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САМАРСКИЙ ГОСУДАРСТВЕННЫЙ УНИВЕРСИТЕТ

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Зоология на английском языке

Обязательный материал для чтения на занятиях и дома

Учебное пособие

*для студентов второго курса
специальности «биология»*

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Настоящее учебное пособие предназначается для интенсивной работы с элементарной оригинальной литературой по специальности. Оно включает в себя материалы для устного обсуждения в аудитории: тексты, словарь для запоминания и вопросы. Материал для письменных отчетов дома переводов и кратких изложений содержит тексты и небольшие словарные пояснения.

Автор ориентирует студентов на составление моделей структурно-смысловой организации текстов, что позволяет постепенно переходить к самостоятельному чтению более сложной по содержанию оригинальной литературы по специальности.

Пособие предназначено студентам биологам второго курса высших учебных заведений в качестве основного содержания обучения. Оно может быть использовано студентами как дневной так и вечерней форм обучения. Работа будет полезна всем студентам естественных факультетов, изучающих английский язык. Автор выражает глубокую признательность и благодарность старшему преп. Т.В. Шуруновой за часть предоставленных текстовых материалов.

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I. READING IN CLASS

Text 1

- I. Read the text and state what it is about.

ANIMAL - PLANT DIFFERENCES

Although you may place organisms without difficulty in either the plant or the animal kingdom, it is essential to know the basic nutritional differences these two groups.

Plants require sunlight energy to build up their complex organic compounds (starch, for example) from the simpler inorganic foods they absorb. This process is not only dependent on sunlight, but requires the presence of the green pigment chlorophyll, and a supply of water and carbon dioxide within the plant, before it can take place. Animals do not carry out such a synthesis; they take in readymade organic compounds by feeding on other organisms either living or dead. Thus, plants are the only organisms capable of making organic compounds and animals are dependent on them, either directly or through their supply of these substances.

Animals also differ from the plants in the structure of their cells. Those of animals are bounded by a very thin layer of special protoplasm (a protoplasmic membrane), those of plants have a much thicker layer of dead material outside the protoplasmic membrane. This thick layer (the cell wall) is usually made of an organic substance called cellulose. Furthermore, plant cells generally have spaces or vacuoles full of cell sap within their protoplasm. Chlorophyll is not found in animal cells, but is present in small disc-shaped bodies (chloroplasts) in the protoplasm of many plant cells.

The nucleus is a more or less spherical body present in both cell types.

- II. Remember the following words, consult a dictionary about the way they are pronounced:

nutritional	питательный
starch	крахмал
chlorophyll	хлорофилл
protoplasm	протоплазма
cellulose	клетчатка, целлюлоза
furthermore	к тому же
vacuole	вакуоль
sap	сок (растений)
disk-shaped	дискообразный
chloroplast	хлоропласт
nucleus (pl.nuclei) (бот.)	косточка плода

III. Suggest the Russian for:

animal kingdom; to carry out a synthesis; cell sap; outside the membrane; cell wall; readymade compounds; either living or dead; sunlight energy; a supply of water; disc-shaped body.

IV. Suggest the English for:

Сложные соединения; растительный мир; зависит от солнечного света; органическое вещество; присутствие хлорофилла; основное различие; двуокись углерода; тонкий слой; более или менее; гораздо более толстый слой.

V. Answer the following questions:

1. What do plants require sunlight energy for?
2. What does the process of forming complex organic compounds in plants require?
3. Why do animals depend on plants?
4. What is the structure of the cells of animals?
5. What is the structure of the plant cells?
6. In what types of cells is chlorophyll found?

Text 2

- I. Read the text and say what information it carries.

THE PHYSICAL BASIS OF LIFE

The realization that all animals and plants possess a fundamentally similar organization – the structural and physiological units, or cells – leads quite naturally to an intensive study of the material of which the cells are composed – the physical basis of life itself. Accordingly we must now consider more specifically the characteristics of actual life – stuff – protoplasm.

As the finer structure of animals and plants came within the range of vision through improvements in microscope lenses, it was gradually recognized that the ultimate living part appeared to be a granular, viscid fluid. This started a long series of studies on the materials of the bodies of unicellular organisms similar to Amoebae and of the cellular elements of higher animals and plants, which finally led, about middle of the last century, to the complete demonstration of the full morphological and physiological significance of protoplasm. There is, in truth, an essentially similar, fundamental, living material

of both animals and plants – a common physical basis of the life. This reduction of life phenomena established the life science, biology.

The physical chemists tell us that protoplasm consists of matter in the colloidal state – a condition of matter that chemists have long been familiar with in the inorganic world. A colloid has been described as matter divided into particles larger than one molecule and suspended in a medium of different matter. Therefore, butter and cream are each colloids: the former consisting of water finely divided and suspended in oil, and the latter essentially of finely divided oil in water. But protoplasm is a stupendously more complex colloidal system. It comprises not two, but very many substances, some in simple and others in highly complex molecular form, so finely divided that they are invisible with the ordinary microscope.

Now colloidal systems in general are characterized by tremendous surface activity – the result of energy relations between the contact surfaces of the particles of the different component substances. This being so, and protoplasm being a colloid composed of very many different kinds of materials, the total surface area between suspended substances and suspending media is very great, and thus affords the requisite conditions for an exceedingly intricate system of energy relations. And when we add to this the fact that at such surfaces chemical changes, some involving changes in electrical potential occur, and also that mechanical changes are induced by precipitation, coagulation and constant redistribution between the suspending media and the substances in suspension, we begin to get at last a glimpse of the exceedingly intricate and delicate energy-transforming system that protoplast really is.

II. Remember the following words and word combinations, consult a dictionary about the way they are pronounced:

realization	понимание
unit	единица
accordingly	поэтому; соответственно
consider	рассматривать
ultimate	последний, окончательный
viscid	вязкий
fluid	жидкость
both... and...	как... так и...
denominator	знаменатель
suspended (хим.)	взвешенный
medium (pl.media, mediums)	среда
therefore	поэтому, следовательно
finely	мелко
invisible	невидимый
surface	поверхность

induce
precipitation (хим.)
redistribution

вызывать, побуждать
осаждение
перераспределение

- III. Give the definition of the word "colloid".
- IV. Find the examples of colloids in the text.
- V. What does the author mean when he says "the reduction of life phenomena to a common denominator"?
- VI. Divide the text into several logical parts, give a heading to each of them, make up a model of the information.

Text 3

- I. Read the text and say what it is about.

SOME GENERAL ASPECTS OF OSMOREGULATION IN ANIMALS

Life began in water, and most probably in sea water. The biochemical processes sustaining life, and fertilization which perpetuates it, can take place only in water, and often in water of a specific salt content. The simplest animals living today are small organisms whose cells are bathed in sea water. From the surrounding sea water they take their food and oxygen, and to it they return their waste products. In more complex animals the tissues are no longer in direct contact with the ambient medium, but are bathed in blood or some other extracellular fluid. These fluids form a private pond supplying oxygen and food to the cells and receiving their waste products. The volume of extracellular fluid is usually much smaller than that of the cells it surrounds, and in these crowded conditions many complex systems have developed to regulate the composition of the fluids. Of these regulatory processes, respiration supplies oxygen and removes carbon dioxide, digestion maintains the level of nutrients, and osmoregulation controls the volume and composition of the body fluids. Not only do the excretory organs osmoregulate, but also the body surface and the gut lining, both of which may transport salt and water between the environment and the interior of the body. Excretory systems can play only a negative part in maintaining body fluid concentration, conserving or excreting substances already present in the blood, but they are unable to add to the blood substances which are not already present. The activity of the gut and body surface, on the other hand, can play a much more positive role.

- II. Remember the following words and word combinations, consult a dictionary about the way they are pronounced:

fertilization	удобрение
waste product	продукт распада
tissue	ткань
ambient	окружающий
blood	кровь
pond	пруд, бассейн
supply	снабжать, поставлять, доставлять
volume	объем, масса
composition	состав
respiration	дыхание
remove	устранять, убирать
digestion	пищеварение
maintain	поддерживать, сохранять
level	уровень
nutrient	питательный
excretory organ	эксcretорный орган
gut	кишка
lining	содержимое
salt	соль
environment	окружение; окруж. среда
interior	внутренность
conserve	сохранять
on the other hand	с другой стороны

II. Suggest the Russian for:

specific salt content; extracellular fluid; to be unable to add...; ambient medium; complex systems; to maintain the level of nutrients; regulatory processes the excrete substances; on the other hand; the interior of the body.

IV Suggest the English for:

простейшие животные; окружающая морская вода; играть отрицательную роль; продукты распада; более сложные животные; поверхность кишок; играть положительную роль; состав жидкостей; сохранять вещества; удалять двуокись углерода.

V Supply extended answers to the following questions:

1. Where are the simplest animals found today?
2. Why is sea water so important for the simplest animals?
3. What is the role of blood and other extracellular fluids?
4. What are the functions of respiration?

5. What organs osmoregulate?
6. What part do excretory systems play?

VI. On the basis of the text explain that the statement "Life began in water" is true.

Text 4

- I. Read the text and state what information it carries.

BACTERIA

The Bacteria constitute an important group of Thallophita whose relationships are very obscure. The majority of species are colorless unicellular plants of extremely small size. Some are so small as to be almost, if not quite, invisible under the highest powers of microscope. They occur in almost every possible situation, and live under the most varied conditions.

They are not killed by cold, and some can survive for many months at the temperature of liquid air.

Very little is known regarding the internal structure of the cells, and it is a matter of doubt whether or not they possess a true nucleus. The cell-wall appears to consist of a protein, and may be regarded merely as a differentiated outer layer of the cytoplasm.

Multiplication of the cells by division, under normal circumstances, ensues with great rapidity, often taking place once every hour, or even more frequently.

Bacteria survive unfavorable conditions by the formation of resting spores, produced within the cells by a localized concentration of the greater part of the protoplasm. Bacterial spores are often very resistant to extremes of temperature and can sometimes withstand prolonged boiling.

Most sorts of Bacteria live a free life in water, earth, etc. Many exert a very beneficial action in promoting decay and maintaining the circulation of nitrogen and carbon dioxide in nature, while a small number are extremely harmful, living as parasites on higher animals and plants, and causing such diseases as typhoid, cholera, plague, etc.

The identification of the pathogenic forms is of great importance. Owing, however, to the small size of the individuals, it is as a rule impossible to identify the species by microscopic examination alone. One has therefore to resort to the various reactions of Bacteria under conditions of culture.

On various artificial media, such as extract of meat, decoctions of fruit, etc. growth is very rapid, and a single organism soon multiplies to such an extent that the mass of its offspring is visible to the naked eye.

II. Remember the following words and word combinations, consult a dictionary about the way they are pronounced:

size	размер
species	вид, род, разновидность
occur	встречаться
condition	условие
liquid	жидкий
regard	рассматривать; принимать во внимание
regarding	относительно
protein	протеин, белок
layer	слой, пласт
multiplication	размножение; умножение
division	деление; разделение
resting	находящийся в покое; спящий
spore	спора
resistant	стойкий, прочный
exert	осуществлять; оказывать (влияние)
decay	гниение, распад
nitrogen	азот
harmful	вредный
cause	вызывать
disease	болезнь
owing to ...	благодаря
identify	опознать
offspring	отпрыск, потомок
naked eye	невооруженный глаз

III. Make up a list of words you consider indispensable for the understanding of the text.

IV. Answer the following of the text.

1. What are the characteristic features of Bacteria?
2. Where do Bacteria occur?
3. In what way do Bacteria multiply?
4. How do Bacteria survive?
5. What kind of action do Bacteria exert in nature?
6. What is the way of identifying the pathogenic forms of Bacteria?

V. Define which details of the text are of particular importance for the understanding of the text.

VI. Make up a list of the properties of Bacteria.

Text 5

I. Read the text and say what it is about.

AMOEBIA

Amoebae are tiny pond-living animals visible to the naked eye. They are very difficult to find among mud and other debris at the bottom of ponds. Before we can understand the methods of reproduction in amoeba we must learn about its structure.

The body of amoeba is bounded by a protoplasmic membrane and the thin layer of protoplasm immediately inside it is devoid of granules and is called plasmagel. The main part of the body is made of a more fluid type of protoplasm called plasmasol and it contains granules of stored food. If you examine an amoeba in a drip of water under a microscope you will see the plasmasol flowing, often in more than one direction, producing a change in shape of the animal as pseudopodia.

It is usually easy to distinguish the posterior end of the body by the numerous very short pseudopodia there, and in the plasmasol at this end is a spherical vacuole which gradually fills with water and then contracts so expelling its contents to the exterior before filling once more. This contractile vacuole keeps the water content of the body at a steady level by counteracting the entry of water from outside. Also in the plasmasol are a transparent nucleus and several food vacuoles which contain the food undergoing digestion after it has been engulfed by pseudopodia and so taken into the body.

II. Remember the following words, consult a dictionary about the way they are pronounced:

amoeba (pl. amoebae)	амеба
tiny	крошечный
pond-living	живущие в прудах
mud	грязь
bottom	дно
plasmagel	плазмагель
plasmasol	плазмазол
shape	форма
pseudopodia pl. (sing. pseudopodium)	ложноножки
posterior end	задний конец
contract	сжимать(ся), сокращать(ся)
contents	содержимое

content
transparent
undergo

содержание
прозрачный
подвергаться чему-либо

III. Make up a list of words used to describe the structure of amoeba.

IV. Supply extended answers to the following questions.

1. Where can amoebae be found?
2. What is the body of amoeba bounded by?
3. What is the main part of the body of amoeba made of?
4. What makes it easy to distinguish the posterior end of the body of amoeba?
5. What is there in the plasmasol at the posterior end of the body?

Text 6

I. Read the text and say what it is about.

LIFE - HISTORY OF AMOEBAS

Amoeba has two different methods of reproduction which follow each other regularly. Young amoebae which have very few granules of stored food, feed actively and grow until they are able to split into two. In this process, known as simple fission, they first withdraw their pseudopodia and become roughly spherical. The nucleus divides into two halves followed by the protoplasm and two smaller amoebae have been formed from one. As they continue to feed and grow, simple fission is repeated many times, in this way the animal is prevented from reaching a large size.

After several months (usually four to six), however, the adults show signs of old age; their movements become much sluggish, their pseudopodia are numerous and branched, and they can no longer divide by simple fission. At this stage the nucleus splits up into small pieces which together with a portion of protoplasm, form tiny spherical spores not more than 1/200 mm in diameter. The spores are set free when the old amoeba breaks up and dies. They resist drought and, if the pond dries up, may be blown about, but of course they could also be spread by ducks, moorhens and other animals. On the other hand, they can hatch directly to form a tiny amoeba without any food granules. After feeding and growth simple fission starts again and so the cycle goes on.

II. Make use of the notes given below, consult a dictionary about the way the following words and word combinations are pronounced:

split	распадаться, расщепляться
fission	расщепление, деление
roughly	приблизительно
withdraw	оттягивать, отдергивать; удаляться
prevent	препятствовать
adult	взрослый
sluggish	медленный, вялый
set free	высвободиться
drought	засуха
duck	утка
moor-hen	белая шотландская куропатка
hatch	выводиться

III. Make up 5 questions on the text and ask your friend to answer them.

IV. Sum up what the text has to say on the following points:

1. The process of simple fission.
2. The formation of spores.
3. The properties of spores.

V. Make up a model of the information and sum it up.

Text 7

I. Read the text and say what information it carries.

HYDRA

Hydra, the freshwater polyp, is a small cylindrical animal quite common in ponds and lakes. The body wall is made up of two layers of cells, an outer ectoderm, and an inner endoderm. The mouth is the only opening from the body cavity and round it are arranged 6-9 hollow tentacles which are used in catching water-fleas and other small pond animals.

If you have kept hydrae and fed them on water-fleas you will see how they reproduce by budding. When they are well fed, they usually produce from the cylindrical body hollow outgrowths known as buds. These develop tentacles at their free end and finally a mouth, after which they separate from the parent. Two or three buds may be present at the same time on one hydra, and a bud may itself start budding before it is free from the parent.

At times a different method of reproduction occurs. You may see hydra with several pale swellings in the ectoderm just below the mouth. These are reproductive organs known as testes and in them develop very large numbers of

microscopic reproductive bodies called spermatozoa (sperms is an accepted abbreviation). The sperms have a single nucleus and a whip-like tail with which they swim in the pond water when they are released.

You may also see hydra with a single large spherical swelling near the other end of the body. This is an ovary and contains a single large egg swollen with stored food. The egg, like the sperm, has a single nucleus, but it is much larger owing to its food store and can be seen easily with the naked eye. The egg cannot develop into a new hydra until it has first been fertilized by a sperm. Although sperms and eggs are often produced by a single individual, they are never ripe at the same time and so it is impossible for one hydra to fertilize its egg with one of its own sperms.

II. Remember the following words and word combinations, consult a dictionary about the way they are pronounced:

hydra (pl.hydrae)	гидра
freshwater	пресноводный
ectoderm	эктодерма
entoderm	энтодерма
cavity	полость
tentacle	щупальце
water-flea	водяная блоха
budding	почкование
outgrowth	вырост
at times	временами, иногда
swelling	выпуклость
ovary	яичник
testes (sing.testis)	яички, тестикулы
spermatozoa	сперматозоиды, сперма
swollen (part.from to swell, swelled)	надуваться, увеличиваться
whip-like	кнутообразный
ripe	зрелый

III. Suggest the Russian for:

to be well fed; pond animals; to be made up of; to see with the naked eye; very large numbers of ...; quite common; a whip-like tail; freshwater polyp; to reproduce by budding; owing to...

IV. Suggest the English for:

в одно и то же время; быть расположенным вокруг; принятое сокращение; единственное ядро; быть свободным от родителя; единственное отверстие; другой способ размножения; гораздо больше; запас пищи; органы размножения.

V. Explain the following terms: ectoderm, endoderm. Then let your groupmate answer your questions on the two methods of reproduction of hydra. Begin your questions with: I wonder... I want to know... I'd like to know...

VI. Make up a model of the text, sum up its information up.

Text 8

I. Read the text and say what it is about.

FERTILIZATION

Fertilization is the entry of a sperm into the egg and the fusion of their two nuclei. In hydra many thousands of sperms are set free from the tester into the water and they swim about for a short time. If some come near to an individual whose ovary contains a ripe egg they will collect round it, and one sperm will enter and fertilize it. For reasons which we do not understand, this fusion of nuclei stimulates the egg to develop into a new individual, i.e. it makes the egg fertile. The very large number of sperms will help to prevent eggs remaining unfertilized.

The fertilized egg cell does not form a new hydra directly. It divides to form two cells, then again to produce four, and eight, and sixteen, and so on, until an embryo of many small cells has been formed. This makes a horny case for itself before it detaches from the parent to remain in the mud for several months. Later a snail hydra emerges from the case, starts to feed and grow, and then forms buds if food is plentiful.

Organisms are male if they produce sperms and female if they produce eggs. Hydra can often produce both, although not at the same time. Such organisms may be called hermaphrodite. Earthworms are also hermaphrodite and, like hydra, do not fertilize eggs with their own sperms.

The methods which involve the separation of a part of the parent which could itself develop into a new individual without any fusion or fertilization are examples of asexual reproduction.

II. Remember the following words, consult a dictionary about the way they are pronounced:

fusion	слияние
unfertilized	неоплодотворенный
embryo	эмбрион, зародыш
horny case	изгиб в форме рога
hermaphrodite	обоеполое существо

earthworm
asexual

земляной червь
бесполой

III. Give the definitions of the following terms.

1. Fertilization.
2. Hermaphrodite.
3. Asexual reproduction.

IV. Answer the following questions:

1. What is fertilization?
2. Under what conditions does fertilization take place?
3. In what way does the fertilized egg cell form a new hydra?
4. What organisms are called male ones?
5. What organisms are called female?

V. Speak on the process of the formation of a new hydra in detail.

Text 9

1. Read the text without a dictionary. Pick out the basic idea of the text.

HOW LIFE IS PASSED ON IN ANIMALS

In the protoplasm of every living organism there is intense chemical activity. Hundreds of chemical changes are taking place at the same time. Such changes are carried out by enzymes. Finally, in every individual, this intense activity must be carried and we recognize that death has occurred. But this does not mean that the races of animals and plants must die out because they all can produce new individuals like the parent or parents. This is what biologists call reproduction.

After they have reached maturity, animals and plants split off special bits of their living material which develop, often by a highly complicated process of growth, into new individuals.

There are many different ways in which this reproduction can be carried out and we examine the process in two different types of animals - amoeba and hydra.

II. Remember the following words and word combinations, consult a dictionary about the way they are pronounced:

to be passed on
enzyme

передаваться
энзим, фермент

to die out	вымирать
maturity	зрелость
to split off	отделять

III. Make up 3 questions covering the contents of the text.

IV. Make up a model of the text, sum up its information up.

Text 10

I. Read the text and state what it is about.

EARTHWORMS

Choose a large worm which has a thickened pale band towards one end put it on a piece of paper, and add a few drops of water to prevent its skin from drying up. You will notice that the worm is made up of segments, and that the head or anterior end is pointed unlike the hind or posterior end which is flattened and rather blunt. Hold up the worm and you will see that the underside is paler in colour than the back. If you run your finger along its underside from the posterior end, you will feel a slight roughness due to a series of bristles. How many bristles are there? Your hand lens will help you to answer this question. Examine the underside of the worm, holding the hand lens close to your eye. The you will see four rows of bristles down the body. Earthworms use these bristles to move.

Can you find the mouth? It is difficult because it is small and usually closed. It lies under a little overhanging lip called prostomium at the anterior end, and is surrounded by the first segment. With the help of the prostomium the worm takes in soil and fragments of decaying leaves or other vegetable matter through the mouth. This material is passed down the alimentary canal, a tube which we see as a dark line through the semi-transparent body wall in small worms, and is finally passed out through the opening, the anus, on the last segment.

II. Remember the following words and word combinations, consult a dictionary about the way they are pronounced:

anterior end	передний конец
hind or posterior end	задний конец
flattened	плоский
blunt	тупой
bristle	щетина
underside	нижняя часть

overhanging lip	нависающая губа
prostomium	простомиум
matter	вещество
alimentary canal	пищеварительный тракт
semitransparent	полупрозрачный
anus	задний проход

III. Answer the following questions.

1. What is a worm made up of?
2. What is the difference between the anterior and posterior ends of a worm?
3. What is the function of the bristles?
4. Why is it difficult to find the mouth of a worm?
5. What does the prostomium serve for?

IV. Make up a list of words used to describe the structure of earthworms .

V. Give a short account of

1. the structure of a worm;
2. the process of digestion in a worm.

Text 11

1. Read the text and say what information it carries.

THE EFFECT OF EARTHWORMS ON LITTER DISAPPEARANCE

The development of surface organic horizons is often attributed to the absence of earthworm activity. In many cases other factors are more important but the classical experimental plots of Park Grass, Rothamsted provide an example where the effects of earthworm activity may be fairly clearly defined. As a result of repeated applications of ammonium sulphate the acidity of some plots has eliminated the earthworm population completely and a thick mat of dead vegetation has developed. It has been suggested that the mat of partly decomposed herbage which accumulated was formed because the intense acidity of the soil retarded the decay of organic matter. This is evidently only part of the explanation, for when the organic matter. This mixed with the soil it decomposes readily. Probably the primary cause of the formation of a "mat" in these plots is the complete absence of worms (to pull the dead herbage into the soil. A comparable accumulation of organic matter in an orchard under grass occurred where the earthworm population has been poisoned by copper sulphate

spray. Both soil profiles showed the clear disjunction between the organic layer and the mineral soil and the absence of crumb structure which are characteristic of mor soil. In New South Wales, Australia irrigated pastures from which earthworms are absent may accumulate surface mats up to 4 cm thick and containing as much as 147 kg/ha of organic nitrogen. In some of these sites where earthworms have been introduced experimentally, the mixing of voided earth with the litter has led to the disappearance of the mat as a discrete layer.

II. Remember the following words, consult a dictionary about the way they are pronounced:

horizon	горизонт, (геол) ярус; отложение одного возраста
eliminate	уничтожать, ликвидировать
vegetation	растительность
decompose	разлагаться, гнить
herbage	травы
orchard	фруктовый сад
poison	яд
spray	жидкость для пульверизации
profile	профиль; очертание, контур
crumb	крошка
voided	пустой; лишенный чего-либо
litter	подстилка

III. Suggest the Russian for:

to decompose readily; mineral soil; to be clearly defined; dead herbage; discrete layer; earthworm activity; crumb structure; organic matter; to be attributed to...; partly decomposed herbage.

IV. Suggest the English for:

основная причина; гниение органического вещества; полное отсутствие; органический азот; накопление органического вещества; в результате...; популяция земляных червей; органический слой; неоднократное применение; быть характерным для чего-либо.

V. Point out which of these sentences contains the information from the text.

1. Soil provides the water and mineral salts which plants require as food material.
2. When the organic matter is mixed with the soil it decomposes readily.
3. the soil water contains oxygen dissolved from the air.
4. As the plants die they form humus.

5. The mixing of voided earth with the litter had led to disappearance of the mat as a discrete layer*

VI. On the basis of the article prove the importance of the earthworms for soil formation.

VII. Make up a model of its information and sum it up.

Text 12

I. Read the text and state what information it carries.

PHYSIOLOGICAL BASIS OF THE ODOR HYPOTHESIS

Students of fish behavior have long observed that fish have an extremely acute sense of smell. It is well known that shark and tuna are drawn to a vessel by the odor of bait in the water. Karl von Frisch was among the first to demonstrate scientifically the effect of an odor upon the behavior of fishes. During his studies he noticed that when a bird dropped an injured fish into the water, the school of fishes from which it had been seized quickly dispersed and later avoided the area. This observation led von Frisch (1941) to prove in the laboratory that fish can be alarmed by extremely dilute emanations from injured fish skin. Many other workers have demonstrated the importance of the fish olfactory sense in locating food and recognizing other fish. Odors may also warn fishes away from poisons. In fact we (Easier and Wisby, 1950) found that fishes can sense low concentrations of certain industrial pollutions and their behavior can be utilized as a qualitative biological assay of pollution. In contrast, the common chemical sense and the mechanism that permits temperature gradient discrimination are imprecise and less sensitive when compared with the olfactory system.

The olfactory organs of fishes have evolved in a great variety of forms. In the teleosts or bony fishes, of which the salmon is a representative, the nose pits have two separate openings. Water enters the anterior opening as the fish swims (cilia sometimes assisting the intake), passes over nasal receptors, and flows out through a second opening, which in some species, may be opened and closed rhythmically by the fish's gill ventilation. Any odorous substances in the water stimulate the nasal receptors chemically, perhaps by an effect on enzyme reactions, and the resulting nerve impulses are relayed to the central nervous system by the olfactory nerve.

II. Remember the following words and word combinations, consult a dictionary about the way they are pronounced:

behavior (or behaviour)	поведение
acute	острый
sense	чувство
shark	акула
tuna	тунец
odor (or odour)	запах
bait	приманка
injure	повредить, ранить
school	стая (рыб)
avoid	избегать
emanation	излучение, испускание
olfactory	обонятельный
pollution	загрязнение
assay	анализ
smell	запах
bony fishes (or teleosts)	костистые рыбы
salmon	лосось, семга
nose pits	носовые отверстия
cilia	реснички
nasal	носовой
gill (обыкн. pl.)	жабры

III. Suggest the Russian for:

to be among the first; temperature gradient discrimination; olfactory system; dilute emanations; acute sense of smell; to be drawn to...; to warn away from; school of fishes; nasal receptors; injured fish skin.

IV. Suggest the English for:

количественный биологический анализ; напротив...,¹ органы обоняния; поведение рыб; низкие концентрации; обоняние рыбы; большое разнообразие форы; по сравнению с...; центральная нервная система; костистые рыбы.

V. Define which details of the article are of no importance for the understanding of the contents of the text.

VI. Speak on the work of the olfactory organs of bony fishes in detail.

VII. Make up a model of the text information and sum it up.

Text 13

I. Read the text and say what it is about.

AMPHIBIANS - CLASS AMPHIBIAN

The class Amphibian includes salamanders, frogs, toads and a few wormlike tropical animals called caecilians. Frogs and toads are not likely to be confused with any other vertebrates, but some of the salamanders greatly resemble lizards, which are reptiles. [Salamanders, however, have smooth moist skins without scales, whereas a lizard skin is scaly and rough.] Amphibian characteristics include a three-chambered heart and well-developed limbs which have replaced the fins of fish. The eggs of most amphibians are deposited in water. The young respire by means of gills; the adults of some species which have lungs leave the water. The name Amphibia, meaning "double life", was given this class because so many members of it live both on land and in water.

Amphibians are said to be cold-blooded, which means that their body temperature varies with the environment. Consequently, during cold weather many amphibians hibernate; they bury themselves in mud or moist soil, the body temperature drops, and all physiological activities are greatly slowed down. With the return of warm weather the amphibians emerge, often congregating in the water in hordes to breed. Some amphibians also aestivate during dry periods.

Living amphibians are classified into three orders: the Gymnophiona, Caudata, and Salientia. Numerous extinct species have also been discovered.

II. Remember the following words, consult a dictionary about the way they are pronounced.

amphibia	амфибии; земноводные
amphibian	земноводный, амфибия
salamander	саламандра
frog	лягушка
toad	жаба
caecilian	червяга, червяги
vertebrate	позвоночное животное
lizard	ящерица
reptile	пресмыкающееся
moist	влажный
scale	чешуя
limb	конечность
fin	плавник
deposite	класть, осаждать
respire	дышать

lung	легкое
blood	кровь
consequently	следовательно, поэтому
hibernate	впадать в летнюю спячку, быть без действия
horde	стая
breed	размножаться, выводить
aestivate	впадать в летнюю спячку
dry	сухой
order	отряд, подкласс
extinct	вымерший

III. Suggest the Russian for:

to congregate in hordes; physiological activities; to hibernate in cold weather; to resemble greatly; wormlike tropical animals; to be confused with; to vary with the environment; scaly skin; to aestivate in dry periods.

IV. Suggest the English for:

трехкамерное сердце, замедляться, некоторые виды, как... так и, хорошо развитые конечности, вымершие виды, следовательно, температура тела, дышать жабрами, хладнокровный.

V. Answer the following questions:

1. What animals does the class Amphibia include?
2. What is the difference between the skins of salamanders and lizards?
3. In what way do amphibians respire?
4. How do amphibians behave in cold weather?
5. Into what orders are amphibians classified?

VI. Make up a list of words which characterize amphibians.

VII. Speak on the class Amphibia.

Text 14

I. Read the text in 2 minutes without a dictionary and answer the questions:

1. What are characteristic features of the amphibians?
2. What features do frogs and toads have in common?

The amphibians, or second group of vertebrates, are creatures that live partly on land and partly in water. Like their cousins, the fishes, they are cold-blooded animals, deriving heat only from their surrounding environment. Also

like most fishes, the young are hatched from eggs which are fertilized outside the body.

There are only three orders of amphibians, the first order being made up of frogs and toads, the second of salamanders, and the third of relatively unimportant forms native to the tropics.

Frogs and toads are extremely interesting because they pass through different stages of development during which they change from one type of creature to another. Both frogs and toads lose their tails when they become full grown; they are called tailless amphibians. The salamanders are lizard-like creatures with a moist slimy skin and short legs. Most species are only few inches long.

Most of the amphibians are of little commercial importance, although the toad and frog consume large numbers of destructive insects and the hind legs of certain frogs are used for food and are considered a great delicacy.

II. Study the notes, consult a dictionary about the way the words are pronounced:

creature	создание, живое существо
derive	получать
tail	хвост
slimy	слизистый, скользкий
leg	нога
inch	дюйм
consume	потреблять, съесть
insect	насекомое

III. Entitle the text, make up its model and sum it up.

Text 15

I. Read the text and state what it is about.

CROCODILIANS - ORDER CROCODILIA OR LORICATES

The crocodilians are a remnant of a group of reptiles that lived millions of years ago. Structurally they have undergone few changes from their ancestors. They remain in water much of the time, but frequently emerge to bask in the sun. Some species have been known to travel overland from one body of water to another.

The skin of crocodiles is studded with heavy bony plates in addition to the smaller scales. These plates provide considerable protection but they are not bulletproof as is sometimes claimed. The tail is flattened from side to side and is used in swimming; it can be swung with terrific force and hence is also an effective weapon.

Crocodylians are oviparous. The eggs are laid on land, as is characteristic of all reptiles. The female usually builds a crude nest by piling up debris and decaying vegetation and sand; when the eggs are laid, the nest is covered. Some species guard their nests until the eggs are hatched; others, less maternal, pay no attention to them after the eggs are deposited.

The crocodylians are the bulkiest of living reptiles, although some snakes are longer. No positive statement about the maximum length of crocodylians is possible, but 23 feet is believed to be about correct, in spite of lengths of 29 to 33 feet that have been reported. The skins are so widely used for making wallets, purses, and shoes that most crocodiles are killed before they reach their maximum size.

Crocodiles will eat any animal they can overcome; several species are confirmed man-eaters.

Crocodiles and alligators can be distinguished, by the shape of the head. The snout of a crocodile is much narrower at the tip than at the base, which gives the head a somewhat triangular shape. In contrast, an alligator's snout is almost as broad near the tip as it is at the base.

II. Remember the following words and word combinations, consult a dictionary about the way they are pronounced:

crocodylian	крокодиловый
loricate	панцирный, имеющий панцирь
remnant	остаток
ancestor	предок
overland	сухопутный
crocodile	крокодил
bony plate	костяная пластинка
protection	защита
oviparous	яйценосный
nest	гнездо
debris	обломки
sand	песок
maternal	материнский
alligator	аллигатор
snout	морда
tip	кончик; тонкий конец

III. Suggest the Russian for:

to be distinguished by...; in addition to...; an effective weapon; to undergo some changes; to build a crude nest; a somewhat triangular shape; in contrast; to pile up debris; to be confirmed man-eaters; to reach maximum size.

IV. Suggest the English for:

гораздо уже; широко использоваться; обращать внимание на...; что характерно для всех пресмыкающихся; хотя путешествовать по суше; следовательно; огромная сила; обеспечивать защиту; гниющая растительность.

V Ask your friend to answer your questions on the text. Begin your questions with: I'm interested to know..., I want to know..., I'd like to know ...

VI. Make use of the text and prove that a crocodile and an alligator are not one and the same animal.

VII. Sum up the text information, making its model.

Text 16

I. Read the text and say what information it carries.

SNAKES AND LIZARDS - ORDER SQUAMATA

In many respects snakes are the most interesting members of the entire animal kingdom. Among their amazing characteristics is their ability to swallow objects several times larger than their own diameter. This ability is due to the loose construction of the head and to the fact that the various parts of the jaws can be moved independently. The teeth, which curve toward the rear, help in holding the prey and pulling it down the throat. During swallowing, the bones of the head are greatly separated, and the jaws work independently forward and back, gradually drawing the food down the esophagus and into the stomach.

Most snakes lay eggs; but a few species, including rattle-snakes copperheads, and water moccasins, are ovoviviparous. One of the oldest and most widely believed snake stories is that the females swallow their young to protect them. Many snakes do eat the young of other snakes, but they do so to satisfy hunger.

Venomous snakes had an excellent hypodermic apparatus long before we thought of one. There are several kinds of venomous serpents, but the poison glands and the mechanism for injecting the venom are similar in all of them. The poison glands correspond to salivary glands and are located at the angle of the jaw, one on each side. From each gland a duct leads forward and opens into a hollow or grooved fang in the upper jaw. When a snake bites, the two long fangs penetrate the victim's flesh, and both jaws close immediately. The muscles that close the jaws also compress the poison glands, whereupon venom squirts from the glands and passes down the duct through the fangs and into the victim.

There are comparatively few venomous snakes. Of the approximately 2400 known species, only some 200 have venom that is dangerous to man. Many snakes are beneficial because they eat rats, mice, and other harmful rodents.

II. Remember the following words, consult a dictionary about the way they are pronounced:

squamata	чешуйчатые (от squama - чешуя)
swallow	глотать, проглатывать
jaw	челюсть
teeth	зубы
curve	гнуть(ся), изгибать(ся)
rear	задняя сторона
prey	добыча; жертва
throat	горло, гортань, глотка
esofagus = esophagus = oesophagus	пищевод
stomach	желудок
rattlesnake	гремучая змея
copperhead	щитомордник
water moccasin	водяной щитомордник,
ovoviviparous	яйцеживородящие
venomous	ядовитый
serpent	змея, змей
venom	яд (животного происхождения)
gland	железа
salivary	слюнный
duct	проток, канал (в организме)
hollow	пустой; полый
groove	желобок
fang	клык
victim	жертва
flesh	тело, плоть
muscle	мускул, мышца
rat	крыса
mice	мышы (ед. mouse)
rodent	грызун

III. Suggest the Russian for:

to move independently; to curve toward the rear; a widely believed story; salivary glands; to be similar; loose construction; to pull (draw) down the throat; to be due to...»; hypodermic apparatus; entire animal kingdom.

IV. Suggest the English for:

в несколько раз больше; вредные грызуны; верхняя челюсть; ядовитые железы, задолго до; снимать железы; удовлетворять голод; сравнительно мало; во многих отношениях; соответствовать чему-либо.

V. Make up a list of words used to describe the structure of the head of a snake.

VI. Explain what the author means when he says; There are comparatively few venomous snakes.

VII. Make up a model of the text information, sum up what the text has to say on the following points:

1. The process of swallowing big objects.
2. The mechanism for injecting the venom.

Text 17

I. Read the text and state what it is about.

NUTRITION OF INSECTS

Insects eat a wide variety of organic materials. Their diet ranges from dry dead wood to the living tissues of mammals and reflects the hundreds of thousands of species and the diverse habitats of this remarkable class of animals. What an insect eats and how much it eats largely determine its ecological role and its economic importance. If the Colorado potato beetle had not begun eating the leaves of the cultivated potato it would still be an insect of restricted geographical range and of interest only to coleopterists.

What an insect eats is not always as obvious as one might at first suppose. Larvae of the fruit fly, *Drosophila*, live in decaying fruit, but their diet consists of the yeasts and other microorganisms growing in their fruit. The meadow grasshoppers (*Conocephalinae*) were thought to eat primarily the leaves of grasses and other plants, but observations on the crop contents of these Orthoptera show that they actually subsist on insects, pollen, flowers, and seeds of grasses, and hardly ever eat leaves. Anobiid beetles which burrow in wood feed on the fungi that grow along the walls of the burrows.

Moreover, not everything that an insect ingests as food can serve as a source of nutrients. Various wood-eating beetles, such as the powder-post beetle, *Lyctus*, are unable to digest cellulose, the main constituent of their food, and utilize only the starch, sugars, and nitrogenous materials also present in the

wood. Similarly, most leaf-feeding insects do not digest and hence obtain no nutritional value from the cellulose which constitutes a considerable proportion of their natural food.

A knowledge of what an insect eats and of what substances in its diet it is able to assimilate constitutes but the initial steps toward an understanding of its fundamental nutritional physiology.

II. Remember the following words, consult a dictionary about the way they are pronounced:

diet	пища
tissue	ткань
mammali	млекопитающее животное
habitat	место распространения, естественная среда
potato	картофель
beetle	жук
cultivated	культурный; обработанный
Coleoptera	жесткокрылые; жуки
larvae (pl. от larva)	личинка
fly	муха
yeast	дрожжи
meadow	луг
grasshopper	кузнечик
crop	зоб
subsist	существовать; кормиться
pollen	пыльца
seed	семя
burrow	рыть нору; жить в норе; нора; червоточина
fungi (pl. от fungus)	грибы, плесень
ingest	глотать, проглатывать
powder-post beetle	капошонник
cellulose	клетчатка; целлюлоза
starch	крахмал
assimilate	поглощать, усваивать

III. Suggest the Russian for:

living tissue; decaying fruit; nutritional value; leaf -feeding insects; Colorado potato beetle; to range from ... to; crop contents; a wide variety; a source of nutrients; wood-eating beetles,

IV. Suggest the English for:

составлять значительную часть; культурный картофель; кроме того, экономическая важность; подобным образом (так же); личинка фруктовой мухи; экономическая роль; быть не в состоянии сделать что-либо; первые шаги; основная составная часть.

V. Find topical sentences in each paragraph of the text, make up a model of its information and sum it up.

VI. Define which details of the text are of particular importance for characterizing the nutrition of insects.

Text 18

I. Read the text and state what it is about.

THE NATURE OF METAMORPHOSIS

There are two ways of regarding metamorphosis.

(I) It may be supposed that the insect is undergoing a progressive development towards the adult forms that it is subject during its larval stages to some inhibition which prevents the completion of this development until it is fully grown; that the restraint is then removed and differentiation is completed.

(II) Alternatively, it may be supposed that metamorphosis involves a switch into a line of development which is qualitatively different from that of the larva. In other words, that a new system of genes, previously latent in the chromosomes, is brought into action at a given point in development and it is this system that is responsible for the control of the adult form. According to this conception, the origin of metamorphosis has consisted in the independent evolution of two genetic systems, one controlling larval form and the other controlling adult form. The successive stages of the insect are thus comparable with the different forms in a polymorphic species, or with the different forms of the parts of the body, which are likewise believed to result from the activation of different sets of genes.

Hormonal differences certainly exist in the blood at metamorphosis, and these are responsible for the morphological changes. If young larvae of *Rhodnius* are decapitated and transfused with the blood of 5th-stage larvae, which are in process of moulting to become adult, they undergo a precocious metamorphosis. Even 1st-stage larvae recently emerged from the egg, if treated in this way, will develop the cuticle and pigmentation rudimentary wings, abdominal structure and genitalia characteristic of the adult. Pieces of the

integument from larvae of *Galleria* (Lep.) implanted into pupating larvae of the same species, or another species such as *Achroea*, moult to form pupal cuticle synchronously with their new host; further development of these implants to form imaginal cuticle takes place when the host pupa completes its metamorphosis. By implantation of isolated fragments in the mature larva, the integument of newly hatched *Galleria* larvae can be caused to become pupal and then imaginal.

The insect seems to be capable of developing its imaginal characters, that is, of undergoing metamorphosis at any stage – provided that the appropriate hormones are circulating in the blood.

II. Remember the following words, consult a dictionary about the way they are pronounced:

metamorphosis	превращение
restraint	ограничение
inhibition	торможение, подавление, сдерживание
differentiation	видоизменение
decapitate	обезглавливать
transfuse	переливать, делать переливание (крови)
treat	обрабатывать
precocious	преждевременный, рано развившийся
cuticle	кожа, кожаца
pigmentation	пигментация
rudimentary	зачаточный, недоразвитый
wing	крыло
abdominal	брюшной, абдоминальный
genitalia=genitals	половые органы
integument	оболочка, наружный покров
implant	внедрять
pupate	окукливаться
imaginal	имагинальный (относящийся к взрослой стадии)
pupa	куколка

III. Suggest the Russian for:

to be responsible for; to result from; successive stages; alternatively; to be brought into action; newly hatched; polymorphic species; to undergo a metamorphosis; hormonal differences; precocious metamorphosis.

IV. Suggest the English for:

другими словами; обработать таким образом; морфологические изменения; в соответствии с ...; на любой стадии; набор генов; при условии что; зрелая личинка; в данный момент; новый хозяин.

V. Make up a list of words you consider indispensable for the understanding of the text.

VI. Make up a model of the text information, sum it up, speaking on the two ways of regarding metamorphosis.

VII. Imagine that your friend has just made a report on the nature of metamorphosis. Ask him questions on the subject.

Text 19

I. Read the text and say what it is about.

DECEPTION BY IMITATION

In the battle for existence a weaker animal very often takes on a resemblance in form to a stronger or more aggressive animal. This resemblance is a protection to the weaker animal because it is often mistaken for the animal it resembles and consequently goes unharmed. The similarity of form probably came about by gradual changes from one generation to another in which animals of a weaker species take on the characteristics of a stronger one. It is probably in this way that a butterfly known as the viceroy has come to imitate a larger species known as a monarch or milkweed butterfly. The monarch has large, reddish-brown wings with black veins, a peculiar odor, and evidently an unpleasant taste. The viceroy has grown to resemble the monarch so closely that the birds can scarcely tell them apart and consequently leave both of them alone.

Some insects resemble flowers and leaves, and others even resemble sticks. In each case the object mimicked is one that the insect's enemies avoid or in which they are not interested. Insects that prey upon other insects often have the characteristics of something attractive to their prey. Certain spiders that live in flowers are coloured like the flowers. This makes it possible for them to remain hidden, waiting to seize as prey the unsuspecting insects that⁷ come for pollen and nectar.

The leaf insects are remarkable in that their similarity to leaves is almost perfect. When they first hatch, they have a reddish color that makes them appear like "buds. Then, as they begin to feed, they change their color to green, and

take on markings that resemble the veins of a leaf. As they grow older, they acquire rust-colored spots and markings that resemble the veins of a leaf. As they grow older, they acquire rust-colored spots and markings similar to those of a leaf when it begins to decay. Thus the mimicry is complete throughout the life of the insect.

II. Remember the following words, consult a dictionary about the way they are pronounced:

deception	обман
butterfly	бабочка
viceroy	вице-король
milkweed butterflies	данаиды
vein	жилка (листа)
taste	вкус
enemy	враг
spider	паук
bud	почка; бутон
mimikry	мимикрия, подражание
monarch	данаида; большая коричнево-оранжевая бабочка

III. Suggest the Russian for:

to resemble very closely; to be mistaken for somebody; to take on a resemblance to...; to come to do something; rust-coloured spots; to tell somebody apart; leaf insects; throughout the life; to come about.

IV. Suggest the English for:

красновато-коричневые крылья; следовательно; в каждом случае; постепенные изменения; специфический запах; от одного поколения к другому; некоторые пауки; остывать в покое; предмет, которому подражают.

V. Supply extended answers to the following questions.

1. Why do weaker animals take on a resemblance to stronger animals?
2. How did the similarity come about?
3. Why are some spiders coloured like flowers?
4. What changes in appearance do the leaf insects undergo?

VI. On the basis of the text give some examples of deception by imitation.

Text 20

I. Read the text and state what information it carries.

CHARACTERISTICS OF MAMMALS

Mammals are characterized by having hair. They have ruled the animal world thousands of years ago. This place they have maintained because they have the best developed brains of all animals. They are warm-blooded (the body temperature remaining the same in winter and in summer), breathe by means of lungs, give birth directly to young, and are provided with milk glands to suckle their young. A muscular wall (diaphragm) subdivides the body cavity into two parts. The anterior contains the four-chambered heart and the lungs; the posterior contains the stomach, intestines, liver, kidneys, and reproductive organs. At birth the young resemble the parents in having the same parts.

All the animals are able to live because they secure food which nourishes their bodies, exercise the function of respiration, excrete waste, are adapted to their environment, and reproduce their kind.

Most mammals have two pairs of limbs; the fore limbs may be variously modified for different uses, as for running on hard ground in animals like the horse, for tree-climbing and food-getting in the squirrel, for flying in the bats, and for swimming in the seals. In all fore limbs of mammals, even those as different as the leg of squirrel, the flipper of the whale and seal, and the wing of the bat, the arrangement of the bones is the same.

The hind legs of mammals do not show so much variation as the forelegs, but in some cases, as in the whale, the hind legs have almost disappeared through disuse and there is no external evidence of them.

The skeleton of mammals is built on a similar pattern in all cases. Even 'apparently marked differences are found, on examination, to be only modifications of similar parts. In the vertebral column there are several regions, such as neck, rib, back hip, and tail. It happens that the number of the separate vertebrae in the neck region is the same in the dog, horse, giraffe, be man, etc., but the neck region is not of the same length. This is very conspicuous in the giraffe, but when one examines this very long neck he will find only the regular seven neck vertebrae. Each of these vertebrae in the neck of the giraffe is very large, and this adaptation helps him in securing his food, which consists of the leaves of trees.

II. Remember the following words and word combinations, consult a dictionary about the way they are pronounced:

brain	мозг
breathe	дышать
give birth to	рождать
suckle	кормить грудью; вскармливать

cavity	полость
diaphragm	диафрагма
intestines	кишки; кишечник
liver	печень
kidney	почка
nourish	питать, кормить
waste	отходы
fore limbs	передние конечности
squirrel	белка
bat	летучая мышь
seal	сивуч; тюлень
flipper	плавник; ласт
whale	кит
arrangement	расположение, устройство
skeleton	скелет
vertebral column	позвоночный столб, спинной хребет
neck	шея
rib	ребро
back	спина
hip	бедро; поясница
vertebrae (pl. от vertebra)	позвонок
giraffe	жираф

III. Suggest the Russian for:

the body cavity; to be adapted to...; hind legs; similar pattern; to show much variation; by means of lungs; reproductive organs; to be provided with; apparently marked differences; external evidence.

IV. Suggest the English for:

теплокровные; передние конечности; область шеи; температура тела; молочные железы; расположение костей; состоять из...; животный мир; четырехкамерное сердце; одинаковой длины.

V. Make up a list of words which characterize mammals.

VI. Enumerate the parts of the body mentioned in the text.

VII. Explain the terms: warm-blooded; diaphragm.

VIII. On the basis of the text prove that the following statement is true:

The skeleton of mammals is built on a similar pattern in all cases.

IX. Make up a model of the text information and sum it up.

I. Read the text and say what information it carries.

DOING WITHOUT THINKING

A set of cells in the mouth is stimulated and starts impulses in the neighbouring nerve cells that keep going until they reach the brain stem. From there the impulses start back along another set of nerve cells to the cells of the stomach. As a result, the stomach secretes juices. These actions that we do without thinking are called reflexes.

Reflexes are caused by things outside the body as well as by things that happen inside.

Perhaps you have wondered how fish and frogs can get along with such small, undeveloped brains. Now you can begin to figure it out. You have seen how very useful are the reflexes which go on as a result of activity, not on the cerebrum, but of the nerve cells in the brain stem and spinal cord. For example, a shadow approaches a frog. And because of reflexes the frog's leg muscles react and it jumps into the pond - just as your finger and arm muscles react to the heat of a stove.

Still, you may say, reflexes can't be responsible for many of the things animals do. How do frogs have sense enough to find a winter home where they won't freeze to death? Aren't birds pretty smart to fly south in the fall? And what about ants that actually use other ants as "slaves" to do their work and other insects as "cows" to supply them with food?

All of these seem like very thoughtful things for creatures to do. But in reality they are done without thinking. They are what we call instinctive behaviour. The only real difference between a reflex and an instinct is this: a reflex is a simple response to a stimulus - a frog's muscle contracts when a shadow falls on its eye. An instinct, however, is a very complicated set of responses that involves the whole animal.

An instinct is a way of behaving that living creatures are born with. Instincts are not learned and can hardly be changed. If you know what the instinctive behaviour of the parents is like whether they are ants, or frogs, or fish - you know how their offspring will act.

II. Remember the following words and word combinations, consult a dictionary about the way they are pronounced:

stem	СТВОЛ
juice	СОК
to cause	ВЫЗЫВАТЬ
get along	ЖИТЬ
figure out	ПОНИМАТЬ

cerebrum	головной мозг
spinal cord	спинной мозг
shadow	тень
finger	палец
ant	муравей
cow	корова
thoughtful	зд. глубокомысленный
offspring	отпрыск

III. Suggest the Russian for:

to freeze to death; the brain stem; arm muscles; a way of behaving; a set of nerve cells; spinal cord; to be caused by ...; response to a stimulus; what about...; to supply with food.

IV. Suggest the English for:

неразвитый мозг; в действительности* из-за рефлексов ; нервные клетки; реагировать на тепло; так же как и...; понять что-либо; инстинктивное поведение; мышцы ноги; отвечать за что-либо.

V. Explain the following terms: a reflex; an instinct.

VI. Ask your friend to answer your questions on the text. Begin your questions with: I wonder..., I'm interested to know ... , I want to know ..., I'd like to know.

VII. Compress the text to no more than 6-10 sentences, make up a model of its information and sum it up.

Text 22

1. Read the text in 2 minutes without a dictionary. Entitle the text.

Instincts can be so complicated that they seem like intelligent human behaviour. Some insects, for example, live in colonies and are called social insects. The way they live and the things they do have made people say that they have kings, queens, workers, soldiers, farmers - that they even make war. These comparisons with the way human beings act are, of course, fascinating, but they are also misleading. The important thing about all insect behaviour is that it is completely instinctive. Insects behave as they do because they are responding automatically to stimuli. Sometimes the stimulus is chemical, sometimes it is the mechanical contact with an object. Bees do not collect pollen and make honey

because they know that winter is coming and they will need food. What they do is automatic and fixed. The difference between the bees that make honey and the bees called drones that do not work is not one in thought or laziness. The two groups simply have different body structures and respond accordingly.

II. Study the notes, consult a dictionary about the way the words are pronounced.

misleading	зд. неверный
stimuli (pl. от stimulus)	стимулы
bee	пчела
honey	мед
drone	трутень

III. Find the topical sentence of the text, make up a model of the text information and sum it up.

Text 23

I. Read the text and state what information it carries.

SYMBIOSIS

Associations are not confined to members of the same species, nor are all an expression of cooperative adaptations. All graduations occur from those which are mutually beneficial to the parties in the pact, to those in which one member secures all the advantage at the expense of the other.

The most intimate associations in which the organisms involved are mutually benefited, if not absolutely necessary for each other's existence, are termed symbiotic. A familiar case is the common green Hydra (*Chlorhydra viridissima*) that owes its colour to the presence of a large number of unicellular green plants which live in its endoderm cells. The products of the photosynthetic activity of the plant cells are at the disposal of the Hydra, and the latter, in return, affords a favourable abode and the material necessary for the life of the plants.

A far more striking example of symbiosis is afforded by Lichens which represent intimate combinations of various species of colourless plants (Fungi) and simple green plants (Algae). In each case the Fungus supplies attachment, protection, and the raw materials of food, while the Alga performs photosynthesis. Each can live independently under favourable conditions, but in partnership they are superior to hardships with which many other plants cannot cope, and thus some Lichens become the vanguard of vegetation in repopulating rocky, devastated areas.

From the practical standpoint of agriculture the symbiotic nitrogen-fixing Bacteria are of first Importance. It will be recalled that these Bacteria form small nodules on the rootlets of higher plants, such as Beans and Clover, and make atmospheric nitrogen available to the latter-return it to the cycle of the elements in living nature. Still another type of association in which both partners profit is represented by the relation that occurs between Ants and Plant Lice, or Aphides. The defenseless Aphides are protected, herded and milked by the Ants to supply their demand for honeydew, a secretion of the Aphids which the Ants greedily devour.

II. Remember the following words, consult a dictionary about the way they are pronounced:

symbiosis (pl. symbioses)	симбиоз
symbiotic	симбиозный
abode	жилище
lichen	лишайник
algae (sing, alga)	морская водоросль
rocky	скалистый, каменистый
devastate	опустошать, разорять
nodule	узелок
rootlet	корешок
bean	боб
clover	клевер
lice (pl. от louse)	вши
aphides (pl. от aphid)	тля
herd	пасти
to milk	доить
honeydew	медвяная роса
devour	пожирать

III. Suggest the Russian for:

the raw materials of food; to be at somebody's disposal; to make something available; to cope with ...; to supply the demand for ...; to be confined to ...; to owe something to...; intimate associations; to be of first importance; cooperative adaptations.

IV. Suggest the English for:

живая природа; бесцветные растения; тот же вид; одноклеточные растения; атмосферный азот; за счет другого; с точки зрения сельского хозяйства; взаимовыгодный.

V. Explain the words: symbiotic; algae; honeydew.

VI. On the basis of the text formulate what symbiosis is and illustrate your statement with some examples.

Text 24

I. Read the text and say what information it carries.

RESPIRATION

The essential factor of respiration is an interchange of gases between protoplasm and the environment: an intake of free oxygen for combustion, and an outgo of the waste products, chiefly carbon dioxide and water. In the unicellular organisms, such as *Protococcus* and *Amoeba*, and simple multicellular animals like *Hydra*, this appears to be a relatively simple process since an elaborate mechanism is not necessary to facilitate the interchange. But with the establishment of the highly differentiated multi-cellular body, fewer cells are in direct contact with the aerating medium and so various provisions are necessary to transfer the gases to and from the outer world and the individual cells themselves.

In all forms the akin functions to some extent; in the Earthworm, in fact it acts as the chief respiratory membrane since a profuse supply of blood vessels to the moist surface of the body effects a sufficiently rapid gaseous interchange for the relatively inactive life of the organism. The Crayfish meets the problem of respiration by the gills: a method of bathing a large area of the respiratory membrane in the respiratory medium, the surrounding water. Insects, however, instead of bringing the blood to the surface, develop a network of tubes, or tracheae, which ramify throughout the body tissues and conduct air directly to the cells.

Among the lower Vertebrates, as has been indicated, the anterior end of the digestive tract functions as common food and respiratory passage. In Fishes, the respiratory water current which enters the mouth makes its exit by way of the gill pouches and gill slits, the lining of the pouches functioning as the respiratory membrane.

II. Remember the following words, consult a dictionary about the way they are pronounced.

respiration
intake
combustion

дыхание
поглощение, потребление
окисление (органич. веществ)

outgo	выход; расход
waste products	отходы, продукты распада
aerate	проветривать, вентилировать
medium (pl. media, mediums)	среда; средство
profuse	обильный; чрезмерный
crayfish	рак (речной)
tracheae (pl. от trachea)	трахеи
ramify	разветвляться
pouch	сумка, мешочек
slit	щель
lining	выстилка; содержимое

III. Suggest the Russian for:

aerating medium; a network of tubes; highly differentiated multi-cellular body; to meet the problem; interchange of gases; gill slit; respiratory membrane; the lower vertebrates; rapid gaseous interchange; gill pouch.

IV. Suggest the English for:

кровеносные сосуды; относительно простой процесс; пищеварительный тракт; свободный кислород; до некоторой степени; внешний мир; двуокись углерода; прямой (непосредственный) контакт; фактор, составляющий сущность; одноклеточные организмы.

V. Supply extended answers to the following questions.

1. What is the essential factor of respiration?
2. In what way does the process of respiration go on in the unicellular organisms?
3. Why is the process of respiration more complicated in the multicellular bodies?
4. What is the function of the skin in the process of respiration?
5. What is characteristic for respiration in Insects?
6. What is the function of the gills in the process of respiration in Fishes?

VI. Speak on the ways of meeting the problem of respiration by different kinds of creatures.

Text 25

I. Read the text and say what information it carries.

CIRCULATION

In the Protozoa and many of the lowest Metazoa, the transport of materials to and from the various parts of the organism is obviously a simple problem compared to that presented by animals with deeply-hidden tissues, each and every cell of which must be served. Indeed a complex body is impossible without a complex circulatory system.

The crucial points of contact between the higher animal and its environment, in so far as the intake of matter and energy is concerned, are the membranes which line the digestive tract and the lungs. Through the former must pass all the materials which are to be assembled as internal parts of the organism and the fuel which is to supply the energy for the vital processes, while through the latter must pass the oxygen which is to realize this energy. Only when these membranes have been passed, are the materials really within the body and at its disposal for distribution by the circulatory system to the individual cells of the various organs which are to use them.

In addition to carrying the fuel and the oxygen the circulatory system must remove the waste products of metabolism from the cells and deliver them to the proper excretory organs, such as the lungs or kidneys to be passed to the outside world. The circulatory system is, therefore, the essential connecting link between the points of intake, utilization, and outgo of materials. The circulatory system is also a coordinating agent of crucial importance, because it distributes complex chemical substances, known as hormones, from their specific points of origin in the various endocrine glands to the particular tissue or organ where their regulatory influence is to be effected. So the circulatory system is a distributing system which not only maintains a suitable environment for the myriads of cells of the body, but also, in cooperation with the nervous system, unifies the organs into an organism.

II. Remember the following words, consult a dictionary about the way they are pronounced:

circulation	циркуляция
protozoa	протозоа
circulatory	циркулирующий
fuel	топливо, горючее
vital	жизненный
excretory	выводной, выделительный
hormone	гормон

endocrine	эндокринный
endocrine glands	железы внутренней секреции

III. Suggest the Russian for:

a. vital process; deeply-hidden tissues; a point of origin; compared to ...; essential connecting link; a complex circulatory system; crucial points; in addition to...; the intake of matter.

IV. Suggest the English for:

внешний мир; железы внутренней секреции; быть в чем-либо распоряжении; огромной важности; отдельные клетки; органы выделения; пищеварительный тракт; продукты распада (отходы).

V. Make up a list of words you consider indispensable for the understanding of the text.

VI. Make up a model of the text information, sum up what it has to say on the functions of the circulatory system.

Text 26

I. Read the text and entitle it.

Various stages in the development of a circulatory system can be traced in the Invertebrates. In some it consists merely of a single cavity or several connected cavities filled with a fluid containing various types of cells, while in others the cavities are replaced by definite tubes, or vessels, for the conduction of the fluid. With the establishment of closed vessels, the contractions of various organs and the movements of the body as a whole can no longer be entirely depended on for the movement of the fluid, and accordingly in certain regions, a muscular layer is developed in the walls of the vessels, which by rhythmic pulsation forces the fluid along. Thus, for example, in the Earthworm, there is fluid within the body cavity, which is forced about by the movements of the worm and bathes most of the internal organs; and there is also a system of vessels (vascular system), a part of which contracts rhythmically and distributes the blood to the individual cells.

In the Vertebrates circulation is effected by two systems, the blood vascular and the lymphatic systems. The blood vascular system consists of vessels which distribute the blood composed of a liquid plasma, in which float various formed elements, chiefly red and white cells. The lymphatic system comprises spaces,

channels and vessels in the lower Vertebrates, but in the Mammals, including Man, it is essentially a network of vessels so that in higher animals the so-called closed circulatory system gradually takes the ascendancy over the predominantly open circulatory system of lower forms. The lymphatics carry lymph which consists of a liquid plasma with white cells. Both systems are closely associated, but the lymphatic plays a relatively passive role.

II. Study the notes, consult a dictionary about the way the words are pronounced

trace	проследить
vessel	сосуд
vascular	сосудистый
float	плавать
channel	проток
network	сеть
ascendancy	доминирующее влияние

III. Find topical sentences in each paragraph of the text and make a model of the text informations.

IV. Read the text once more and sum up what it has to say on the following points:

1. Circulation in the Invertebrates.
2. Circulation in the Vertebrates.

II. READING AT HOME

1. Translate the Texts in Writing

Text 1

POLYPS ARE TINY ANIMALS

Like buds on a tree, polyps sprout on a tube coral. Polyps are tiny animals. They have soft bodies protected by hard skeletons shaped like cups. The corals have tentacles for trapping food. Young polyps anchor themselves to old ones. Each polyp splits into two polyps. Then each splits again. The colony grows. The skeletons of millions of dead polyps can form coral reefs and islands.

Notes:

polyp полип

tentacle щупальце

Text 2

WHY ARE MOTHS ATTRACTED TO A LIGHT

Scientists tell us that moths are not really attracted to the light itself. When moths fly at night, they use moon as a beacon to guide them. By always keeping the light of the moon falling on its eyes at the same angle, a moth is able to fly a straight path. Since the moon is far away, its light falls in much the same angle to the earth for whatever distance the moth might fly. But nearby lights confuse it. When it tries to navigate by a street light instead of the moon, the moth is forced to fly in ever smaller circles that eventually lead to the light itself.

Text 3

WHAT'S NEW IN BUG CONTROL

Go into the fields and collect several cups of insects that are damaging the crops. Put them in a blender and add water. Blend at high speed. Dilute the mixture with more water. Spray the thinned-out bug juice on your crops. It may kill some kinds of bugs that you've just blended.

Some farmers are finding out that this method is not as ridiculous as it may seem. For years they have used strong chemicals to kill or reduce the number of

insects that otherwise would have ruined their crops. Today they are experimenting successfully with bug juice.

This new way of killing invented by a farmer whose fields were crawling with crop-destroying bugs. He searched his fields for dead, dying or diseased bugs. He reasoned that the sick bugs were infected with germs. By means of the bug-juice spray, made from the diseased insects, the germs would attack the healthy insects. The bugs would no longer be able to damage the crops.

Experts aren't sure if this explains why the bug juice works. Other reasons might be that the smell of the bug juice drives away the harmful bugs or that the odor of the bug juice attracts the bugs' enemies. Whatever the reason, many farmers are grateful for this simple but effective method of insect control.

Notes:

blender	смеситель
thinned-out	разжиженный
germ	зародыш, эмбрион

Text 4

INSECTS ARE ON THE MARCH

Hordes of pesky bugs – biting people, ravaging crops and devouring homes – threaten much of the U.S. this year.

An insect invasion worse than any in recent years is arriving with warm, moist weather.

Already, swarms of biting bugs are pushing into many parts of the South – from mosquitoes and black flies breeding in swampy areas to fire ants building their mounds in farm fields.

In California, farmers are spraying to combat the Mexican fruit fly, while suburban gardeners are working to wipe out a surge of Japanese beetles.

From Florida to Hawaii, home-owners and builders are fighting a new king of pest, the Formosan termite, that consumes wood far more rapidly than domestic varieties and can hollow out the walls of buildings in three months.

Meanwhile, the gypsy moth - finally under control in Hew England - has moved into the hardwood forests of Pennsylvania, West Virginia and Ohio. In some localities, researchers say, there are several million of the leaf-eating caterpillars per acre.

Such outbreaks don't surprise many scientists, who say conditions are ripe for insect infestations. Reports Don Weidhaas, entomologist with the federal Agricultural Research Service In Florida: "Flooding has left a lot of water standing In pools. That plus the warmer temperatures means the bugs will be out In droves."

The gnawing appetites of insects have enormous economic effects. Some 15 to 20 percent of U.S. food and fiber crops - and 40 percent around the world - are consumed by Insect pests. Sales of farm pesticides total nearly 5 billion dollars a year, and household insecticides and repellents add an additional 2.3 billion.

Notes:

bug	клоп, жук
mosquito	москит; комар
fire ant	муравей Рихтера
Japanese beetle	хрущик японский, жучок японский
Formosan termite	термит, <i>soptotermes formasanus</i> (ЛАТ.)
gypsy moth	шелкопряд непарный
hardwood	твердая древесина (лиственных пород)

Text 5

GYPSY MOTHS

In parts of the Northeast, where this voracious insect has devastated 21 million acres of trees, the caterpillar has been thwarted by its own seven-year life cycle, spraying, disease and the introduction of natural parasites. However, the Mid-Atlantic states as well as Michigan, California and the Pacific Northwest have been hit with new infestations, threatening some of the country's most productive timberland.

Many U.S. experts wonder if insects are beginning to overwhelm mankind's age-old efforts to dominate them. Among the reasons; Hundreds of major insect species have grown resistant to some pesticides, and others have adapted well to climatic changes and changing agricultural practices.

To stem the tide, biotechnologists are using a variety of exotic methods for turning nature itself against the pests. Says Isao Kubo, a chemist at the University of California at Berkeley: "Most natural pesticides work by interfering with some specific process - the way insects reproduce, mature, find food and even taste food."

Text 6

MEET THE MOLLUSKS

Mollusks are soft-bodied animals that have no skeletons. Many mollusks, such as snails and clams, form shells that protect them. But some mollusks have no shells around their bodies. They have other ways of protecting themselves.

Stories and movies often show the octopus as a monster. This eight-armed sea animal has rows of suckers and two large eyes. It looks strange and frightening to many people. But the octopus is a timid animal. Instead of attacking, it usually tries to hide or escape from its enemies.

The octopus has many ways of avoiding danger. Because its body is soft, it sometimes escapes by squeezing into a small opening in the ocean floor. As the octopus crawls or swims, its body color changes to match the rocks or shells below it. If attacked, the octopus squirts an inky fluid into the sea. The fluid may confuse the attacker while the octopus swims away. The octopus swims fast by shooting water from its body.

The octopus is a mollusk called a cephalopod. Cephalopod comes from two Greek words. It means "head-foot", and describes the main body parts of a cephalopod. Another group of mollusks is called gastropods. Gastropod means "belly-foot", the main body parts of gastropod. Snails and slugs are gastropods.

A gastropod has a broad band of flesh called a foot. The animal uses its foot to push itself along the bottom.

Many gastropods live in a single shell. Others, have little or no shell. For protection, some of these gastropods squirt dye. Others have an unpleasant taste. Predators learn to avoid them.

Notes:

snail	улитка
clam	съедобный морской моллюск (разинька, венерка и пр.)
shell	панцирь, раковина
sucker	присосок
cephalopoda	головоногие
gastropods	брюхоногие моллюски
slug	слизень полевой

Text 7

DO YOU KNOW ...

... how the fish lives in a frozen pond? We know that ice is lighter than water, and therefore it floats. So what we call a frozen pond is a pond the structure of which is frozen. Skaters understand it quite well. They always want to know how thick the ice on the pond is, because they know that there is water under it.

When we speak about fish living in a frozen pond, we mean fish living in water which has a layer of frozen water above it. The most serious problem for the fish is not the coldness of the water in which it lives, but how that water can

get enough air for the fish. When a pond is not frozen, oxygen from the air is passing into the surface of the water as soon as it is used by the fish in the pond.

When a pond is frozen, this process is almost stopped. Of course the water can get a little oxygen at the edge of the ice, or through airholes.

But the best hope for the fish is new water which comes into the pond below the ice from different springs or streams and which brings enough oxygen for the fish in the pond.

And you may be sure that if the water in the pond does not get enough oxygen for the fish, the fish dies.

Notes:

spring родник, ключ

Text 8

KISSING GOURAMI

This fish has been publicized both as "kisser" and as an industrious eater of all kinds of algae. The latter claim is much exaggerated. The purpose of the kissing is not known. Some aquarists say these fishes annoy others by sucking at their sides. The larger ones do persecute the smaller of their own kind. Only one or two in a "community" tank seems best.

Breeding begins at 5-inch size. They embrace like other Gouramies, build no nest and have from 400 to 2,000 floating amber eggs, pinhead size. The young hatch upside-down in a day. The parent may eat eggs, but completely ignore the young. Babies need Infusoria for a week, followed by newly-hatched brine shrimp or sifted live Daphnia. In two weeks, fine floating food, thereafter they are surface feeders. Adults like powdered oatmeal with ground dried shrimp; also crumpled dried spinach. They have few diseases, but weaken if kept cool or not fed several times daily. Prefer a temperature of 75-82° F. There are two color strains: silvery green and a pinkish, iridescent White. It is the latter strain that does most of the breeding. There are no external differences in the sexes.

Notes:

gourami гурами
pinhead булавочная головка
infusoria инфузории
brine морская вода
shrimp креветка
daphnia дафния
outmeal овсяная мука
spinach шпинат

Text 9

TORTOISES

Tortoises eat greenstuff, tomatoes and sliced fruit. Favourite food lettuce. Give it fresh water every day. Let it roam free in the garden, sinking a shallow dish in the ground so it can bathe in warm weather.

You can keep your tortoise in a wooden pen in the garden and you can move the pen when the tortoise eats all the grass in one place, but remember that tortoises can climb up high wire fences and escape. Some animals, like the tortoises, hibernate (go to sleep) throughout the winter months. In October the tortoise usually becomes very sleepy. Put him in a box on a bed of leaves or hay and cover him with the same thing. Cover the hay with wire or a wooden lid with holes to stop rats climbing in.

Place the box in a shed and leave it there until March. In the spring the tortoise will begin to wake up slowly.

Notes:

tortoise	черепаха
tomatoe	помидор
lettuce	салат, латук
pen	небольшой загон

Text 10

LEATHERBACK TURTLES

Leatherback turtles ere huge. They are the biggest turtles in the world and often grow to eight feet in length longer than a bed. Some weigh over 2,800 pounds - more than a large horse.

Leatherback turtles spend their lives in the ocean Their front legs have developed into flippers, and with these they propel themselves through the water. Often their flippers have a spread of ten feet.

Leatherback turtles live in the warm seawater of the tropics and semitropics all around the world. Occasionally they are found on the coasts of our country, but only because they have been caught in a storm. These sea turtles are amazing, because they travel thousands of miles going from one small island to another. No one knows how they find their way.

Notes:

leatherback turtle	кожистая черепаха
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2. Sum up the Information of the Texts in Writing

Text 11

FOSSIL 'AQUARIUM' PREHISTORIC ANIMALS

Excavating layers of limestone on the shore of the White Sea, 100 kilometres north of Archangel, Soviet scientists have found what they describe as a unique "aquarium" of an underwater world six hundred million years old. There are plates of rock made tip of numerous imprints and stone caste of ancient multicell animals such as jellyfish, polyps, flat worms and other organisms from fifty centimetres down to several millimetres. Many of them were hitherto unknown to paleontologists.

This is the largest find of animal fossils from the pre-Cambrian era in the Earth's geological history in the Northern Hemisphere. At that time, the invertebrate ancestors of present-day animals were to be found only in the seas, as they did not dare to explore the land.

The size and variety of species of the natural paleontological preserve in the White Sea are comparable to the famous surface rocks from the same era found in southern Australia, which are regarded as a model. A comparative analysis of the Australian and White Sea prehistoric fauna has established complete identity between more than a dozen organisms found in geographical spots remote from one another. The experts see this as evidence that the biological evolution was similar in opposite parts of the globe, that quite possibly there was an open sea between them, and that there were more uniform climatic conditions throughout the planet.

Notes:

fossil	окаменелость, ископаемое
jellyfish	медуза
ancestor	предок
fauna	фауна

Text 12

DEATH OF THE DINOSAUR

Dinosaurs have been extinct for about 65 million years. Interest in dinosaurs, though never seems to die. People are constantly coming up with new explanations of what happened to make dinosaurs and other reptiles suddenly disappear from the world. Two of the latest theories, published in the magazine

New Scientist, show that scientists have a sense of humour. The ideas are rather amusing but they may just be true, too!

The first idea is based on the fact that modern reptiles are cold-blooded. This means that the temperature of their bodies changes according to the temperature of the surroundings. (Birds and mammals, on the other hand, are warm-blooded so their body temperature stays reasonably constant even when it's cold outside). Dinosaurs were giant reptiles, so they may have been cold-blooded too. If they were, they would have found it difficult to wake up on cold mornings.

At about the time the dinosaurs died out, the climate was getting colder. So the dinosaurs were probably slow and sleepy in the mornings before "they warmed up. By contrast, the primitive mammals that lived then would have been bright and active because their bodies were always warm. The mammals would soon have discovered that the dopey dinosaurs were leaving a valuable source of food unguarded - dinosaur eggs. So the dinosaurs who had dominated the earth for so long may have died out because their eggs were eaten by the newly-evolved mammals.

The second suggestion is based on another observation of present-day reptiles. The sex of some turtles and crocodiles depends on the temperature of the egg during incubation. The sex of the offspring of a dinosaur may have been decided in the same way. It's easy to imagine the effect of a change of climate. If the temperature dropped so it was cold all the year round, instead of just in winter, all the dinosaurs born would have been the same sex. As the older dinosaurs died, there would only be one sex of dinosaurs left. This would mean no further breeding, and eventually no more dinosaurs.

There is no firm evidence for either of these explanations for the end of the dinosaur, but they are both worth thinking about .

Notes:

dinosaur динозавр

extinct вымерший

Text 13

WHERE HAVE ALL THE DINOS GONE?

Of all the mysteries of the dinosaurs, none has generated more speculation than why the beasts vanished some 65 million years ago. Increasingly, the evidence points to an explanation that's literally out of this world. A giant meteor or comet that crashed into the earth, blasting huge clouds of debris aloft. With sunlight choked off for months, plant life would have dwindled, robbing

the dinosaurs of their chief food supply. Small omnivorous mammals could have gotten by with scavenging.

The impact theory was suggested seven years ago by physicist Luis Alvarez of Lawrence Berkeley Laboratory, who found high concentrations of the element iridium in clay throughout the world, deposited just when the dinosaurs vanished. Iridium is rare on earth but is richly concentrated in comets and meteors. That suggested an impact occurred, and that its force was enough to eject a dust cloud that settled over the globe.

New researchers at the U.S. Geological Survey in Denver have bolstered Alvarez's theory. Bruce Bohor and coworkers examined the crystal structure of quartz particles from the similar clay deposits at seven sites. In every instance, the quartz showed signs of being struck by an enormous shock wave. The only other places such shocked quartz is found are known meteor-impact craters and underground nuclear-test sites.

Volcanic eruptions also give off high concentrations of iridium, and had been suggested as an alternative explanation for Alvarez's discoveries. But volcanoes pack too little punch to shock quartz grains. A meteor 6 miles across, on the other hand, striking the earth at 45,000 miles per hour, would release as much energy as several billion atomic bombs. The resulting prehistoric nuclear winter could have sent the dinosaur to oblivion.

Notes:

literally	буквально
omnivorous	вседневный
eruption	извержение

Text 14

GATORS AND CROCS

Crocodylians have few enemies. True and false.

Baby alligators and crocodiles have many enemies. They are eaten by raccoons, otters, wading birds, big fish, snakes and turtles; also by many other kinds of larger animals, including bigger alligators and crocodiles.

If they live long enough to grow up, they have no enemies except people. But with such an enemy they really don't need any others. People have destroyed many of the animals' homes, filling them in with soil or garbage and building houses there. Great numbers of baby alligators have been captured and sold as pets. Millions of larger ones have been killed for their thick, leathery skins, which have been made into shoes, handbags, luggage and belts.

The number of alligators and crocodiles alive today is very small compared to the number just 100 years ago. Crocodylians "talk" to each other. True.

Most reptiles are strangely silent, but not so with crocs and gators. When hatching they crip and yap until freed from the covered nest. As they grow, they make many sounds, from soft hisses to mighty bellows. The roar of a big alligator is one of the loudest sounds in all of the animal kingdom. It sounds like thunder, a foghorn or even a train rumbling by. It is so powerful that it may shake the ground!

Notes

gators = alligator	аллигатор
croc = crocodile	крокодил
crocodilian	крокодиловый
reaccon	енот
otter	выдра
wading bird	болотная птица
snake	змея

Text 15

LIZARDS OF KOMODO

On the small island of Komodo in Indonesia live some most remarkable animals - the Komodo monitors. They the world's largest lizards. They weigh as much as an American black bear - up to 365 pounds and some of them are over ten feet long. Most American lizards are so small that you can hold one in your hand.

These giant lizards are often called Komodo dragons. It is odd that animals looking so much like fairy-tale monsters really exist. But they do, and they are almost as fierce as real dragons would be. They are dangerous hunters, that attack and eat deer and even such tough animals as water buffaloes. Water buffaloes can take on tigers, but a Komodo Monitor can easily bring down a water buffalo and eat it. People on the islands, have to watch out for these lizards

Komodo monitors are only found on the island of Komodo and a few smaller islands near it. No one in Europe knew of these lizards until 1912, although the Dutch had been in the region since the sixteenth century. It is surprising that such an animal could have escaped the attention of explorers and naturalists for so long. When it was found, it caused a sensation among scientists.

Notes:

monitor	варан
bear	медведь

dragon	дракон
deer	олень; лань
buffalo	буйвол

Text 16

WHO'S WHO AMONG THE CHICKADEES

All winter long, black-capped chickadees are among the most common visitors at bird feeders over much of the northern part of North America. But when spring arrives, these familiar little birds usually disappear from the feeders, almost as though they have left the area.

Actually, these chickadees are year-round residents over most of their range. The birds don't leave their winter neighborhoods, but abandon the feeders as they switch diets to their more natural fare of caterpillars and other insect food. At the same time, they adopt a different social organization. They are preparing for the breeding of the next generation, the crucial act of survival for all species. In the spring the successful ones will be frantically feeding clutches of five to nine nestlings - extending the black-capped chickadee life-line into uncertain future.

In the spring and summer, chickadees live in monogamous breeding pairs. Each pair of successful breeders stakes out and defends a territory against all other black-capped chickadee. Territories, up to one-fourth of a square mile, must contain an adequate supply of natural food as caterpillars, for both adults and nestlings. They must also have at least one suitable nest site, typically a rotten tree stump where chickadees can dig out a hole for their nest. The entrance is usually on the side of the stump, although it is not uncommon for it to be on the top. Both sexes share in the excavation duties; often several potential sites are dug out before the final selection is made. Only the female builds the nest, although her mate often accompanies her closely while she works. When the clutch is completed, the female incubates, while the male defends the territory and brings food for his mate on the nest. When the young hatch, both parents bring food for their nestlings. After leaving the nest, young chickadees generally remain dependent on their parents for up to four weeks before dispersing, often moving several miles away before settling down on their own.

At the end of the summer, a major social shift occurs. The older birds, undergoing post-breeding molt, no longer defend their breeding territories but gradually come together with several of the newly fledged young chickadees to form flocks. These flocks will occupy and defend a flock territory (usually two to three times the size of a breeding territory) against neighboring chickadee flocks. They persist through the winter until the birds break up into breeding pairs the following spring.

Notes:

chickadee	американская черноголовая синица
caterpillar	гусеница
nestling	птенец
clutch	кладка яиц

Text 17

CAN DUCKS SWIM WITHOUT BEING TAUGHT?

Like all young waterfowl, ducks don't have to be taught how to swim. A baby duck knows how to swim as soon as it hatches from the egg. The mother duck leads the ducklings to the water as soon as they can travel. It will take a duckling six or more weeks before learning to fly. During their first few months, the young ducklings live on water insects, grasses and other kinds of plant life. Ducks and most other water birds have a Special way to keep dry. They use their bills to spread waterproofing oil over their feathers. The oil comes from a gland near their tails.

Notes:

duck	утка
waterfow	водяная

Text 18

HOW DO CHICKENS CHEW THEIR FOOD?

Chickens, like all other birds, have an unusual way of chewing their food. The work of chewing is done by the gizzard, the part of the bird's stomach where the food is ground up. Since birds have no teeth, they must swallow their food whole. After food is swallowed, it passes into a space called a "crop" in the chicken's gullet, or throat. There the food is stored and softened. The food then passes into the gizzard, where it is crushed by the grinding action of the tough gizzard lining, often with the aid of gravel and grit that the chicken has swallowed.

Notes:

chicken	цыпленок; (амер.) курица
chew	жевать
gizzard	второй желудок (у птиц)
crop	зоб (у птиц)
gullet	пищевод; глотка

Text 19

THE DODO

If it seems strange to you that a whole type of animal life can become extinct, remember what happened 300 years ago to the dodo.

These kindly, gentle, flightless birds became extinct simply because they were so friendly and trusting. They lived only on the island of Mauritius, in the Indian Ocean, and when sailors landed on the island, the dodos flocked around them.

But the sailors were looking for food after their long voyages, and it wasn't long before they found that the dodos were good to eat, so the friendly birds soon ended up in the cooking pot.

So the dodo vanished, leaving behind it the saying: «As dead as the dodo»!

Notes:

dodo дронг

Text 20

HELP FOR THE DOLPHINS

People love dolphins. But they love tuna fish, too, and that's been causing some problems. Yellow fin tuna, the kind most people eat, have a habit of swimming beneath schools of certain kinds of dolphins. The tuna fishermen know this, so to find the tuna they simply look for schools of dolphins. When they see a school, they set out their nets to catch the tuna. But they end up catching some of the dolphins too. Since dolphins are mammals, they need to breathe air. And since the dolphins are held under water when caught in the nets, they drown. Over the past few years, many thousands of dolphins have been killed in this way.

But there is some good news, thanks to people working to help the dolphins. A law now says that only a certain number of dolphins may be killed. So most of the fishermen are being more careful. They try their best to chase the dolphins out of the nets before they pull them tight around the tuna. They also are trying new nets which allow the dolphins to escape more easily.

Someone now has an even better idea: make decoy dolphins out of fiberglass to fool the tuna. Tuna fishermen would pull the fake dolphins behind their boats to attract the tuna. They would then net the tuna, and no dolphins would be killed: What a great trick! I hope it works, and I know you do too.

Notes:

tuna тунец
yellow fin tuna желтоперый тунец

to try one's best	употреблять все усилия
decoy	приманка
fake	подделка

Text 21

JACKRABBIT

A jackrabbit is a hare, not rabbit, and we'd better explain the difference before going any further. A hare is born fully furred, with its eyes open, and can hop around a few minutes after birth. A rabbit is born furless, blind and is helpless for a time after birth. The Jackrabbit got its name because its big ears resemble those of the jackass, or burro, with which it shares the plains of the West. It is big - up to 15 pounds and 30 inches long from nose to stubby tail and speedy - up to 35 mile* an hour *t* it is being chased by a hungry coyote. A rumor has it that he is equally as good as the bunny in hiding Easter eggs.

Notes:

jackrabbit	крупный североамериканский заяц
hare	заяц
rabbit	кролик
jackass	осел
burro	(разг.) ослик
coyote	луговой волк, койот
bunny	ласковое название кролика

Text 22

A HOPPING WILD ANIMAL

Do you know the name of a soft, brownish or grayish, furry animal with long ears and a short, fluffy tail that lives in fields, prairies, marshes, and swamps? It is one of the few animals that traverses the land by hopping instead of walking or running. In fact, this creature, when chased by a foe, can hop as fast as eighteen miles an hour! You've probably guessed it. It's a wild rabbit.

Since rabbits and hares look very much alike, people often mistake them. Some hares and rabbits have even been categorized incorrectly. For example, the Belgian hare is a rabbit, and the jack rabbit is a hare. Most rabbits are smaller and have shorter ears than hares. The easiest time to tell the two animals apart is at birth. A nascent rabbit is blind, has no fur, and can't move about. A newborn hare can see. It has a thin coat of fur, said it can hop a few hours after

birth. Also, the bones in a rabbit's skull are of a different size and shape from those in a hare's cranium.

Most rabbits rest and sleep during the day, and eat and play at night. A rabbit is called a herbivorous animal because of the leafy green food he eats. In the spring and summer months, he eats flora, such as clover, grass, and weeds. During the winter, he nibbles twigs, bark, and the fruit of trees and bushes. Many rabbits have made a farmer angry by ravaging his beans, lettuce, peas, or other vegetables. By gnawing the bark and eating the sprouts, rabbits have damaged fruit trees and berry bushes.

Notes:

wild	дикий
Belgian	бельгийский
nascent	рождающийся
skull	череп
cranium	череп
herbivorous	травоядный

Text 23

THE HISTORY OF THE DOG

Scientists think that dogs, wolves and bears must have evolved from a small animal called a Miachis which lived 40 million years ago. And for at least 10,000 years, man and dog have been living together, sharing food, shelter, work and play. There are very many different breeds (kinds) of dogs because men have wanted dogs for many different purposes - hunting (killing small animals; fetching dead birds for the hunter) f "working (with sheep or cattle; with police; pulling sleighs in the snow) and as small ornamental pets. Different breeds of dogs have got to have personalities which suit their work. Dogs, like wolves, used to live and travel in packs with other dogs. To a pet dog, the family is its pack and one person is the leader of the pack or family.

Notes:

wolves (pl. от wolf)	волки
sheep	овца, баран
cattle	крупный рогатый скот
pack	стая (волков и т.п.); свора

3. Choose any Text you Like, Translate it or Sum up the Information of it

Text 24

IT'S INTERESTING TO KNOW

Man has developed mechanical contraptions to help him travel quickly, but Nature has equipped some of her creatures with built-in speed. Some land animals can travel as fast as most cars do. A jack rabbit can build up a speed of about forty-five miles an hour when a hound is close behind it. A good race horse can make that same speed. The white-tailed deer can do almost fifty miles an hour when it needs to, and a long-legged ostrich can tiptoe over the ground at nearly a mile a minute. Some water animals aren't slow either. Many of the large fishes in the ocean can keep up with the fastest ocean liners man has made. There is one fish, the wahoo, that can scoot along at seventy miles an hour. The really speedy animals, though, are the animals of the air. Many birds can fly along at fifty and sixty miles an hour; a few can make eighty. A fast bird may even reach a speed of a hundred miles an hour in a power dive, about the speed of some airplanes.

Notes:

hound	гончая
ostrich	страус
wahoo	акантоцибиум

Text 25

ANIMAL THAT FACES EXTINCTION

An animal that faces extinction is vicuna, a gentle, llama-like creature which lives in the Andes mountain* of South America. Years ago, when vicunas were numerous, the Indians hunted them for their wool.

Nowadays that wool fetches a very high price and, although the hunting of vicunas has been prohibited in Peru, poachers who kill them and smuggle their wool abroad have so depleted their numbers that there are said to be only 10.000 of the animals left in Peru.

So, unless something is done quickly, they will be wiped out!

Notes:

vicuna	вигонь, викунья
llama	лама

Text 26

ANIMALS OF AUSTRALIA

Australia, the island continent, has many unusual animals. The animals are not found anywhere else in the world in their natural habitat. However, some of them are special exhibit! in zoos outside of Australia.

The best known of these animals is kangaroo. There are many kinds of kangaroos. The smallest one, a wallaby, is only as big as a rabbit. The largest kangaroo is over seven feet tall. Kangaroos carry their babies in pouches until the babies are old enough to maneuver by themselves. They have strong hind legs and powerful tails which help them leap along the ground with great celerity, sometimes as fast as twenty-five miles an hour.

The koala is sometimes called a teddy bear, but it is not really a bear. Koalas resemble kangaroos, because they carry their babies in a pouch. Later the progenies ride on their mothers' backs. These animals like to hang upside down in trees. Koalas eat mostly leaves and roots. They never drink water!

The platypus is the most exceptional of all Australian animals. It has a bill like a duck's and fur like a beaver's. Even though the platypus is a mammal, it lays eggs like a bird!

The dingo is the wild dog of Australia. Dingoes are mediumsized and range in color from yellowish-white to black. Dingoes don't bark very often; they howl instead. These dogs hunt alone or in groups. They eat small kangaroos and sheep.

Notes:

kangaroo	кенгуру
wallaby	кенгуру (малый),
koala	коала, сумчатый медведь
teddy bear	медвежонок (игрушка)
progeny	потомство; потомок
platypus	утконос
bill	клюв
beaver	бобр
bark	лаять
howl	выть

Text 27

RED FOX IN KANSAS

The natural history of the red fox, *Vulpes vulpes*, was studied in eastern Kansas.

Observations in the field indicated that the red fox uses a den only in severe winter weather and in the reproductive season. It was noted that the selection of

denning sites was influenced by type of soil, presence of cleared areas, and availability of water. A secluded island in the Kansas River was a favoured breeding area. In the years when it was easily accessible; four or five dens were used at the same time within its 53 acres. In North Lawrence one den was only 100 yards from an occupied house at the edge of the residential district. In the course of study no definite evidence was found to indicate the use of a single den by more than one family of foxes at the same time.

Examination of the reproductive tracts of males disclosed that they were capable of breeding as early as late November. Most matings, probably occur in January, and litters are born in March and April, after a gestation period of 53 days. The average size of eight litters reported from Kansas was 4.5 pups. Young foxes grew rapidly during their first few months and attained nearly adult size by the time they were five to six months old. Tracking provided information as to the hunting habits of 3 species. The red fox forages individually in the late summer-autumn, but hunts in pairs and family groups in winter spring. While foraging in pairs, foxes used various maneuvers capturing prey that could not have been employed by individuals.

Notes:

den	берлога, логовище; пещера
mating	спаривание
litter	выводок, помет, приплод
gestation	беременность
forage	разыскивать пищу

Text 28

BANK OF EMBRYOS OF AGRICULTURAL ANIMALS

The Microbiology Institute of the Latvian USSR Academy of Sciences has started a bank of embryos. This will make it possible to reproduce in 20-30 years any of the record milk cows of the Latvian brown breed in its direct progeny.

The embryos of pedigree cattle will be kept in laboratory test tubes for some years at a temperature of 196° C below zero. When the need arises they will be thawed out and implanted in the productive cows, selected to carry "others" calves. A record milk-giving cow only gives birth to 3-4 calves, but if the ova from it are used, this number can be increased 10-fold in time. It is also planned to regulate the calves' sex which is important for the rational formation of a herd.

Scientists intend to make the bank eventually the depository of the genetic fund not only of the elite agricultural animals but also of wild animals which belong to rare or vanishing species.

Notes:

pedigree родословная, генеалогия

calves телята

ovule клетка яйца

Text 29

PRZHEVALSKI'S HORSE RETURNS

Wild horses are to return to their native steppes, according to an international project initiated by Soviet experts in the Askania-Nova reserve.

Unfortunately, the fate of this animal is rather typical. Discovered in 1879 in Central Asia by the famous Russian traveller Nikolai Przhevalski, it soon became a rare breed. It has seen last in nature in the middle of the 20th century. Since then these remarkable steppe horses: have only been seen in zoos.

The Institute Askania-Nova situated in the biospheric reserve of the same name in south Ukraine has become well known by its work of many years on breeding and studying Przhevalski's horses. The first samples were brought there late in the 19th century and in the 1950s the reserve became the owner of the last species caught in wildlife and presented by Mongolian scientists. This mare named Orlitsa-3 has been acknowledged as world model of the species. She became the progenitor of the herd multiplying in the steppe of the Askania reserve.

Today there are about 600 such horses in the zoos of our planet. One hundred of them were born in Askania-Nova. This reserve has accumulated the richest knowledge about the life, behaviour and habits of these animals; their ration and "family" relations. Scientists of Askania-Nova cooperate with their colleagues from many countries, exchange horses with zoos in other countries. The Askania herd has been selected for the programme of returning Przhevalski's horse to its native land not only because it is the most numerous. It is just as important that unlike other members of this breed kept in zoos Askania horses never knew what captivity is. Inhabiting the vast and enclosed area of the maiden steppe they have retained the natural instincts, developed in the millennia of evolution and needed for life outside captivity.

This is no small thing. Let's take the ability of the leader to guide his family of mares and growing foals. A great deal depends on it whether the herd will survive in severe natural conditions. One must see with what skill Parad grandson of Orlitsa-3 guides his team and saves them from any danger. Experts had an opportunity to compare his "work" with the behaviour of stallions grown in zoos, received in exchange from the USA. They did not and could not have such habits, their herds, as scientists put it, were like an ordinary village herd

scattered on the meadow. There fore, it is easy to foresee their fate when they meet a pack of wolves or other beasts of prey.

"We propose that all the horses which the BOOS of some countries intend to grant for this project should be brought together in Askania-Nova, " says deputy-director of the institute Pyotr Golovanev. "Here herds will be formed and the 'novices' will acquire, as a result of contacts with horses from Askania-Nova, the habits of life in a herd. Perhaps, it would be better to wait till the first offspring: families with foals, according to - our observations, are more stable.- After that they will be sent to the Gobi reserve of the Mongolian People's Republic. The next responsible stage - adaptation to life in natural conditions will also be monitored by scientists. When their population reaches several hundred the task may be considered complete: after that the laws of nature will take over".

Notes:

mare	кобыла
millennia (pl. от millennium)	тысячелетие
foal	жеребенок
stallion	жеребец
beast	зверь, животное

Text 30

MAN AND GIANT SEAL MEET ON CALIFORNIA'S WINTER BEACHES

Pescadero, California. Every winter since the late 1960s, northern elephant seals measuring up to 16 feet (five me tree) long have been "hauling out" onto a small beach near Pescadero to give birth, fight and mate.

Tens of thousands of people gather on the rugged shore-line to watch. The demand to witness one of nature's greatest shows is so great that tickets for it are sold weeks in advance through a nationwide reservations agency.

You hear them long before you see them. Deep, throaty roars issue from the males as they fight for territory and gather their harems. Only the biggest and most aggressive bulls get to mate.

As you pick your way among the sand dunes, the first seal comes into view. The huge male bellows in your path. Then you spot another and another, looking like enormous slugs asleep on the sand.

More than 1,000 of them crowd the beach, about 50 miles (80 km) south of San Francisco and a 30-minute walk from Highway 1, California's coastal road. The area, Ano Nuevo state reserve, is off-limits to the public except for guided tours.

Ano Nuevo has the only sizeable colony of the warm-blooded mammals on the mainland. The rest breed on offshore islands.

The bulls, weighing up to three tonnes, fight as they jockey for space on the sand and try to protect harems that can number hundreds of females.

Don Hillier, a volunteer guide, said visitors often set out hoping to get close enough to touch the seals.

"They want to see them fight, but when it starts, they change their minds. The fights are really very vicious and ferocious", he said. The combatants are rarely killed, however.

The northern elephant seal, once hunted for blubber, was thought to be extinct in the late 19th century, but a tiny colony of about 100 was discovered on an island off the coast of Mexico in 1892.

They have made a spectacular comeback, doubling their population every five years in the past two decades and they now breed in increasing numbers on the mainland.

The world northern elephant seal population has grown to an estimated 70,000 and some scientists think there may be 100,000. (Southern elephant seals, larger and more numerous, are found from Australia to South America and Africa).

More than 200 pups were born at Ano Nuevo in the first four weeks of this breeding season.

Hillier related how once he had a whole tour group in front of one harem of female seals. "All of a sudden a woman asked me, what is that one doing?"

"I turned around and the female seal was giving birth right in front of us. Soon afterwards the seagulls started swooping down to get the afterbirth"

Scientists have been making some startling discoveries about the animals.

Don Costa, a marine biologist at the University of California at Santa Cruz, said scientists only recently confirmed that the seals routinely dive to a depth of 2,300 feet (760 metres) to feed. Depth recorders strapped to the backs of females show they dive up to 2,700 feet (900 metres).

Researchers have found that during active periods, such as the breeding season, the seals fast. The adult males can lose up to a third, and females up to 45 per cent, of their mass.

In the warm-weather months, the seals migrate north as far as the Gulf of Alaska. They return in mid-December to the islands off Mexico and California, and now Ano Nuevo, to breed.

Signs posted along the highway warn: "Beware of elephant seals" Not bad advice since the bulls can be larger than the family car.

Notes

elephant seal	морской слон
bull	бык, буйвол
blubber	ворвань

seagull	чайка
afterbirth	послед, детское место
migrate	мигрировать, совершать перелет

Text 31

DO ANIMALS COMMUNICATE?

It was a warm, sunny day in the spring. A large brown hen had brought her chicks outdoors. She was scratching in the dirt in the barnyard. The chicks were imitating her. Suddenly, the hen made a clucking noise. When the chicks heard her, they ran to her. It was a cool fall day. A young male bear was looking for a good place to live. He saw a cave and he went to look at it. But when he got near the cave, he saw a tree with deep scratches on it. The scratches were high above his head. The bear decided to look for another cave.

Several female deer were grazing in field with their fame. On of the deer raised her head and looked toward the road. A large dog and a man with a gun were walking into the field. None of the other deer had seen the man and the doe. But when the deer who had seen them put her tail up, all of the deer and their fawns ran into the forest.

What happened? Why did the little chicks run to their mother? Why did the bear decide to move on? Why did all the deer run into the forest?

When the hen made the clucking noise, she was telling her chicks that she had found food for them.

When the bear saw the scratches high on the tree, he knew that they had been made by a bear that was much bigger than he. He knew that he was in another bear's territory.

When the one deer showed the other deer the white hair that grew under her tail, she was warning them of danger. Although they hadn't seen the hunter and the dog, they recognized the signal.

We read that communication is giving or exchanging news or information. Although these animals couldn't read or write or speak a human language, they were communicating. Scientists have found that almost every species of animal has a communication system.

Animals exchange information about food, about territory, about danger and safety. They express fear, hunger, anger, pleasure, and recognition.

Animal messages are not always expressed in sounds. The scratches on the tree were made by a large bear who was saying, "I'm a very large bear, and this is my territory!" Some animals mark their territory in different ways. Rabbits have scent glands under their china. When they rub these glands on stones and twigs, the smell that remains tells other animals that the territory is occupied by a rabbit.

Another animal that defends itself or its territory with a smell is a skunk. It gives a warning signal by stamping its feet. Then it turns around, lifts its tail, and sprays a terrible-smelling substance.

Some animals communicate by touching. Lions, tigers, and other members of the cat family show friendliness by rubbing their heads or necks together.

Color is sometimes very important in animal communication. Some kinds of fish change color when they are angry or frightened. A peacock displays the beautifully colored feathers in his tail when he «ante to attract a f mini».

The next time you are walking in a forest or a field, look and listen for animal signals. But if you see scratches in a tree high above your head, find another place to walk!

Notes:

hen	курица
chick	цыпленок
fall	(амер.)осень
fawn	молодой олень
chin	подбородок
skunk	скунс
peacock	павлин
feather	перо

Text 32

GRAMMES OF ANTIHORMONES INSTEAD OF TONNES OF PESTICIDES

Some five or ten grammes of the substance developed at the laboratory headed by Corresponding Member of the USSR Academy of Sciences Igor Torgov are enough to rid one hectare of farmland of agricultural pests.

Toxic chemicals, or pesticides, widely applied today for pest control, kill crop-eaters and help considerably increase yields and lower their costs* However, at the same time, pesticides harmfully tell on the ecological balance.

Along with the pests, their enemies are devastated as well, and as a result, the former restore their population and continue to multiply uncontrollably.

Bees and bumblebees avoid flowers which have changed their fragrance under the influence of the pesticides. Thus plants stop being normally pollinated, and this has a harmful effect on agriculture.

In a word, pesticides should be used only in extreme cases and only in locations where the pest population surpasses certain limits and is hazardous to the crops.

Very simple traps help determine these localities. Three or four traps are placed in a one-hectare area and are checked weekly. Pests are attracted into the

traps with the help of pheromones, which are biologically active substances serving as a means of communication in the animal kingdom. Pheromones warn animals of the possible danger, help them find one another or gather in a certain place.

At Igor Torgov's laboratory attached to the M.M. Shemyakin Institute of Bio-organic Chemistry, chemically synthesized were pheromones to be used against various agricultural pests, including butterflies, the grain moth, granary weevil and also different bark beetles especially harmful to forestry.

Pheromones help both to detect and locate pest populations and to get rid of them. For example, various beetles are a real menace to felled timber. Special traps with pheromones help completely rid logging areas of these pests.

It must be mentioned that plants themselves are not defenceless against their enemies. Some plants develop hormones that can affect mammals, others can synthesize insect antihormones, that is substances depressing their hormones activity. Some southern plants can develop antijuvenile hormones. After taking even a tiny dose of the substance together with food, the insect stops developing and lapses in lethargy.

Scientists not only managed to synthesize antijuvenile hormones, but also made them 10 or 15 times more effective by slightly changing their chemical structure... Antihormones proved to be quite effective against the Colorado potato beetle, various stink-bugs and the engraver beetle.

Unlike toxic chemicals, hormone preparations do not produce immediate effect on insects. It may take some two or three weeks to extinguish a pest population, but the method has an added advantage of being absolutely harmless to agricultural crops. Besides¹, pests tend to become resistant to certain pesticides, but they can never adapt themselves to antihormones.

Developed in the I.Torgov laboratory were technologies for commercial production of several antijuvenile hormones, synthesized from common and not costly chemical substances. The technologies are flexible enough and allow for varying the spectrum of the synthesized preparations without going into additional expenditures.

The application of pheromones and antihormones is a most promising method of plant protection. There is every reason to hope that thanks to this method, the use of pesticides will be decreased¹ by dozens of times already in the near future.

Notes:

bumblebee	шмель
fragrance	аромат
pheromone	феромон
grain	зерно, хлебные злаки
moth	мотылек
granary weevil	долгоносик амбарный
bark beetle	короед

stink-bugs

ЩИТНИКИ

engraver beetle = bark beetle

Text 33

BACTERIA AS "BREADWINNERS"

The lack of fodder protein is being felt over the world.

This problem is topical in the Soviet Union because two-thirds of our land fall in the zone of so-called risky agriculture: they are constantly subject to droughts or excessive moisture, affected by permafrost or eroded by winds. These factors tell on yield capacity.

In the USSR industrial microbiological synthesis of fodder protein has been devised with a capacity of almost 1.5 million tons a year. However, this satisfies the ever growing "appetites" of cattle breeding and poultry farming only partially. This is the reason why a search for ways of a more complete solution of the problem is still going on.

One of them is connected, for instance, with the usage of hydro-oxidizing bacteria. They grow precipitously: a twofold increase of their biomass takes place every 120 minutes. The content of a highly valuable, in relation to its amino-acid composition, protein in bacteria's cells amounts to around 70-75 per cent. The raw material base for the production of hydrogen bacteria is virtually inexhaustible: the case in question is the biosynthesis of protein from carbon dioxide, oxygen, hydrogen and some mineral elements.

They are everywhere. Carbon dioxide is an associate of many industries and oxygen can be easily extracted from the atmosphere. Hydrogen can be obtained through the electrolysis of water though this process is rather expensive.

That is why a search for alternative variants is being continued. It concerns, in particular, the thermochemical processing of lignites whose stocks in Siberia amount to 600 billion tons. With the numerous "pros" concerning the use of coal for obtaining protein there were serious "cons". The mixed gas obtained during the thermochemical process contains up to 60 per cent hydrogen but at the same time there is carbon monoxide in it. Soviet bio-physicists have worked out new technology of growing microorganisms when bacteria utilize successfully carbon monoxide as a source of energy thereby turning the enemy into an ally and making the process more efficient. The biomass of hydro-oxidizing bacteria which is currently being produced experimentally, has been used for several years of feed livestock, poultry and fur-bearing animals as a substitute (90-100 per cent of the required amount) for feeds of animal extraction. This provides the opportunity of making available a great amount of such valuable fodders as fish and meat-and-bone meal, milk, fish and meat products.

Notes	
fodder	фураж
poultry	домашняя птица
lignite	бурый уголь, лигнит
pros	доводы за
cons (лат. contra)	доводы против
livestock	домашний скот

Text 34

BACTERIA-'METALLURGISTS'

When people cannot extract a required metal from an ore concentrate or ore with the help of traditional technologies this work can be done by bacteria. They do it both more effectively and efficiently. The process is connected with the oxidation by microorganisms of the sulphide of a required metal. A solution is made from which the metal is extracted in a traditional way. The microbes are able to process even the concentrates which formerly could not be processed.

The point is that bacteria put onto the concentrate find the very metal in the mass they were meant for. No mechanical grinding whatever can separate, say, copper sulphide and zinc sulphide which are in a copper-zinc concentrate. After undergoing a pyrometallurgical processing an alloy is obtained. To separate it a sophisticated and expensive technology is needed. Whereas the bacteria, having promptly found "their" mineral, first oxidize into sulphide passing it into solution. Then they set to working on the copper sulphide. If the process is stopped when the zinc is in solution, then the copper can be melted out by a traditional way. As to the zinc in solution, it can also be easily extracted.

Another example is connected with obtaining gold from a concentrate that contains a harmful admixture - arsenic. By using well-known metallurgical processes there is a possibility of letting arsenic go into the atmosphere. The pernicious character of this method is quite evident, that is why such concentrates are not used. As to the minutest microorganisms, they can carry out this task as well. They pass arsenic into solution by preliminary oxidizing it, and gold is extracted traditionally.

Krasnoyarsk scientists are not engaged in biometallurgy itself. They are interested in the microbiological aspect of the technology, to this affect growing bacteria of various groups, various stocks, teaching them to unmistakably distinguish metals. The new branch of industry requires a great amount of bacterial biomass. How can it be obtained?

A group of scientists-headed by scientist Gernady Denisov have created productive cultivators that are both easy to handle reliable. Such "plantations" of bacteria are available for metallurgical industry. Practical experience shows that

a ton copper obtained with the help of bacterial biomass is four times less expensive than the same amount extracted by the pyrometallurgical method.

Notes:

stock природа

Text 35

BACTERIA - 'ECOLOGISTS'

After several prolonged expeditions to various regions of World Ocean a team of scientists headed by Corresponding Member of the USSR Academy of Sciences Iosif Gitelzon conducted a thorough research into sea bacteria's ability to luminesce. Of all the variety of luminescent microorganisms only luminescent bacteria can be cultivated in laboratories and on an industrial scale producing an unlimited amount of biomass. It turned out that the bacteria's bioluminescence reaction can become an efficient test.

If a bacterium is luminescent, that means it is alive and its environment has none of the detrimental impurities. If such impurities emerge, the bacterium stops luminescing and dies. According to scientists, the bacteria's sensitive bioluminescence reaction to outside factors will make it possible to use microorganisms as test objects. Even maximum infinitesimal admixtures in the atmosphere or water reservoirs are revealed by them immediately. But it is not only cells that are used as test objects. The luminescence system isolated from them can be widely employed and is being employed for the microquantity measurement of a number of ferments, substrates and inhibitors due to the great effectiveness of the transformation of chemical bonds' energy into light.

To this effect biophysicists have elaborated a series of bioluminometers. Every instrument is adjusted for conducting certain research work in biochemistry, medicine, microbiology, toxicology, and environmental protection..

This scientific and technological innovation has won several diplomas and medals at Soviet and foreign exhibitions. Along with a computer that analyzes the results of research and displays them in concrete indicators, the bioluminometers show high efficiency. For example in medical work when it is necessary to analyze the inhibitors of human blood's proteases. It is known that the traditional chemical analysis in polyclinics takes a long time. At the same time the ferments of a bioluminometer carry it out in the space of a few minutes answering the questions posed with great precision. Such a diagnostics makes it possible to reveal the signs and trace the dynamics of diseases already at an early stage.

Notes:

luminescent светящийся

protease протеаза

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