中央广播电视大学

英语

第三册

Book Three

北京大学公共英语教研室
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Lesson One

New Words and Expressions

1. lunar ['lu:nə] *a.* 月的
2. explorer [ik'splɔ:rə] *n.* 探险者
3. admit [əd'mit] *vt.* 承认
4. utterly ['ʌtəli] *ad.* 全然；十足
5. sterile ['sterail] *a.* 无微生物的；贫瘠的
6. waste [weist] *n.* 荒地
7. blaze *vi.* 燃烧；发（强）光
8. intense [in'tens] *a.* 强烈的
9. surpass [sə'pɑ:s] *vt.* 超过
10. rocket ['rɔkit] *n.* 火箭
11. encase [in'keis] *vt.* 包装；包裹
12. airtight ['ɛətait] *a.* 密封的
13. suit [sju:t] *n.* 服装
14. provide [prə'vaid] *vt.* 供给；供应
15. apparatus [ˌæpə'reitəs] *n.* 装置；设备
16. bullet ['bulit] *n.* 子弹
17. proof [pru:f] *a.* 能防护的
18. danger ['deindʒə] *n.* 危险
    in danger of 有…的危险
19. meteor ['mi:tjə] *n.* 流星
20. fragment ['frægmənt] *n.* 碎片
21. pea *n.* 豌豆
22. empty ['empti] *a.* 空的
23. rifle ['raifl] *n.* 步枪
24. rush [rʌʃ] *vi.* 冲
25. friction ['frikʃn] *n.* 摩擦
26. vaporise ['veipəraiz] *v.* （使）汽化
27. penetrate ['penitreit] *vt.* 透入；穿透
28. protect [prə'tekt] *vt.* 保护
    protect . . . from 保护…免受…
29. risk *n.* 冒险
    run a risk of 冒…风险
30. encounter [in'kauntə] *v.* 遭遇
31. incomparably [in'kɔmpərəbli] *ad.* 无可比拟地
32. endeavour [in'devə] *n.* 努力
33. summit ['sʌmit] *n.* 高高峰
34. Mount Jolmo Lungma [maunt 'dʒɔlməu 'luŋmɑ:] 珠穆朗玛（峰）
35. advantage [əd'vɑ:ntidʒ] *n.* 优点；有利条件
    have an advantage over 胜过…，比…优越
36. fatigue [fə'ti:g] *vi.* 疲劳
37. climber ['klaimə] *n.* 登山的人
38. absence ['æbsəns] *n.* 缺乏

39. wind *n.* 风
40. contend (against) [kən'tend] *vi.* 斗争
41. noise [nɔiz] *n.* 噪声
42. prevail [pri'veil] *vi.* 流行

Lunar Explorers

It is not possible for us to admit that there is life of any sort on the Moon. It is a world that is completely and utterly dead, a sterile mountainous waste on which during the day the sun blazes down with great heat, but where during the long night the cold is so intense that it far surpasses anything ever experienced on the Earth.

But now the lunar explorers can land there by a rocket. They need to be encased in airtight suits and provided with oxygen apparatus for their breathing. Their suits must be completely bullet proof, for they are in danger of being shot by a shooting star. The average shooting star or meteor, which gives so strongly the impression of a star falling from the sky, is a small fragment of matter usually smaller than a pea and often no larger than a grain of sand. Space is not empty but contains great numbers of such fragments. The Earth, in its travelling around the Sun, meets many of these fragments, which enter the atmosphere at a speed many times greater than that of a rifle bullet. The meteor, rushing through the air, becomes intensely heated by friction and is usually completely vaporised before it has penetrated within a distance of twenty miles from the surface of the Earth. Many millions of these fragments enter our atmosphere in the course of a day, but the atmosphere protects us from them. On the moon, however, they fall to the surface and so great is their number that the lunar explorers run a considerable risk of being hit.

The difficulties that the lunar explorers have to encounter are incomparably greater than those that have to be faced in the endeavour to reach the summit of Mount Jolmo Lungma. Only in two respects do the lunar explorers have the advantage. In the first place movement is less fatiguing

because the gravitational pull of the Moon is not very great, the weight of the Moon being only about one-eightieth of that of the Earth. The second advantage they have over the climbers on Mount Jolmo Lungma is the absence of strong winds for them to contend against. Since the Moon has no atmosphere, there can be no wind; nor, of course, can there be any noise because of sound being carried by the air. The Moon is a world that is completely still and where utter silence prevails.

Reading Material

The Moon

Just think of daytime on the moon lasting nearly fourteen of our days! For nearly fourteen days the surface is baked in the merciless heat of the sun. This explains the desolation which lies all around us. We see no signs of life, for life as we know it cannot live where there is practically no atmosphere and where there are such great changes of temperature. We find no water nor even traces of water because of the moon having no water on its surface. We hear no sound because of sound being carried by the air. The moon is really a world that is completely still and where utter silence prevails.

Of all the many different objects on the Moon, the ringed mountains or craters are the most striking. Many of them are just a few miles across but several are 60 or 70 miles in diameter. Sometimes, when the sun is low in the lunar sky, these and other giant craters look like deep pits. This is only because their mountains cast long shadows which stretch right across the crater floor. Their being not deep at all is due to the fact that they are really saucer-like hollows.

Lesson Two

New Words and Expressions

1. motion *n.* 运动
2. truck *n.* 卡车
3. roll [rəul] *vi.* 滚动
4. highway ['haiwei] *n.* 公路

5. jet *n.* 喷气飞机
6. zoom [zu:m] *vi.* 轰轰响；攒升
7. yet *ad.* 还；仍然
8. drone *vi.* 嗡嗡叫 *n.* 雄蜂
9. barely *ad.* 仅仅，几乎没有
10. electronic [ilek'trɔnik] *a.* 电子的
11. equipment [i'kwipmənt] *n.* 设备
12. tap *vt.* 轻拍
13. velocity [və'lɔsəti] *n.* 速度
14. movement ['mu:vmənt] *n.* 运动
15. outward ['autwəd] *ad.* 向外
16. vibration [vai'breiʃn] *n.* 振动
17. forth *ad.* 向前
back and forth 来来往往地，（前后）来回
18. stretch [stretʃ] *vt.* 拉紧
19. elastic [i'læstik] *a.* 弹性的
20. band *n.* 带
21. fasten ['fɑ:sn] *vt.* 扣紧
22. wooden ['wudn] *a.* 木头的
23. board [bɔ:d] *n.* 木板
24. let go 放掉
25. forward ['fɔ:wəd] *ad.* 向前
26. in other words 换句话说
27. vibrate *vi.* 振动
28. faint *a.* 微弱的
29. hum *vi.* 嗡嗡响
30. evident ['evidənt] *a.* 明显的
31. loud *a.* 响亮的
32. soft *a.* 柔和的

How Sound Travels

Our earth is full of sound because it is full of motion, like trucks rolling along the highway or jets zooming into the sky.

Sometimes a sound is far away and yet it is often possible for us to hear it clearly. We may hear a jet droning so far above the earth that we can barely see it.

How do such far-away sounds travel toward our ears? This, too, has something to do with motion.

All sounds travel to our ears in about the same way and come to us in waves that can be seen only with special electronic equipment.

Most of the sound waves that reach our ears travel through the air, but sound can also travel through water. In still air, sound travels about one kilometre in three seconds. If there is a wind, the sound will go faster in the direction of the wind. Against the wind, it will go more slowly.

Through water, sound travels much faster than through air — about one and half kilometres in one second. If sound passes through iron, it

will speed along five kilometres in one second, about fifteen times as fast as through air.

With a long iron pipe we can make an interesting experiment. Tap one end of the pipe with a hammer. When the ear is put close to the other end, two sounds can be heard with one blow of the hammer if the pipe is long enough. The sound through the iron comes more quickly than that through the air. The longer the pipe, the later the sound will be heard through the air. Thus we may see that sound travels through different substances with different velocities.

Now we know that sound moves and travels. But what kind of movement causes sound waves to start travelling outward in all directions?

Sound is caused by vibrations. A vibration is simply a back and forth movement.

Stretch an elastic band tightly between two nails that are fastened to a wooden board. When we pull back on the band and then let go, it will suddenly jump forward. But before it returns to its original position the elastic band will quickly move back and forth a number of times — in other words, it will vibrate.

If we look very carefully, we can see that this happens within a few seconds. If we listen closely, we may hear the faint humming sound made by the vibrations.

It is such vibrations that make sound waves. It is evident for strong vibrations to make loud sounds and for weak vibrations to make soft sounds.

Reading Material

Diffusion

If a bottle of ammonia is opened in one corner of a closed room, the odor is soon apparent in all parts of the room even though there are no air currents. Why is it possible for the ammonia molecules to reach you? It is because of their moving quickly through the air. The molecules in the air of the room are relatively far apart. As the ammonia molecules move, they pass between

the molecules of the air with occasional collisions. Some of the molecules reach every part of the enclosure in a short time. The process of one substance mixing with another because of molecular motion is called diffusion. If the gas is confined in a small container and the pressure is reduced, diffusion takes place more rapidly, for the gas molecules are farther apart and collisions are less frequent.

The process for liquids to diffuse into one another is slower than that of gases. The diffusion of solids is much less marked than the diffusion of gases and liquids, but it is known to occur. Mercury, for example, appears to diffuse through lead at ordinary temperatures.

Lesson Three

New Words and Expression

1. conduction [kən'dʌkʃn] *n.* 传导
2. drift *n.*, *vi.* 漂流；流动
3. electron [i'lektrɔn] *n.* 电子
4. temporarily ['temprərili] *ad.* 暂时地
5. detach [di'tætʃ] *vt.* 分开；分离
6. electrolyte [i'lektrəulait] *n.* 电解质；电解（溶）液
7. ionic [ai'ɔnik] *a.* 离子的
8. ion ['aiən] *n.* 离子
9. dissociation [di'səuʃi'eiʃn] *n.* 分解；离解
10. potential [pə'tenʃl] *a.* 势（差）的，位（差）的
    potential difference
    （电）势差，（电）位差
11. whereas *conj.* 而；反之
12. single *a.* 单一的；单个的
13. negative (-ly) ['negətiv (-li)] *a.* 阴性的，负的 *ad.* 带负电
14. electrolytic [i'lektrəu'litik] *a.* 电解的
15. positive [-ly] ['pɔzətiv [-li)] *a.* 阳性的，正的 *ad.* 带正电
16. opposite ['ɔpəzit] *a.* 相对的，相反的
17. moreover [mɔ'rəuvə] *ad.* 加之，而且
18. differ *vi.* 不同，相异
19. nature ['neitʃə] *n.* 自然；本性
20. normal ['nɔ:ml] *a.* 正常的
21. present ['preznt] *a.* 现在的；在场的
22. voltage ['vəultidʒ] *n.* 电压
23. apply [ə'plai] *vt.* 施（加）；应用
24. specimen ['spesimən] *n.* 样品
25. appropriate [ə'prəupriət] *a.* 恰

当的，适宜的

26. terminal ['tə:minl] *n.* 电极
27. collide [kə'laid] *vi.* 碰撞
28. frequently ['fri:kwəntli] *ad.* 时常，往往
29. ionize ['aiənaiz] *vt.* 电离
30. ionization ['aiənai'zeiʃn] *n.* 电离作用
31. rarely ['rɛəli] *ad.* 很少；难得
32. seldom *ad.* 很少；不常
33. acquire [ə'kwaiə] *vt.* 获得
34. average ['ævəridʒ] *n.* 平均 on the average 平均计算；平均来说
35. sufficient (-ly) [sə'fiʃnt (-li)] *a.*, *ad.* 充分
36. knock [nɔk] *vt.* 敲打 knock off 击落，撞掉
37. less *prep.* 缺；减掉
38. disruptive [dis'rʌptiv] *a.* 分裂（性）的
39. discharge [dis'tʃɑ:dʒ] *n.* 放电
40. cumulative ['kju:mjulətiv] *a.* 累积的
41. nowadays *ad.* 现在，现今
42. vacuum ['vækjuəm] *n.* 真空
43. conveniently [kən'vi:njəntli] *ad.* 方便地
44. thermionic [θə:mi'ɔnik] *a.* 热离子的
45. emission [i'miʃn] *n.* 发射，放射 thermionic emission 热离子发射
46. television ['teliviʒn] *n.* 电视
47. device [di'vais] *n.* 设计；装置

Conduction of Electricity

Conduction of electricity in solids consists of the drift of electrons that have been temporarily detached from the parent atoms. However, conduction in liquid electrolytes is ionic in nature. Ions, produced by dissociation of molecules, drift through the solution when a potential difference is maintained. Whereas in solid conduction a single kind of changed particle, the negative electron, moves in the process, in electrolytic conduction both positively and negatively charged particles take part in the motion, the positive particles moving in one direction and the negative in the opposite. Moreover, the particles moving in electrolytic conduction are of atomic or molecular mass, consisting of charged atoms or groups of atoms, while in solids the moving particles have the mass of the electron, much smaller than that of the smallest atom.

A third type of conduction occurs in gases. This type of conduction

is similar to liquid conduction in that both positive and negative ions move in the process, but it differs in the very important respect that very few of the ions exist before the beginning of the conduction process. Most of the ions are produced as a result of collisions between moving particles and molecules of the gas. Also the ions are of both atomic and electronic nature.

Under normal conditions a gas is a very poor conductor of electricity. There are very few ions present to take part in the conduction. A low voltage being applied to the specimen of gas, each ion moves toward the appropriate terminal. In this motion the ions collide frequently with molecules of the gas. In these collisions further ionization rarely takes place, because the ion colliding with a molecule seldom has enough energy to remove an electron from the molecule. As the potential difference applied to the gas is increased, each ion will acquire more energy, on the average, between collisions. When the voltage is great enough that an ion acquires between collisions sufficient energy to ionize the atom or molecule that it strikes, two or more new particles are produced, one being the electron knocked off the atom and the other being the atom less its electron. Thus the number of ions builds up very rapidly and a disruptive discharge, or spark, occurs. This process of cumulative ionization is called ionization by collision.

Nowadays we have a new type of conduction that occurs in a vacuum. In order to have conduction in a vacuum charges must be introduced. This is most conveniently done by thermionic emission, the emission of electrons by a conductor when it is heated to a sufficiently high temperature. This type of conduction has been widely used in electron tubes of radio, television, and many other modern devices.

Reading Material

Heating Effect of Electric Current

It is a fact of everyday experience that a conductor in which there is an electric current is thereby heated. In some cases, such as the electric iron and

welding, this heating is desirable. In many other cases, particularly in electric machinery such as dynamos and transformers, the heating is most undesirable. This heat being an expensive loss of energy, the apparatus must be carefully designed so as to get rid of the heat.

In the heating devices the wire in which the useful heat is produced is called the heating element. It is often embedded in a refractory material, which keeps it in place and retards its oxidation. If the heating element is exposed to air, it should be made of metal that does not oxidize readily, nickel-chromium alloys having been developed for this purpose.

Lesson Four

New Words and Expressions

1. relatively ['relətivli] *ad.* 相对地，比较地
2. regular ['regjulə] *a.* （有）规则的
3. pattern *n.* 样式；图案
4. assume [ə'sju:m] *vt.* 采取（某种形式等）
5. principally ['prinsəpəli] *ad.* 主要地
6. nitrogen ['naitrədʒən] *n.* 氮
7. exert [ig'zə:t] *vt.* 用，行使；施加
8. inconvenience ['inkən'vi:niəns] *n.* 不便
9. discomfort [di'skʌmfət] *n.* 不安
10. characterize ['kæriktəraiz] *vt.* 表示…的特性
11. total ['təutl] *a.* 全体的；总计的
12. roughly ['rʌfli] *ad.* 差不多
13. ton [tʌn] *n.* 吨
14. huge *a.* 巨大的
15. Press *v.* 压
16. resultant [ri'zltənt] *a.* 结果的，合成的
    resultant force 合力
17. zero ['ziərəu] *num.* 零
18. immerse [i'mə:s] *vt.* 浸入；沉浸
19. unit *n.* 单位
20. area ['ɛəriə] *n.* 面积
21. standard ['stændəd] *n.*, *a.* 标准（的）
22. moderately ['mɔdrətli] *ad.* 适度地
23. measure ['meʒə] *vi.* 有…长（或宽） *n.* 量度
24. fortunately ['fɔ:tʃnətli] *ad.* 幸而
25. balance ['bæləns] *n.* 天平 *vt.* 平衡
26. magnitude ['mægnitju:d] *n.* 大小；量值

27. withstand [wið'stænd] *vt.* 抵抗；经得住
(withstood, withstood)
28. tin *n.* 白铁
29. can *n.* 罐
30. pump *vt.* 抽
31. collapse [kə'læps] *vi.* 破裂；瓦解
32. conveyer [kən'veiə] *n.* 输送机
33. spout *n.* 喷口
34. insert [in'sə:t] *vt.* 插入
35. loose [lu:s] *a.* 松的
36. blower *n.* 鼓风机；增压机
37. freight [freit] *n.* 货物
freight car 货车
38. unload [ʌn'ləud] *vt.* 卸货
39. barometer [bə'rɔmitə] *n.* 气压表
40. besides [bi'saidz] *ad.* 还有 *prep.* …之外

Air and Air Pressure

All matter, whether solid, liquid, or gas, consists of molecules that attract each other. In solids the molecules are relatively close to each other and the forces of attraction are great enough to hold the molecules in a regular pattern and thus maintain a definite volume and shape. In a liquid the molecules are, on the average, farther apart; the forces are therefore smaller and while the liquid maintains a definite volume it assumes the shape of its container. In a gas the distances between molecules are large compared to their size and the forces of attraction are small compared to those in solids and liquids. A gas therefore has neither shape nor volume of its own but assumes those of its container.

The most common gas is air, a mixture of several gases but principally nitrogen and oxygen. Since the air is always present, we seldom notice the forces that air exerts unless these forces become so great that they produce inconvenience, discomfort, or destruction.

It is a common expression to characterize something as "light as air", but air is hardly "light". Air is attracted by the earth as is every other substance and the total weight of the air is tremendous, roughly 6×10^{15} tons. This huge weight is always pressing on the surface of the earth but since the forces come from all directions the resultant force is zero.

As air has weight, it exerts force on any object immersed in it. The force per unit area is the air pressure. This pressure under standard condition is about $1kg/cm^2$. As a result of this pressure very large forces are exerted on even moderately large areas. On an ordinary window, which measures say 1 metre by 2 metres, the force is $1kg/cm^2 \times 100cm \times 200cm = 20{,}000kg = 20$ tons. Fortunately this large force is normally balanced by another force equal in magnitude but opposite in direction on the other side of the window for no ordinary window would of itself be able to withstand so great a force. If a container such as an ordinary tin can is closed tightly and air pumped out, it soon collapses because of the greater force on the outside. This action is used in certain types of conveyers. A spout is inserted into grain or other loose material, air is removed from the spout by means of a blower, and the outside air pushes the material up the spout. Freight cars or boats may be loaded or unloaded very quickly in this manner.

Air pressure can be measured by an instrument called barometer. No one would need a barometer if the air pressure were always the same everywhere. But it is not. It changes. The air may be pushing harder on us right now than it was an hour ago. Or it may not be pushing so hard. Besides, the air pressure in one place may be very much more or less than that in some other place.

Reading Material

The Nucleus of an Atom

The nucleus of an atom is itself made up of elementary particles of which there are two principal sorts: protons and neutrons.

Proton is the basic particle of all atomic nuclei. It has a single positive charge equal to that of an electron which is negative. Proton is a comparatively heavy particle.

Neutron is a particle which is present in all nuclei except hydrogen. It has a mass slightly larger than that of a proton, but no charge, either positive or negative, a property which allows it, when free, to penetrate all nuclei. All

substances on the earth as well as out of it, whether gaseous, liquid or solid, are made up of atoms. There are 107 elements including all matter as found in nature, and the difference between one element and another is in the structure of its atoms.

The number of protons in the nucleus of an element determines its atomic number, while the total of protons and neutrons its atomic weight.

Lesson Five

New Words and Expressions

1. practically ['præktikli] *ad.* 几乎，实际上
2. unlimited [ʌn'limitid] *a.* 无限的
3. valency ['veiləns] *n.* （化合）价；（原子）价
4. grade *n.* 等级
5. complexity [kəm'pleksəti] *n.* 复杂性
6. range *vi.* 分布
   range from ... to ...
   分布范围从…到…
7. due *a.* 相当的
   in due course
   经过相当时间
8. distinct [di'stiŋkt] *a.* 个别的
9. gradually ['grædʒuli] *ad.* 逐渐
10. invariably [in'vɛəriəbli] *ad.* 不变地
11. association [ə'səuʃi'eiʃn] *n.* 联合
    in association with
    与…结合（相联系）
12. organized ['ɔ:gənaizd] *a.* 有组织的；有机的
13. distinction [di'stiŋkʃn] *n.* 区别
14. inorganic ['inɔ:'gænik] *a.* 无机的
15. organic [ɔ:gænik] *a.* 有机的
16. division [di'viʒn] *n.* 部门；划分
17. rock *n.* 岩石
18. oxide ['ɔksaid] *n.* 氧化物
19. salt [sɔ:lt] *n.* 盐 *a.* 盐的
20. non-metal *n.* 非金属
21. sulphuric [sʌl'fjuərik] *a.* 硫的
    sulphuric acid 硫酸
22. hydrochloric ['haidrə'klɔ:rik] *a.* 氯化氢的
    hydrochloric acid 盐酸
23. and so forth = and so on 等等
24. fat *n.* 脂肪
25. carbohydrate [ˌkɑ:bəu'haidreit] *n.* 醣，碳水化合物
26. protein ['prəuti:n] *n.* 蛋白质
27. dyestuff ['daistʌf] *n.* 染料
28. alkaloid ['ælkələid] *n.* 生物碱
29. perfume ['pə:fju:m] *n.* 香料；芳香

30. petroleum [pi'trəuliəm] *n.* 石油
31. endless ['endlis] *a.* 无穷的
32. glance [glɑ:ns] *n.* 一瞥，一看 *vi.* 看一眼
33. list *n.* 表
34. indicate ['indikeit] *vt.* 表示
35. manufacture [ˌmænju'fæktʃə] *vt.* 创造
36. branch [brɑ:ntʃ] *n.* 部门；分科
37. link *vt.* 连接
38. geology [dʒi'ɔlədʒi] *n.* 地质学
39. metallurgy [mi'tælədʒi] *n.* 冶金学
40. physiology ['fizi'ɔlədʒi] *n.* 生理学
41. biochemistry ['baiəu'kemistri] *n.* 生物化学
42. biology [bai'ɔlədʒi] *n.* 生物学
43. realize ['riəlaiz] *vt.* 认识
44. so-called *a.* 所谓
45. constituent [kən'stitjuənt] *a.* 组成的 *n.* 成分，要素
46. synthesize ['sinθəsaiz] *vt.* 合成
47. artificial ['ɑ:ti'fiʃl] *a.* 人造的
48. embrace [im'breis] *vt.* 包括

Chemistry

The elements combine together in a practically unlimited number of ways, determined by their valencies and chemical nature, to form molecules of many grades of complexity, ranging from hydrogen molecules, H_2, with two like atoms, to molecules built up of various kinds and numbers of atoms. It was realized in due course that of all these distinct forms of matter (substances, or chemical compounds) which gradually became known, some occurred in lifeless mineral matter, while others were invariably found in association with living, or "organized" matter. A distinction was thus recognized in the eighteenth century, between inorganic and organic substances. Thus arose the two great divisions of this science known as INORGANIC CHEMISTRY and ORGANIC CHEMISTRY.

Among the great variety of inorganic materials are, for example, the gases of the atmosphere, waters, rocks, minerals, metals and their oxides and salts, non-metals and their compounds, such as sulphuric and hydrochloric acids, and so forth. Natural organic materials include plant

and animal fats, carbohydrates, proteins, dyestuffs, alkaloids, perfumes, alcohol, organic acids, rubber, coal, petroleum, and so on, in almost endless variety. A glance at such lists is sufficient to indicate that all the great manufacturing industries, including agriculture, the oldest industry of all, have much to do with these two great branches of chemistry. Inorganic chemistry is linked closely to geology, mineralogy, and metallurgy; organic chemistry to physiology, biochemistry, and biology in general.

Not until the early part of the nineteenth century was it realized that all the so-called natural organic compounds contain carbon as a constituent element. At the present day many of the natural organic compounds have been synthesized by artificial processes. Moreover, thousands of artificial carbon compounds unknown in nature have been produced. Organic chemistry embraces all these compounds, so that now organic chemistry is the chemistry of the carbon compounds. Inorganic chemistry embraces all the others.

Reading Material

Organic Chemistry

Organic chemistry is the chemistry of compounds of carbon. It may seem strange to you that one element should have a type of chemistry of its own, but carbon is an extraordinary element. Not only can atoms of carbon join up with other elements, but they can combine with themselves as well. Some other elements can also do this, but not to the same extent as carbon. Carbon atoms can join up to form chains and rings of various sizes. There seems to be almost no limit to what they can do, or to the number that can join together. The carbon atoms in these chains and rings are still able to combine with other elements such as hydrogen, oxygen, nitrogen and others. The carbon chain or ring makes the skeleton of the molecule and the other elements are joined on to the sides of it. The number of different compounds that can be formed in this way seems to be limitless. Thus has grown up a separate branch of chemistry that deals solely with compounds of carbon.

It is called organic chemistry because at one time it was thought that these compounds were only produced in living organisms. Now we know they can be made in the laboratory, and organic chemistry includes the chemistry of dyes, drugs, insecticides, plastics and petroleum as well as that of living things.

Lesson Six

New Words and Expressions

1. nectar ['nektə] *n.* 花蜜
2. honey ['hʌni] *n.* 蜂蜜
3. bee *n.* 蜜蜂
4. sweet *a.* 甜的
5. watery ['wɔtəri] *a.* 水分多的
6. fluid [fluid] *a.* 流体的 *n.* 流体
7. specific [spə'sifik] *a.* 特殊的
8. flavour *n.* （香）味
9. associate [ə'səuʃieit] *vt.*, *vi* 联合
10. draw [drɔ:] *vt.* 汲（取）；吸；拉
    (drew, drawn)
11. disappear [ˌdisə'piə] *vi.* 消失
12. crop *n.* 收获
13. saliva [sə'laivə] *n.* 唾液
14. transformation [ˌtrænsfə'meiʃn] *n.* 转化
15. cane-sugar [kein-'ʃugə] *n.* 甘蔗糖
16. grape-sugar *n.* 葡萄糖
17. fruit-sugar [fru:t-'ʃugə] *n.* 果糖
18. deposit [di'pɔzit] *vt.* 贮存
19. waxen ['wæksn] *a.* 蜡制的
20. cell *n.* 蜂房；细胞；电池
21. store *vt.* 贮存
22. pollen ['pɔlən] *n.* 花粉
23. hive *n.* 蜂房
24. numerous ['nju:mərəs] *a.* 许多的
25. bread [bred] *n.* 面包；食物
    bee-bread 蜜蜂的食料
26. daily *a.* 每天的
27. queen *n.* （蜜蜂的）女王
28. healthy ['helθi] *a.* 健全的
29. surplus ['sə:pləs] *a.* 剩余的
30. community [kə'mju:nəti] *n.* 团体；群落
31. last [lɑ:st] *vi.* 持续
32. minimum ['miniməm] *n.* 最小量
33. imperative [im'perətiv] *a.* 必不可少的
34. factor *n.* 因素
35. conversion [kən'və:ʃn] *n.* 改变
36. removal [ri'mu:vl] *n.* 去掉
37. superfluous [su:'pə:fluəs] *a.* 多余的
38. fan *n.* 扇子 *vt.* 扇
39. wing *n.* 翅膀
40. recall *vt.* 召回
41. aqueous ['eikwiəs] *a.* 含水的

42. equivalent [i'kwivələnt] *a.* 相等的
43. litre ['litə] *n.* 升（容量单位）
44. necessitate [ni'sesiteit] *vt.* 使…需要，迫使
45. house *vt.* 收藏
46. precious ['preʃəs] *a.* 宝贵的
47. construct [kən'strʌkt] *vt.* 构造
48. comparatively [kəm'pærətivli] *ad.* 比较地

From Nectar to Honey

Nectar is a sweet watery fluid which in almost every case has a specific flavour associated with the flower from which it is drawn by bees. This specific flavour as a rule disappears in the honey, which is a much less watery fluid than the nectar. The several changes which nectar undergoes in becoming honey begin in the honey crop, where the saliva which is mixed with the nectar starts the transformation of the cane-sugar of the nectar into the grape-sugar and fruit-sugar of the honey, and this process continues after the fluid has been deposited in the waxen cells. The need of honey in the hive surpasses that of pollen, and the honey-cells are more numerous than "bee-bread" cells. The stored honey and pollen serve for the daily food of the workers, the drones, and the queen, but in a healthy hive there is a surplus store, and this surplus store enables the community of honey-bees to last year after year. Although in the winter the activities of the hive drop to a minimum, still there is some movement of the bees and so food is imperative.

The fresh nectar poured out of the body of the bee contains 80 per cent of water and is very fluid. One of the most interesting factors in the conversion of nectar to honey is the removal of the superfluous water. The worker-bees after a hard day in the field return to the hive, and after depositing their evening harvest, take their stand and begin fanning with their wings. They continue this exercise hour after hour until the rising of the sun recalls them to their harvest fields. A good hive will in the course of a night drive an amount of aqueous vapor equivalent to 1.5 litres of water, and so gradually the amount of water is reduced from 80