известно, широко употребительны в современной специальной литературе и трудны для перевода.

Работа над каждой темой завершается контрольными упражнениями. Выполняя эти упражнения, учащиеся проверяют свой уровень подготовки по данной теме.

Вторая часть содержит тексты инструкций по использованию приборов. Учебные задания и упражнения помогают формировать у студентов умения ориентироваться в текстах этого жанра. Именно эти тексты использует специалист — выпускник техникума в своей практической деятельности.

Третья часть рекомендуется для домашнего чтения. Задания этой части направлены на развитие навыков ознакомительного и поискового чтения. Для этого, работая с текстом, рекомендуется находить в нем определенные данные, выбирать смысловую основу, сопоставлять содержание отрывков, подбирать заглавия и т. д.

В пособии имеется список наиболее часто употребляемых сокращений.

При работе с пособием, автор рекомендует использовать пособие «Техника перевода специальных текстов» (авт. А. В. Парихина) или другие источники.

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## Part I

# MODERN MEANS OF COMMUNICATION

## Chapter I ELECTRIC POWER

In this chapter you will read about the development of power base in the USSR.

### § 1. The Energy Potential of the USSR

I. Practise the following words from the text:

the USSR	to rise, tose, risen подниматься
power ['paʊə] мощность, сила	to generate ['dʒenəreɪt] поро- жкать, производить
world [wɜ:ld] мир	to increase [ɪn'kri:sɪz] возрастать, увеличивать (ср)
output ['aʊtput] производитель- ность, выход	to install [ɪn'stɔ:l] устроить, установить
per cent ['pɜ:sent] процент	to use [ju:z] использовать
unit ['ju:nɪt] единица; уста- новка	nearly ['nɛəli] почти up to вплоть до, до by 3d. на
plant [plɑ:nt] установка; завод	energy ['enədʒi]
capacity [kə'pæsɪtɪ] емкость	potential [pə'tenʃl]
aggregate [ˈægrɪgət] общин, со- вокупный	method ['methəd]
possible ['pɒsəbl] возможный	communication [kə,mju:nɪ'keɪʃn]
thermal [ˈθɜ:ml] тепловой	station [ˈsteɪʃn]
total [təʊtəl] полный	electricity [ɪlek'trɪsɪtɪ]
to build, built, built [bɪld, bɪlt]	
строить, создавать	

II. Read and translate these word combinations:

1. modern methods;
2. electric power;
3. power sta-  
tions;
4. energy system;
5. power plants;
6. total capacity;
7. power capacity;
8. generating unit

III. Translate the following sentences:

- In the USSR people...  
— build electric power stations.  
— generate and use electric power.

- increase total electric power output.  
— increase the capacity of power stations.

IV. Mind the difference in the meaning of these word combinations:

1. power output;
2. total power;
3. total power output;
4. high-capacity power stations;
5. high-capacity unit;
6. thermal power stations;
7. energy system;
8. electric energy system;
9. electric energy

V. a) Read the questions and translate them into Russian. b) Read and translate the text. c) Find answers to the questions in the text:

1. At what plants is electric power generated? 2. What country has the world's largest power stations? 3. What is the aggregate capacity of our power plants? 4. How much electricity was produced according to plan in 1976?

### TEXT

Modern methods of communication use electric power. Electric power is generated at power stations. The USSR has a powerful energy system with the world's largest power stations. The output of power has risen by nearly 150 per cent in the last ten years. Some 1,111,000 million kWh of electricity was produced, according to plan, in 1976, and the total capacity of all power stations will go up to 220,000,000 kW.

At present the greatest part of all the country's power capacity is thermal, and most of it comes from the big stations. The capacity of the generating units at these stations has been increased in the postwar years which made it possible to build high- and super-high-capacity power stations. The USSR has the highest aggregate capacities at thermal power stations in the world. About one third of all the power generated in the USSR comes from thermal electric stations with capacities of 1,000,000 to 3,000,000 kW each. Even bigger stations, of up to 4,800,000 kW, are now being built. Each of these stations can produce as much electric power as Austria or Argentina.

Generating units of new types are now being installed at thermal power stations. The first units of 500,000 and 800,000 kW capacity have already been built and installed.

In near future these high-capacity units will be used more and more at our power stations.

VI. Give the English equivalents of the Russian words given in brackets:

1. The aggregate (ёмкость) of the power plants will be about 200,000,000 kW. 2. It is (возможно) to build super-high-capacity power stations. 3. The units of great capacities (устанавливаются и строятся).

### § 2. The Atomic Power Stations (APS)

I. Practise the following words from the text:

degree [di'grɪ:] степень	important [ɪm'pɔ:tənt] важный
source [sɔ:sɪ] источник	to secure [sɪ'kjʊə] обеспечивать
importance [ɪm'pɔ:təns] важность	безопасность
ночь	to equip [ɪ'kwɪp] оборудовать
installation [ɪnstə'leɪʃn] установка	to reach [ri:tʃ] достигать
установка	атомная
use [ju:s] использование	engineering [ˌendʒɪ'nɪrɪŋ] инженерия
Soviet [sə'viɪt] советский	concentration [ˌkɒnsən'treɪʃn] концентрация
structural ['strʌktʃrəl] составной	figure ['fɪgə]

II. Read and translate these word combinations:

1. power stations; 2. nuclear installations; 3. power engineering; 4. neutron reactors; 5. atomic power stations; 6. Soviet power engineering; 7. fast neutron reactors; 8. power capacity concentration; 9. nuclear power concentration; 10. fast neutron nuclear installations

III. Translate the following sentences:

The atomic power stations...

— are important structural elements in power engineering.

— secure a high degree of power concentration.

— are equipped with powerful generating units.

— are an important modern source of electricity.

IV. a) Read the questions and translate them into Russian. b) Read and translate the text. c) Find answers to the questions in the text:

1. What sources of energy is this text about? 2. Why is APS an important source of energy? 3. What is the capacity of the big APS generating units? 4. What was the aggregate capacity of the Soviet APS in 1974? 5. Where have the fast neutron installations been built?

## TEXT

Atomic power stations (APS) are becoming one of the most important structural elements in Soviet power engineering. They secure a high degree of power capacity concentration.

The big APS will be equipped with generating units of very great capacity each. APS are at present ecologically the cleanest source of energy. The aggregate capacity of Soviet APS reached 3,700,000 kW in 1974. This figure is to increase in the next ten to twelve years, during which many new APS will be built. The raising of the per unit capacity of reactors makes it possible to cut the cost of APS and to produce cheap electricity. The importance of atomic energy will grow when fast neutron reactors are used in the USSR. The first fast neutron nuclear installations have already been built in the USSR.

V. Give the English equivalents of the Russian words given in brackets:

1. The APS are an important (источник) of energy.  
2. They (оборудованы) with powerful generating units.  
3. This figure (возрастет). 4. The per-unit (ёмкость) of reactors will grow. 5. The fast neutron (установки) have been built at the atomic power stations.

### § 3. Hydro-electric Power Engineering

I. Practise the following words from the text:

chain [tʃeɪn] цепь, сеть	to include [ɪn'klu:d] включать
quantity [ˌkwɒntə'tɪ] количество	urban [ˈɜ:bən] городской
development [dɪ'veləpmənt] развитие	both . . . and как, так и
population [ˌpɒpjʊ'leɪʃn] население	etc. = et cetera и так далее
снабжать	centre [ˈsentrə]
to supply [sa'plaɪ]	hydro- ['haɪdrə]
обеспечивать	effective [ɪ'fektɪv]
to start [stɑ:t] начинать	mass [mæs]
to provide [prə'vaɪd] обеспе-	production [prə'dʌkʃn]
чивать	unique [ju:'ni:k]
to exceed [ɪk'si:d] превзойти	

II. Read and translate these word combinations:

1. power engineering; 2. electric power supply; 3. hydro-electric power engineering; 4. the USSR power industry development; 5. the USSR energy potential; 6. the development of APS; 7. the chain of power plants; 8. these power stations; 9. the power industry of the USSR; 10. mass production; 11. heat-and-power plants;

12. generating unit in use; 13. atomic power stations under construction; 14. neutron nucleus installation in use; 15. electric stations under construction; 16. both electric and thermal energy; 17. both the atomic power plants and hydro-electric power stations; 18. both industrial and urban centres

III. Translate the following sentences:

1. The chain of hydro-electric power stations...  
— is being developed year by year.  
— includes power stations on the Volga.  
— will start operating next year.
2. Electric power plants...  
— generate electric and thermal energy.  
— supply energy to urban centres.  
— produce large quantities of power.  
— provide power for industry.
3. This unique generating unit...  
— has started operating not long ago.  
— provides power for both industrial and urban centres.  
— exceeds in power all the other units.  
— can supply with power a city with a large population.

IV. a) Read and translate the questions. b) Read the text and translate it into Russian. c) Find answers to the questions in the text:

1. What are the world's largest hydro-electric power stations? 2. What is the capacity of Bratsk plant? 3. What power stations are at present in operation? 4. What stations provide power for the development of Siberia? 5. What is the capacity of the unique generating unit? 6. How many cities in the USSR have large heat-and-power plants? 7. What plants does the chain of hydro-electric power stations on the Volga include? 8. How much is the aggregate capacity of the heat-and-power plants in the USSR?

### TEXT

Hydro-electric power engineering is another important factor in the USSR's energy potential. The hydro-electric power stations had the aggregate capacity of 37,000,000 kW in 1974. Among them are the 4,100,000 kW plant in Bratsk, the 6,000,000 kW plant in Krasnoyarsk, the chain

of hydro-electric power stations on the Volga, etc. The Sayano-Shushenskaya hydro-electric power station, the Ust-Ilim station and others are at present in operation. Hydro-electric power stations generate some 20 per cent of all the electricity produced in the USSR.

The most effective stations which produce large quantities of electricity, help the industrial development of Siberia that is rich in natural resources. They provide the power bases for major complexes of energy-intensive industries there.

The heat-and-power plants are very important for the energy potential. They generate both electric and thermal energy which makes it possible to provide power for industrial and urban centres.

At present more than 700 cities in the USSR, including Moscow, Leningrad, Kiev, and Minsk, have large heat-and-power plants.

The mass production of large heat-and-power turbines has started in the last few years. A unique generating unit of 250 mW capacity has been built. It can supply heat to a city with a population of 200,000 to 250,000.

V. Give the Russian equivalents of the English words given in brackets:

1. (Сеть) of power stations is being built on the Volga.
2. Large (количество) of electricity is used for the (развитие) of industry. 3. This (уникальный) unit supplies energy to a city with a large population. 4. The heat-and-power plants (обеспечивают) power for urban centres.
5. The USSR's power industry (развивается) year by year.

### § 4. Transmission of Power over Long Distances

I. Practise the following words from the text:

length	длина	to 'interconnect	соединять	меж-
grid	сеть, сетка	to unite	[ju: 'naɪ] объединять	ду собой
consumer	[kən 'si:ʒ:mə]	to link	связывать	
бигель				
'distance	расстояние,			
to be 'long	to принадлежать, ор-			
носятся к				
to transmit	[trænz'mɪt]	пере-		
давать				
to con'nect	соединять			

to 'interconnect	соединять	меж-
ду собой		
to unite [ju: 'naɪ]	объединять	
to link	связывать	
north	север	
south	[saʊθ]	юг
west	запад	
main	[meɪn]	главный
long	[lɒŋ]	длинный

'reasonable умеренный  
i. e. (id est *лат.*) то есть  
inter-мек-, между-  
transmission

'territory  
group [gru:p]  
European [ju:ro'pian]  
to 'centralize [in'tsentrailize]  
to intensify [in'tensifai]

II. Read and translate these word combinations:

1. high-capacity generating plants; 2. high-voltage power lines; 3. electric power supply centre; 4. the united power grid; 5. the CMEA united power grid

III. Translate the following sentences:

1. At present people are able to...
  - link up power stations into power grids.
  - connect small consumers of power to the main power system.
  - transmit electric power over long distances.
  - transmit electric power to small consumers of power from the main systems.
  - interconnect the power grids.
  - build high-voltage lines.
2. High-voltage transmission lines...
  - have the total length of more than 400,000 km.
  - link up power stations.
  - transmit electric power from the Volga hydro-power stations over a distance of 1,000 km.
3. The Volga hydro-power plants have been linked with the Urals and Moscow. 4. Linking up the power system of European countries with the grids of the West of the USSR started in May, 1959. 5. The total capacity of the interconnected grids is about 48,000,000 kW. 6. The length of the line is more than 3,000 km.

IV. Mind the difference in the meaning in these word combinations:

- a) the world's largest power stations, hydro- and thermal power stations, the world's largest hydro- and thermal power stations;
- b) high-voltage lines, transmission lines, high-voltage transmission lines;
- c) interconnected grids, total capacity, interconnected grids total capacity

V. a) Read and translate the questions. b) Read and translate the text. c) Find answers to these questions in the text:

1. Which country has the largest hydro- and thermal power stations? 2. Why is it so important for the people

of the USSR to transmit electric power over long distances? 3. What is the total length of high-voltage power lines in the USSR? 4. How is the development of the power industry in the USSR intensified? 5. What elements do the large power groups include? 6. What grids are linked up with the CMEA united power grid? 7. What is the saving in capacities through the united power grid? 8. How else is economic saving produced? 9. What for are different power systems interconnected?

TEXT

The USSR today has the world's largest hydro- and thermal power stations. High-capacity generating plants are being built all over the country.

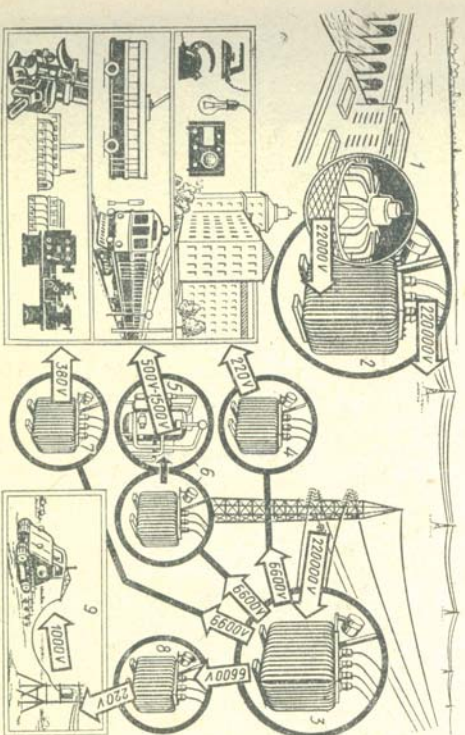


Fig. 1. Diagram of power transmission from the station to consumers.

Electric power is generated at power stations but it must be transmitted over long distances. The territory of the USSR which is very large makes it important for the people to be able to transmit electric power over long and very long distances. Transmission of electric power from the main power systems to small consumers of power is a problem of importance today.

In the USSR electricity is transmitted over 1,000 km and the total length of high-voltage power lines is more than 400,000 km. This figure is to be increased.

The development of the power industry in the USSR is intensified through the organizing of large power groups. These groups include the electric power supply centre and consumer centres. Most of them are at present united into the united power grid of the USSR. This grid includes a number of very large power grids in the European part of the USSR, the Urals and Kazakhstan.

More than 97 per cent of all the electricity in the USSR is centralized, i. e. in power grids. The power grids in the south and in the north-west European parts of the USSR are linked up with countries that belong to the CMEA united power grid.

The organization of the united power grid of the USSR has already given a great saving. The saving in capacities is no less than 6,000,000 kW. Economic saving is also produced by the construction of bigger power stations and units, by building and economically reasonable use of the energy resources and equipment of power stations. Different power systems are interconnected to increase saving of electricity supplies and to produce large quantities of cheap electricity.

VI. Give the English equivalents of the words given in brackets:

1. At present people (могут передавать) electric power over long (расстояние). 2. Electric power is transmitted from (главная) power to small (потребители) of power. 3. The total (длина) of high-voltage power lines (будет увеличена) in future. 4. Each group (включает) the power supply centre and consumer centres. 5. Many power stations (соединены между собой) to produce cheap electricity.

### TEST EXERCISES

I. Choose the proper word. Translate the sentences into Russian:

1. Modern methods of communication (produce, use) electric power.
2. Electric power (is developed, is generated) at power plants.
3. The power industry in the USSR (develops, increases) much faster than in other countries.
4. New powerful stations (are being built, are being produced) on the Volga and on the Dnieper.

II. a) Give the proper attributes to the nouns. b) Give nouns to the attributes:

Model: total power capacity

Nouns: system, output, unit, development

Model: power supply centre

Attributes: united power, high-capacity generating, the Volga hydro-power, unique generating

III. Think of the questions to these answers:

1. The USSR has the world's largest power stations. ...?
2. More than 97 per cent of all the electricity in the USSR is centralized. ...?

## Chapter II

### CABLES

In this chapter you will read about cables, their types, and cable laying.

#### § 1. Cables

I. Practise the following words from the text:

part [pa:t]	часть	to insulate [ɪn'sju:leɪt]	изолировать
pair [paɪ]	пара	Вать	
number ['nʌmbə]	зд. несколько.	to carry [ˈkæəri]	нести, провезти
ряд		to put, put, put [pʊt]	положить,
copper ['kɒpə]	медь	класс	
wire ['waɪə]	провода, провод	thus [ðʌs]	таким образом
current ['kʌrənt]	ток	cable [ˈkeɪbl]	кабель
circuit ['sɜ:kɪt]	контур, цепь	metallic [mɪ'tæɪlɪk]	металлический
conductor [kən'dʌktə]	проводник		
to consist of [kən'sɪst]	состоять из		

II. Read and translate these word combinations:

1. copper wire;
2. power plants;
3. electric cable;
4. metallic cable;
5. metallic circuit;
6. metallic conductor;
7. insulated conductor;
8. insulated circuit of transmission line;
9. a number of wires;
10. other parts;
11. a number of cables;
12. a number of metallic cables;
13. thick wire;
14. main parts;
15. a number of pairs;
16. this part; thick cables

III. Translate the following sentences:

1. The transmission line may consist of...  
— thick wires.



- long and thick copper wires.
  - thick copper cables.
  - metallic conductors.
2. Thick cables...
- carry electric power.
  - form the main part of the line.
  - carry electric current.

- IV. a) Read and translate the questions. b) Read the text. c) Find in it answers to these questions:
1. What is the main part of the transmission line?
  2. What elements form one thick cable? 3. What does one pair consist of?

### TEXT

Electric power is generated at power plants and it must be transmitted to other parts of the country. How is current transmitted to these parts? Thick wires carry electric power over long distances. The wires are not always made of copper, often they are made of other metals. A number of wires put together form one thick cable. A cable consists of a number of wires put together and a pair consists of two insulated conductors forming a metallic circuit.

Thus the basic transmission element of communication is a long transmission line, and a cable is the main part of this long transmission line.

- V. Give the English equivalents of the Russian words given in brackets:

1. (Ряд) wires forms one thick cable.
2. (Пара) consists of a number of insulated conductors.
3. (Кабель) is (главная часть) of this transmission line.
4. (Таким образом) a cable (состоит из) number of wires put together.
5. (Изолированные проводники) form a part of an electric circuit.

### § 2. Cable Laying

- I. Practise the following words and word combinations from the text:

disadvantage [dɪsəd'vɑ:ntɪdʒ]	damage ['dæmɪdʒ]
недостаток	duct канал, проводка
ground [graʊnd] земля	low [ləʊ] низкий
protection защита, охранение	

direct [dɪ'rekt] прямой, непосредственный	to bury ['berɪ] уложить в землю
to take (took, taken) out вынимать	that is to есть
to take place иметь место	temperature ['tempərɪtʃə]
to lay, laid, laid [leɪ, leɪd]	corrosion [kə'rouʒən]
прокладывать	tunnel [tʌnəl]

- II. Read and translate these word combinations:

1. cable laying; 2. corrosion protection; 3. direct laying;
4. cable papers; 5. cables laid directly; 6. cables drawn into ducts; 7. cables put on hangers; 8. cables warmed before laying

- III. Translate the following sentences:

1. Cables may be...
  - laid directly.
  - buried directly in the ground.
  - drawn into ducts.
2. Direct laying has...
  - advantages and disadvantages.
3. Cables are protected...
  - against corrosion.
  - against low temperature.

- IV. a) Read and translate the questions. b) Read the text. c) Find answers to the questions in the text:

1. How may cables be laid? 2. What cables must have protection against corrosion? 3. What disadvantage has direct laying? 4. Is it possible to use direct laying in cities? 5. How must cables be laid in cities? 6. When will damage to the cable papers take place? 7. In what weather must cables be kept warm?

### TEXT

Cables may be laid directly, that is buried directly in the ground, or drawn into ducts already laid. Cables laid directly in the ground must always have some protection against corrosion.

Direct laying is cheaper but it has a disadvantage: a cable laid directly cannot be taken out. In cities it is not possible to use direct laying and cables must be laid in ducts.

In tunnels and subways cables are put on the walls on hangers.

In cold weather cables must be kept warm or warmed before laying. No cable must be laid when the temperature is low as damage to the cable papers will take place.

V. Give the English equivalents of the Russian words given in brackets:

1. Cables must have some (защита) against corrosion.
2. Direct laying has (недостаток). 3. (Повреждение) to the cable papers will take place. 4. It is not (возможно) to use direct laying in cities. 5. Cables must be laid in (каналы).

### § 3. Polythene Cables

I. Practise the following words from the text:

co-axial [kou'æksɪəl] коаксиальный, совпадающий осями	local ['loukəl] местный
network сеть линий или проводов	to lead, led, led вести
core [kɔ:] прокладка, комплект	to reduce [ri'dju:s] сокращать
жил	type [taɪp]
sheath [ʃi:θ] оболочка	natural ['nætʃrəl]
lead [led] свинец	asbestos [æz'bestɪs]
property ['prɒpərti] свойство	cement [sɪ'ment]
	process ['prəʊses]

II. Read and translate these word combinations:

1. conductor insulation; 2. polythene cable; 3. paper insulation; 4. polythene sheaths; 5. co-axial cables; 6. lead-sheathed cable; 7. asbestos-cement ducts; 8. long-length cabling; 9. local line network; 10. paper-core cable; 11. lead-sheathed paper-core cables; 12. co-axial cables of reduced length

III. Translate the following sentences:

1. These cables have...  
— polythene insulation.  
— natural polythene sheaths.  
— paper cores.
2. Properties of the cables...  
— were improved.
3. A number of joints...  
— was reduced.
4. Polythene cables...  
— were produced after World War II.  
— have a number of advantages.

- are not damaged by corrosion.
  - are put into ducts.
  - are used to longer lengths than lead covered cables.
  - are used in local line networks.
- IV. a) Read and translate the questions. b) Read the text. c) Find in it answers to the questions:
1. What two types of polythene cables are used?
  2. What advantages have polythene cables? 3. What process is called "long-length cabling"? 4. What improved the properties of co-axial cables? 5. What cables have natural polythene sheaths?

### TEXT

In a polythene cable polythene may be used for both a conductor insulation and a sheath.

There are two types of polythene cables: the one having polythene insulation for the conductors and the other having paper insulation as used in lead-sheathed paper-core cables. Cables including 100 pairs and more have natural polythene sheaths.

Polythene cables were produced after World War II and have a number of advantages over the lead-sheathed cables. For example, they may be laid directly in the ground without ducts, while lead-sheathed cables are usually laid in asbestos-cement ducts. Polythene cables are not damaged by corrosion as lead-sheathed cables are. They can be, when put into ducts, used in much longer lengths than lead-covered cables. Thus, the number of joints used is reduced. This process is known as "long-length cabling".

These advantages of polythene cables have led to their use in local line networks.

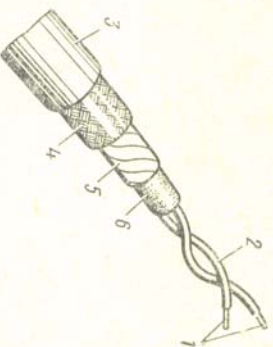


Fig. 2. Flexible twin polythene insulation:

1 — stranded plain copper wires; 2 — polythene (one coloured, one natural); 3 — P.V.C. sheath; 4 — tinned copper wire braid; 5 — metallised paper; 6 — polythene filler.

Since 1921 a large number of co-axial cables of increasing length have been made and laid. Their properties were improved by the use of polythene as an insulating material.

V. Give the English equivalents of the Russian words given in brackets:

1. (Свойства) of the co-axial cables were improved.
2. Polythene cables are not (повреждаются) by corrosion.
3. (Колличество) of joints is (сокращено). 4. (Прямые шесты) of polythene cables have led to their use in local line networks.

#### § 4. Texts for Reading and Translation

1. a) Read and translate the questions. b) Read and translate the text using a dictionary. c) Find answers to the questions in the text:

1. What type of cables is used in factories, mines and ships? 2. What type of cables is used for junction circuits? 3. What type of cables is used for long distances? 4. For what voltages are paper-insulated cables produced? 5. For what voltages are rubber- and plastic-insulated cables produced?

#### TEXT 1

Rubber- and plastic-insulated cables are used for distribution of energy in factories, mines, ships, and other places where flexibility is important.

Paper-insulated lead-covered cables are used for junction circuits. For longer distances a co-axial type of cable is used. In this co-axial type of cable a pair is formed of a conductor and an insulation which may be of air or of a plastic dielectric.

Paper-insulated cables are produced for voltages up to 400 kV. Rubber- and plastic-insulated cables are nowadays produced for voltages up to 11 kV. Usually rubber- and plastic-insulated cables are used for voltages of less than 1 kV. Multi-channel cables are used for long distance communication.

II. Give a title to the text above.

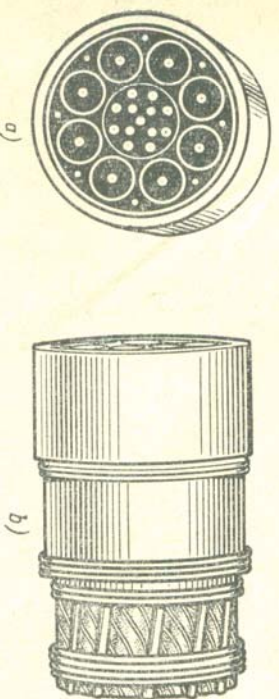


Fig. 3. Co-axial cable:  
(a) Cross-section of completed lead-covered, 8-strand co-axial cable;  
(b) Length of co-axial cable to show stranding or twist conductors.

III. Translate these word combinations:

1. the world's system of communication; 2. submarine telephone cable; 3. telephone cable service; 4. long distance communication; 5. multi-channel telephone cable; 6. multi-channel long distance telephone cable

#### TEXT 2

Nowadays telephone forms an important part of the world's system of communication.

It was time when it took a month to transmit a message across the Atlantic and another month to receive an answer.

In 1956 the first trans-Atlantic telephone cable service was opened and thus Europe and America became linked by submarine telephone cable. Now we can speak across the Atlantic, listen to plays and musical concerts.

The trans-Atlantic telephone cable is used for long distance communication: it is some 4,200 nautical miles in length. On this cable very high voltages are used for the power supply: +2,000 volts at one end, and -2,000 volts at the other.

The trans-Atlantic telephone cable is a multi-channel telephone cable including 36 channels. The cable provides 24-hour service and enables speech to be transmitted over each of its 36 channels.

The multi-channel long distance telephone cable was produced due to the development of the insulating material known as polythene and the development of the telephone repeater.

IV. Give a title to the text above.

## § 5. Repeaters

### I. Practise the following words from the text:

device [dɪ'vaɪs] прибор, меха-	submarine ['sʌbməri:n] подводная
tube [tu:b] лампа	to send, sent послать
repeater [ri'pi:tə] усилитель,	to amplify ['æmplɪfaɪ] усиливать
передатчик	signal ['sɪgnəl] сигнал
way [weɪ] путь, направление	section ['sekʃn] секция
flexible ['fleksəbl] гибкий	vacuum ['vækjuəm] вакуум
rigid ['rɪdʒɪd] жесткий, твердый	

### II. Read and translate these word combinations:

1. amplifying devices; 2. a number of vacuum tubes;
3. a number of circuits; 4. one-way flexible repeater;
5. two-way flexible repeater; 6. two-cable submarine system; 7. one-cable submarine system

### III. Translate the following sentences:

- A repeater of one-way flexible type...  
 — amplifies current.  
 — increases a coming signal.  
 — includes a number of vacuum tubes.  
 — sends a coming signal into the next section of the cable.

### IV. a) Read and translate the questions. b) Read the text. Translate it into Russian. c) Find answers to the questions. In the text:

1. What elements does a repeater include? 2. What are the two basic types of repeaters? 3. Where is the flexible repeater used? 4. Where is the rigid repeater used?

## TEXT

Do you know what a repeater is? It is an amplifying device including a number of vacuum tubes and their circuits. They increase a small coming signal—by a factor which may be as much as a million—and send it into the next section of the co-axial cable.

There are two basic types of repeaters: the one-way flexible type and the two-way rigid type. The flexible repeater is used in a two-cable submarine system. The rigid repeater is used in a submarine cable system—with only one cable.

### V. Give the English equivalents of the Russian words given in brackets:

1. A repeater is a (прибор).
2. It includes vacuum tubes and their (контуры).
3. Vacuum tubes (увеличивают) a small coming current.
4. The (гибкий) repeater is used in a two-cable submarine system.
5. The (жесткий) repeater is used in a one-way submarine system.

## § 6. Superconductive Cable Constructed in the USSR

### I. Practise the following words from the text:

research [ri'reʃɪtʃ] научное ис- следование	to equal ['i:kwəl] быть рав-
sample [sɑ:mpl] образец	практически ['præktɪkəlɪ] на са- мом деле
quarter ['kwɔ:tə] четверть	whereas [weə'æz] тогда как
superconductive [... kəp'dʌktɪv] сверхпроводимый	ampere ['æmpɪr] ампер
super ['sju:pə] сверх, пре-	cryogenic [krɪ'dʒenɪk] криогенный
to call [kɔ:l] называть	concentrate ['kɒnsəntrət] концентрировать
to test испытывать	laboratory ['læbrətɪrɪ] лаборатория
to enable ['ɛnbəl] давать возможность	phase [feɪz] фаза

### II. Read and translate these word combinations:

1. research institute; 2. power-engineering institute;
3. laboratory test; 4. laboratory equipment; 5. two-phase current; 6. the USSR power resources; 7. research workers; 8. laboratory sample; 9. superconductive cryogenic electric transmission line

### III. Translate the following sentences:

1. Research workers at the institute...  
 — produced a laboratory sample of a cryogenic cable.  
 — tested the superconductive electric cable.  
 — improved the properties of the cable.
2. The superconductive cryogenic cable enables people...  
 — to transmit electric current up to 10,000 amp.  
 — to test and improve transmission lines.  
 — to transmit current almost without loss.

### IV. a) Read and translate the questions. b) Read and translate the text. c) Find answers to the questions in the text:

1. What is the new cable called? 2. What is the research institute called? 3. In what country was the cryogenic cable made? 4. In what part are the power resources of the USSR mainly concentrated? 5. In what

part of the USSR are three-quarters of the industrial potential concentrated? 6. What does the new cable enable people to do? 7. What does the superconductive cryogenic electric transmission line enable us to do? 8. How much do losses in transmitting electric power equal?

### TEXT 1

Research workers at the Power-Engineering Institute have made a laboratory sample of superconductive electric cable. This cable, called cryogenic, is to be used on the electric transmission lines to test and improve them. The transmission lines supplied with the cryogenic cable will make it possible to transmit three-phase electric current practically without loss. At present losses in transmitting electric power over long distances are known to equal 10 per cent and more. The properties of the new cable to be used on the transmission lines will enable the transmission of electric currents up to 10,000 amperes at 10,000 volts and more.

The superconductive cryogenic electric transmission line is of great importance for the USSR with its long distances. The power resources of the USSR are known to be concentrated mainly in the eastern parts of the country, whereas three-quarters of the industrial potential is in the European part.

V. Give the English equivalents of the Russian words given in brackets:

1. The new cryogenic cable (даёт возможность) us to transmit electric current up to 10,000 amp. 2. Research workers made (лабораторный образец) of superconductive electric cable. 3. The cable will (соединить) the power resources of the USSR with the power plants. 4. Three-quarters of the industrial potential is in the (Европейская часть) of the country.

VI. Read and translate the text using a dictionary:

### TEXT 2

Electric power is generated at power stations. How is the current transmitted to the distant places? Thick wires usually carry it across the country, and steel pylons hold

the wires above the ground. The pylons are so high that nobody can touch the wires at the top. The wires are not usually made of copper, they are made of aluminium. Thirty wires put together form one thick cable. Aluminium is so light that the pylons can easily hold the cables up. It would not be cheap to drive very large currents through these cables. Large currents need very thick wires. If thin wires were used, they would get hot or melt, and so the currents ought to be as small as possible. Can we send a lot of electric power if we use a small current? We can do so if the voltage is high. We need a small current and a high voltage; or a large current with a low voltage. A small current is cheaper because the wires need not be thick.

The result is that the voltage has to be very high. The pressure in aluminium cables may be 132,000 volts, and this is very high. The voltage of a small battery which we carry in our pockets is usually between 1 and 9 volts. A car battery has a voltage of 6 or 12 volts. In a house the pressure in the wires may be 230 volts, or something like that. Even 230 volts is high enough to kill a person, so what would happen if we touched one of the aluminium cables? The high voltage would drive a heavy current through the body to the earth.

The wires are placed high up so that nobody could touch them. When they lead down to a house or a railway, the voltage is made lower. It can be changed easily; but if the voltage is lower, the current must be higher. If it is not, we shall lose power. So the wires have to be thicker. The wires must never touch steel pylons. If they did that, the current would escape to the earth through steel. Steel is a good conductor of electricity, so are most metals. We have to separate the wires from the pylon, and we do this with insulators.

### TEST EXERCISES

I. Choose the proper words. Translate the sentences into Russian:

1. Polythene cables have (disadvantages, advantages) over the lead-sheathed cables. 2. The number of joints is (reduced, increased). 3. Polythene is a (conducting, insulating) material. 4. Since 1921 co-axial cables have been (laid, improved). 5. In cities cables are laid (directly, in ducts).

11. a) Put the proper attributes to the nouns. b) Put nouns to the attributes:

Model 1: insulated circuit

Nouns: cable, wire, communication, service, current, institute, sample

Model 1: submarine telephone cable

Attributes: long distance, two-cable submarine, one-way flexible, two-way rigid, industrial, thick, super-conductive

III. What devices are described in the texts?

1.

It is an amplifying device. It includes vacuum tubes and their circuits. They increase a small coming signal and send it into the next section of the co-axial cable.

2.

This cable is to be used to test and improve electric transmission lines. It will make possible to transmit three-phase electric current almost without loss. This cable is important for the USSR with its long distances.

3.

Europe and America are linked by submarine telephone cable. It is some 4,200 nautical miles in length. It is a multi-channel telephone cable including 36 channels. Very high voltages are used for the power supply on this cable. It provides 24-hour service.

IV. Think of the questions to these answers:

1. ...? The trans-Atlantic telephone cable is a multi-channel telephone cable. 2. ...? Paper-insulated cables are produced for voltages up to 400 kV. 3. ...? Three-quarters of the industrial potential is concentrated in the European part of the USSR. 4. ...? The pressure in the aluminium cable may be some 132,000 volts.

### Chapter III

#### TELEPHONY

##### § 1. Telephone

In this chapter you will read about telephone, its construction, its operation, and its use.

I. Practise the following words and word combinations from the text:

sound [saund] звук

any [ʔeni] эд, любой

speech [spi:tʃ] речь

considerable [kən'sidərəbl] значительный

end конек

by means of с помощью, посредством

receiver [ri'si:və] приёмник

in addition to в добавление к

прибавление

аппарат [ʔəpə'reitəz] прибор, аппарат

to add добавлять, складывать

microphone [ˈmikrəfoʊn] микрофон

to receive [ri'si:v] принимать, получать

telephone [ˈteləfoʊn] телефон

to reproduce [ˌri:prə'dju:s] воспроизводить

telephone [ˈteləfoʊn] телефон

to switch включать

system [ˈsɪstəm] система

to change менять

11. Read and translate these word combinations:

1. speech transmission; 2. sound transmission; 3. transmission equipment; 4. telephone set; 5. considerable changes; 6. considerable number; 7. electric apparatus; 8. electric network; 9. by means of sound energy; 10. by means of electric waves; 11. by means of switching systems; 12. by means of a telephone set; 13. any change; 14. any number; 15. a common circuit; 16. a telephone in addition to a microphone; 17. an electric network in addition to the receiver

111. Translate the following sentences:

1. Telephone communication includes...

— telephone sets.

— transmission system.

— switching system.

2. Telephone sets change sound energy into electric waves.

3. Sounds are reproduced...

— by means of a telephone set.

— over considerable distances.

4. The receiver includes both a telephone and a microphone.

IV. a) Read and translate the questions. b) Read the text. c) Find answers to the questions in the text:

1. By what means is speech transmitted over a distance? 2. By what means are electric waves carried over a distance? 3. By what means are two telephone sets connected? 4. What parts does a telephone set include?

5. What parts does a receiver include? 6. What parts are linked to a common circuit? 7. What device is used for reproducing sounds over considerable distances?

### TEXT

Telephony is the transmitting of speech over a considerable distance by means of electric current, using wires.

Telephone communication includes 1) telephone sets to change sound energy into electric waves and back again, 2) transmission system to carry electric waves over any distance, and 3) switching system to connect any two telephone sets.

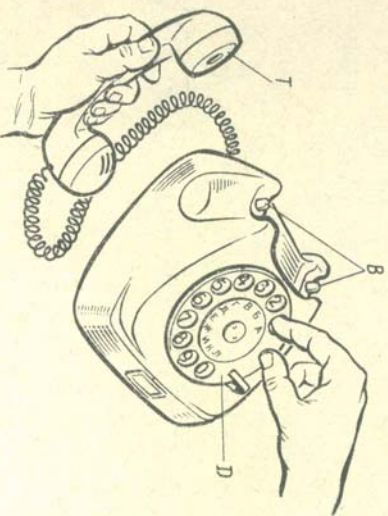


Fig. 4. Modern telephone set:  
T — receiver with telephone and microphone; D — disc;  
B — receiver and bell contact switch.

Telephone is a device for reproducing sounds over considerable distances. Telephone set includes a transmitter and an electric network in addition to the receiver. The transmitter transmits sounds and the receiver receives them. The receiver includes a telephone and a microphone. Both the microphone and telephone are linked to a common circuit with an apparatus at the other end of the line.

V. Give the English equivalents of the Russian words given in brackets:

1. (Звуковая энергия) is changed into electric waves.
2. (Система переключения) connects two telephone sets.

3. Telephone sets transmit sounds over (значительные расстояния). 4. (Звуковая энергия) is changed into electric waves. 5. (Система переключения) connects two telephone sets. 6. Telephone communication (включает) three parts. 7. Телефонная трубка (состоит из) a telephone (в добавление к) a microphone.

### § 2. Transmitter

I. Practise the following words and word combinations from the text:

- |   |                                   |
|---|-----------------------------------|
| carbon [ˈkɑːbən] углерод, уголь<br>(химически чистый) | to decrease [diːˈkriːs] уменьшать |
| oscillation [ˌɒsɪˈleɪʃn] колебание                    | to press [prɛs] прижимать, давить |
| frequency [ˈfriːkwənsɪ] частота                       | widely [ˈwaɪdli] широко           |
| pressure [ˈpreʃə] давление                            | either ... or [ˈaɪðə ... ɔː]      |
| resistance [rɪˈzɪstəns] сопротивление                 | или ... или                       |
| ленине  |                                   |
| to pass [paːs] проходить, проходить                   | 'contact                          |
| ПУСКАРЬ   | 'constant                         |
| to vary [ˈveəri] менять (ся)                          | granule [ˈgrænʊlə]                |
|   | diaphragm [ˈdaɪəfræm]             |

II. Read and translate these word combinations:

1. transmitted oscillations; 2. transmission of oscillations; 3. frequency of oscillations; 4. microphone housing; 5. carbon chamber; 6. transmitter resistance; 7. carbon diaphragm; 8. carbon granules; 9. insulating spacer; 10. constant frequency; 11. sound pressure

III. Translate the following sentences:

1. The transmitter consists of...  
— a microphone housing,  
— a carbon chamber,  
— a carbon diaphragm,  
— carbon granules,  
— an insulating spacer,  
— and a conductor.
2. Carbon granules...  
— pass current,  
— either decrease the resistance or increase the resistance.
3. Telephony...  
— is widely used in our country.  
— enables us to transmit sound energy.

IV. Show the parts of the transmitter in Fig. 5.

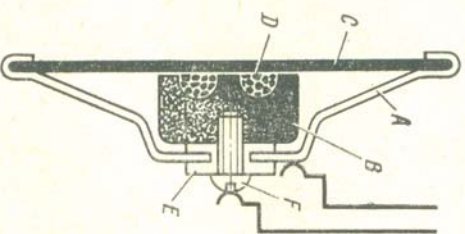


Fig. 5. Transmitter.