



**托福TPO长难句Structure Analysis &Paraphrase**

**Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Class: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

(一)A of B 结构

例：The gradual drying of the soil (caused by its diminished ability to absorb water) results in the further loss of vegetation, **so that** a cycle of progressive surface deterioration is established.

S(ed分词做后置定语)VO, conj. SV.

1. New types of ships **were needed**, new methods of finding one’s way, new techniques for financing so vast a scheme. The sheer scale of the **investment** (that/which it took to begin commercial expansion at sea) reflects the immensity of the profits (that such East-West trade could create).
2. Large wind farms might also interfere with the flight patterns of migratory birds in certain areas, and they have killed large birds of prey (especially hawks, falcon, and eagles) that prefer to hunt along the same ridge lines that are ideal for wind turbines.
3. It is significant that the earliest living things that built communities on these islands are examples of symbiosis, a phenomenon that depends upon the close cooperation of two or more forms of life and a principle that is very important in island communities.
4. In the wake of the Roman Empire’s conquest of Britain in the first century A.D. a large number of troops stayed in the new province, and these troops had a considerable impact on Britain with their camps, fortifications, and participation in the local economy.
5. Inequalities of gender have also existed in pastoralist societies, but they seem to have been softened by the absence of steep hierarchies of wealth in most communities, and also by the requirement that women acquire most of the skills of men, including, often their military skills.

（二）分词定语结构

例：The gradual drying of the soil caused by its diminished ability to absorb water results in the further loss of vegetation, so that a cycle of progressive surface deterioration is established.

例：In a countercurrent exchange system, the blood vessels carrying cooled blood from the flippers run close enough to the blood vessels carrying warm blood from the body to pick up some heat from the warmer blood vessels; thus, the heat is transferred from the outgoing to the ingoing vessels before it reaches the flipper itself.

1. The destruction caused by the volcanic explosion of Mount St. Helens, in the North western United States, for example, pales in comparison to the destruction caused by humans.
2. In a period characterized by the abandonment of so much of the realistic tradition by authors such as John Barth, Donald Barthelme, and Thomas Pynchon, Joyce Carol Oates has seemed at times determinedly old-fashioned in her insistence on the essentially mimetic quality of her fiction.
3. The hypothesis that begging calls have evolved properties that reduce their potential for attracting predators yields a prediction: baby birds of species that experience high rates of nest predation should produce softer begging signals of higher frequency than nestling of other species less often victimized by nest predators.
4. Many plants and animals disappear abruptly from the fossil record as one moves from layers of rock documenting the end of the Cretaceous up into rocks representing the beginning of the Cenozoic.
5. But the myths that have grown up ground the rites may continue as part of the group’s oral tradition and may even come to be acted out under conditions divorced from these rites.
6. The final stage of a succession, called the climax by Clements and early ecologist, is likewise not predictable or of uniform composition. There is usually a good deal of turnover in species composition, even in a mature community.
7. But detractors maintain that the terraces could also have been created by geological activity, perhaps related to the geologic forces that depressed the Northern Hemisphere far below the level of the South, in which case they have nothing whatever to do with Martian water.

8.Two additional kinds of evidence support the hypothesis that petroleum is a product of the decomposition of organic matter: Oil possesses optical properties (known only in hydrocarbons) (derived from organic matter), and oil contains nitrogen and certain compounds believed to originate only in living matter. Tpo43-2 [Q3]

（三）分词状语结构

例：Glaciers move slowly across the land with tremendous energy, carving into even the hardest rock formations and thereby reshaping the landscape as they engulf, push, drag, and finally deposit rock debris in places far from its original location.

对比：

Many plants and animals disappear abruptly from the fossil record as one moves from layer of rock documenting the end of Cretaceous up into rocks representing the beginning of the Cenozoic.

1. The temperature increased dramatically in a short period of time (years rather than centuries), allowing for a growth of the hunting-gathering population due to the abundance of resources.
2. During the early stages of its development, a society becomes aware of forces that appear to influence or control its food supply and well-being. Having little understanding of natural causes, it attributes both desirable and undesirable occurrences to supernatural or magical forces, and it searches for means to win the favor of these forces.
3. Numerous insects occupy the marsh, feeding on living or dead cord grass tissue, and red win blackbirds, sparrows, rodents, rabbits, and deer feed directly on the cord grass.
4. At one time, the animals present in these fossil beds were assigned to various modern animal groups. but most paleontologists now agree that all Tommotian fossils represent unique body forms that arose in the early Cambrian period and disappeared before the end of the period, leaving no descendants in modern animal groups.
5. The same thing happens to this day, though on a smaller scale, wherever a sediment-laden river on stream emerges from a mountain valley onto relatively flat land, dropping its load as the current slows.
6. Estimates indicate that the aquifer contains enough water to fill Lake Huron, but unfortunately, under the semiarid climatic conditions that presently exist in the region, rates of addition to the aquifer are minimal, amounting to about half a centimeter a year.
7. Fladmark’s hypothesis received additional support from the fact that the greatest diversity in native American languages occurs along the west coast of the Americas, suggesting that this region has been settled the longest.
8. While accepting that this sequence fits the archaeological profile of those sites, which were occupied continuously over many thousands of years, a number of writers have warned that the underlying assumption of such a sequence – a development form the simple and the geometric to the complex and naturalistic – obscures the cultural continuities in Aboriginal Australia in which geometric symbolism remains fundamentally important.
9. Earth is a target in a cosmic shooting gallery, subject to random violent events that were unsuspected a few decades age.

（四）动名词主语

例： assessing the impact of the army on the civilian population starts from the realization that the soldiers were always unevenly distributed across the country

1. Importing the grain，which would have been expensive and time consuming for the Dutch to have produced themselves, kept the price of grain low and thus stimulated individual demand for other foodstuffs and consumer goods.
2. Discovering the inputs and outputs of rivers is a matter of measuring the discharges of every inflowing and outflowing stream and river.
3. Learning appropriate social behaviors is especially important for species that live in groups, like young monkeys that needed to learn to control selfishness and aggression and to understand the give-and take involved in social groups.

**（五）平行结构**

例：Is this a defect, or are the authors working out a different kind of aesthetic, or trying to react against certain type of mainstream aesthetic?

例：What we today call American folk art was, indeed, art of, by, and for ordinary, everyday ‘folks’ who, with increasing prosperity and leisure, created a market for art of all kinds, and especially for portraits.

例：In a period characterized by the abandonment of so much of the realistic tradition by authors such as John Barth, Donald Barthelme, and Thomas Pynchon, Joyce Carol Oates has seemed at times determinedly old-fashioned in her insistence on the essentially mimetic quality of her fiction.

1. Modern architectural forms generally have three separate components comparable to elements of the human body; a supporting skeleton or frame, an outer skin enclosing the interior spaces, and equipment, similar to the body’s vital organs and systems.
2. A population of oaks is likely to be relatively stable through time, and its survival is likely to depend more on its ability to withstand the pressures of competition or predation than on its ability to take advantage of chance events.
3. The tradition of religious sculpture extends over most historical periods but is less clearly delineated than that of stone wares or porcelains, for it embraces the old custom of earthenware burial ceramics with later religious images and architectural ornament
4. But as more and more accumulations of strata were cataloged in more and more places, it became clear that the sequences of rocks sometimes differed from region to region and that no rock type was ever going to become a reliable time maker throughout the world.
5. With a moderate to fairly high net energy yield, these systems emit no heat-trapping carbon dioxide or other air pollutants and need no water for cooling; manufacturing them produces little water pollution.
6. There appear to be many unexplored matters about the motivation to reflect—for example, the value of externally motivated reflection as opposed to that of teachers who might reflect by habit.
7. Therefore, when observational assessment is used as a technique for studying infant perceptual abilities, care must be taken not to over generalize from the data or to rely on one or two studies as conclusive evidence of a particular perceptual ability of the infant.
8. As the demand for agricultural produce from both consumers and industry increased, agricultural land became more valuable and people tried to work the available land more intensively and to reclaim more land from wetlands and lakes.
9. The explanation is that the Maya excavated depressions, or modified natural depressions, and then plugged up leaks in the karst by plastering the bottoms of the depressions in order to create reservoirs, which collected rain from large plastered catchment basins and stored it for use in the dry season.
10. Certain fossils always appear in more ancient sediments, while others begin to be seen as the strata become more recent.

11 . Even though the fine arts in the twentieth century often treat materials in new ways， the basic difference in the attitude of artists in relation to their materials in the fine arts and the applied arts remains relatively constant.

（六）插入语所谓插入语就是不影响句子含义和结构的插入成分。常见的插入语有that is, that is to say, what’s more, to tell you the truth, frankly speaking等，处理插入语的最佳办法就是删除。

关于插入语的分类：

1.形容词或形容词短语作插入语(true，wonderful，excellent，strange to say，most important of all， sure enough等)

例一：True，he left us.

例二：Most important of all，we must do enough research before writing a paper.

2.副词或副词短语作插入语(indeed，surely，still，otherwise，certainly，however，generally， personally，honestly，fortunately，luckily，though，besides，exactly，perhaps，maybe，probably，frankly，or rather等)

例一：Indeed，it was the attitude and not the result that is important.

例二：When we got there，we found，however，he had already gone.

3.介词短语作插入语(in fact，in one’s opinion，in general，in a word，in other words，in a few words, of course, by the way，as a result，for example，on the contrary，on the other hand，to one’s surprise，in short，as a matter of fact，in conclusion，in brief等)

例一：In fact，I failed the exam finally.

例二：As a matter of fact，we are supposed to gain something after working hard.

4.分词或分词短语作插入语(现在分词-ing，过去分词-ed)

现在分词：

例一：Generally speaking，men are stronger than women.

例二：Judging from the tone，I think Tom is in a bad mood.

过去分词：

例一：Compared with women，men are stronger.

5.不定式或不定式短语作插入语(to be frank，to be honest，to be sure，to tell you the truth，to make matters worse，to sum up，to start with，to begin with等)

例一：To tell the truth，it was Tom who stole the bag.

例二：To conclude，chances are for the people who have prepared better.

6.句子作插入语(I am sure，I believe，I think，I know，I suppose，I hope，I’m afraid，you see， what’s more，that is to say，as we know，as I see，believe it or not等)

例一：What’s more，enough sleep ensures a better exertion.

例二：We will win the match finally，I believe.

01) 定语从句做插入语

　　Stokoe—who has been devoting his time to writing and editing books and jounals on ASL(American Sign Language) and deaf culture—is having a casual chat with a celebrity at a café.

　　致力于撰写和编辑关于美国手语和聋哑人文化的书籍和杂志的Stokoe正在一家咖啡厅里与一位名人进行闲谈。

02) 同位语从句做插入语

　　Yellow fever, the disease that killed 4000 Philadelphians in 1793, has reappeared after nearly two decades in abeyance in the Western Hemisphere.

　　黄热病,这种疾病在1793年使得4000费城人死亡，它在西半球消停了近二十年之后又重新出现了。

03) 状语从句做插入语

Because many of the minerals found on the ocean floor are still plentiful on land, where mining is relatively inexpensive, mining the ocean floor has yet to become a cautious cause.

1. Ekman has found that the so-called Duchenne smile, which is characterized by ''crow’s feet" wrinkles around the eyes and a subtle drop in the eye cover fold so that the skin above the eye moves down slightly toward the eyeball, can lead to pleasant feelings.

2. The country's currency, weakened both by concern about the government's agreement with the International Monetary Fund and by growing fears of a rise in inflation, continued its slide to a record low against the dollar, forcing the central bank to intervene for the fourth time in a week.

3. However, unlike the cases of sea otters and pinnipeds (seals, sea lions, and walruses, whose limbs are functional both on land and at sea), it is not easy to envision what the first whales looked like.

4. The skull is cetacean-like but its jawbones lack the enlarged space that is filled with fat or oil and used for receiving underwater sound in modern whales.

5. The structure of the backbone shows, however, that Ambulocetus swam like modern whales by moving the rear portion of its body up and down, even though a fluke was missing.

6. What we today call American folk art was, indeed, the art of, by, and for ordinary, everyday "folks" who, with increasing prosperity and leisure, created a market for art of all kinds and especially for portraits.

7. A detailed study has been made of the prints using photogrammetry, a technique for obtaining measurements through photographs, which created a drawing showing all the curves and contours of the prints.

多重逻辑：

The gradual drying of the soil caused by its diminished [**ability**](http://top.zhan.com/cihui/toefl-ability.html) to absorb water results in the [**further**](http://top.zhan.com/cihui/ielts-further.html) loss of vegetation, so that a cycle of progressive surface deterioration is established.

例题141

PASSAGE EXCERPT:“Hardy's weakness derived from his apparent inability to control the comings and goings of these divergent impulses and from his unwillingness to cultivate and sustain the energetic and risky ones.”

例题142

PASSAGE EXCERPT:"A long-held view of the history of the English colonies that became the United States has been that England's policy toward these colonies before 1763 was dictated by commercial interests and that a change to a more imperial policy, dominated by expansionist militarist objectives, generated the tensions that ultimately led to the American Revolution.”

例题143

PASSAGE EXCERPT: "The gradual drying of the soil caused by its diminished ability to absorb water results in the further loss of vegetation, so that a cycle of progressive surface deterioration is established.”

例题144

PASSAGE EXCERPT: "That sex ratio will be favored which maximizes the number of descendants an individual will have and hence the number of gene copies transmitted.”

**托福TPO26阅读长难句TPO26: Energy and the Industrial Revolution**

1. The success of the steam engine resulted in increased demands for coal, and the　consequent increase in coal production was made possible as the steam-powered pumps　drained water from the ever-deeper coal seams found below the water table.

2. The resulting boom in the iron industry expanded the annual iron output by more than　170 times between 1740 and 1840, and by the 1850s Great Britain was producing more　tons of iron than the rest of the world combined.

**TPO26: Survival of Plants and Animals in Desert Conditions**

1. Most plant tissues die if their water content falls too low: the nutrients that feed plants　are transmitted by water; water is a raw material in the vital process of photosynthesis;　and water regulates the temperature of a plant by its ability to absorb heat and because　water vapor lost to the atmosphere through the leaves helps to lower plant temperatures.

2. There are two general classes of vegetation: long-lived perennials, which may be　　succulent (water-storing) and are often dwarfed and woody, and annuals or ephemerals,　which have a short life cycle and may form a fairly dense stand immediately after rain.

3. They possess drought-resisting adaptations: loss of water through the leaves is reduced　　by means of dense hairs covering waxy leaf surfaces, by the closure of pores during the　hottest times to reduce water loss, and by the rolling up or shedding of leaves at the　beginning of the dry season.

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**TPO26: Sumer and the First Cities of the Ancient Near East**

1. The earliest of the city states of the ancient Near East appeared at the southern end of the Mesopotamian plain, the area between the Tigris and Euphrates rivers in what is now　Iraq.

2. Uruk, for instance, had two patron gods—Anu, the god of the sky and sovereign of all　other gods, and Inanna, a goddess of love and war—and there were others, patrons of　different cities.

3. It used to be believed that before 3000 B.C.E. the political and economic life of the cities　was centered on their temples, but it now seems probable that the cities had secular rulers　from earliest times.

4. Within the city lived administrators, craftspeople, and merchants. (Trading was　important, as so many raw materials, the semiprecious stones for the decoration of the　temples, timbers for roofs, and all metals, had to be imported.)

5. A major development was the discovery, again about 3000 B.C.E., that if copper, which　　had been known in Mesopotamia since about 3500 B.C.E., was mixed with tin, a much　harder metal, bronze, would result.

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**托福TPO25阅读长难句TPO25: The Surface of Mars**

1. It is no accident that Maxwell Mons on Venus and the Hawaiian shield volcanoes on　Earth rise to about the same height (about 10 kilometers) above their respective　bases-Earth and Venus have similar surface gravity.

2. Scientists have no direct evidence for recent or ongoing eruptions, but if these volcanoes　　were active as recently as 100 million years ago (an estimate of the time of last eruption　based on the extent of impact cratering on their slopes), some of them may still be at least intermittently active.

**TPO25: The Decline of Venetian Shipping**

1. In the fifteenth century there was little problem recruiting sailors to row the galleys　(large ships propelled by oars): guilds (business associations) were required to provide　rowers, and through a draft system free citizens served compulsorily when called for.

2. The step from buying foreign timber to buying foreign ships was regarded as a short one,　especially when complaints were heard in the latter sixteenth century that the standards　and traditions of the Arsenale were running down.

3. Historian Frederic Lane observes that after the loss of ships in battle in the late　sixteenth century, the shipbuilding industry no long had the capacity to recover that it had　displayed at the start of the century.

4. The conventional explanation for the loss of Venetian dominance in trade is　establishment of the Portuguese direct sea route to the East, replacing the overland Silk　Road from the Black sea and the highly profitable Indian Ocean-caravan-eastern　Mediterranean route to Venice.

5. Prices of spices delivered by ship from the eastern Mediterranean came to equal those of　spices transported by Paortuguese vessels, but the increase in quantity with both routes in　operation drove the price far down.

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**托福TPO5阅读长难句TPO25: The Evolutionary Origin of Plants**

1. Water temperature can fluctuate seasonally or even daily and changing level of rainfall　　can lead to fluctuations in the concentration of chemical in the water or even to period in　which the aquatic habitat dries up.

2. From a plant’s evolutionary view point, however, it was also a land of opportunity, free　of competitors and predators and full of carbon dioxide and sunlight (the raw materials for　photosynthesis, which are present in far higher concentrations in air than in water).

3. They include roots or root like structures, a waxy cuticle that covers the surfaces of　leaves and stems and limits the evaporation of water, and pores called stomata in leaves　and stems that allow gas exchange but close when water is scarce, thus reducing water　loss.

4. These include conducting vessels that transport water and minerals upward from the　roots and that move the photosynthetic products from the leaves to the rest of the plant　body and the stiffening substance lignin, which support the plant body, helping it expose　maximum surface area to sunlight.

5. So the most successful groups of land plants are those that evolved methods of fertilized　　sex cell dispersal that are independent of water and structures that protest developing　embryos from drying out.

**托福TPO24阅读长难句TPO24: Lake Water**

1. Then exchanges with the atmosphere are calculated by finding the difference between the　　gains from rain, as measured (rather roughly) by rain gauges, and the losses by evaporation,　measured with models that correctfor the other sources of water loss.

2. Changes in lake level not explained by river flows plus exchanges with the atmosphere　must be due to the net difference between what seeps into the lake from the groundwater7　and what leaks into the groundwater.

3. The residence time is an average; the time spent in the lake by a given molecule (if we could　　follow its fate) would depend on the route it took: it might flow through as part of the fastest,　most direct current, or it might circle in a backwater for an indefinitely long time.

4. In the period 1970 to 1986, rainfall in the area decreased from 1,000 millimeters to 650　　millimeters per annum, while above-average temperatures speeded up the　evapotranspiration rate (the rate at which water is lost to the atmosphere through evaporation　and the processes of plant life).

**TPO24: Breathing During Sleep**

1. During NREM (the phase of sleep in which there is no rapid eye movement) breathing　becomes deeper and more regular, but there is also a decrease in the breathing rate,　resulting in less air being exchanged overall.

2. The amount of air exchanged is even lower in REM than NREM because, although　breathing is more rapid in REM,it is also more irregular, with brief episodes of shallow　breathing or absence of breathing.

**托福TPO24阅读长难句TPO24: Moving Into Pueblos**

1. In the Mesa Verde area of the ancient North American Southwest, living patterns changed　in the thirteenth century, with large numbers of people moving into large communal　dwellings called pueblos, often constructed at the edges of canyons, especially on the sides　of cliffs.

2. Few of the cultural traditions and rules that today allow us to deal with dense populations　existed for these people accustomed to household autonomy and the ability to move around　　the landscape almost at will.

3. Some scholars expand on this idea by emphasizing a corresponding need for arable land　　to feed growing numbers of people: construction of small dams, reservoirs, terraces, andfield houses indicates that farmers were intensifying their efforts during the 1200s.

4. Archaeologists find that even the most isolated residences during the eleventh and twelfth　centuries obtained some pottery, and probably food, from some distance away, while major　ceremonial events were opportunities for sharing food and crafts.

5. Scholars believe that this cooperation allowed people to contend with a patchy　environment in which precipitation and other resources varied across the landscape: if you　produce a lot of food one year, you might trade it for pottery made by a distant ally who is　having difficulty with crops—and the next year, the flow of goods might go in the oppositedirection.

**托福TPO23阅读长难句TPO23: Urban Climates**

1. The second factor is that radiant heat coming into the city from the Sun is trapped in　two ways: (1) by a continuing series of reflection among the numerous vertical surfaces　　that buildings present and (2) by the dust dome, the cloudlike layer of polluted air that　most cities produce.

2. Shortwave radiation from the Sun passes through the pollution dome more easily than　outgoing longwave radiation does; the latter is absorbed by the gaseous pollutants of thedome and reradiated back to the urban surface.

**TPO23:Seventeenth-Century Dutch Agriculture**

1. Dutch agriculture was modernized and commercialized new crops and agricultural　techniques raised levels of production so that they were in line with market demands, and　cheap grain was imported annually from the Baltic region in large quantities.

2. Importing the grain, which would have been expensive and time consuming for the　Dutch to have produced themselves, kept the price of grain low and thus stimulated　individual demand for other foodstuffs and consumer goods.

3. As the demand for agricultural produce from both consumers and industry increased,　agricultural land became more valuable and people tried to work the available land more　intensively and to reclaim more land from wetlands and lakes.

4. In order to increase production on existing land, the peasants made more use of crop　rotation and, in particular, began to apply animal waste to the soil regularly, rather thanleaving the fertilization process up to the grazing livestock.

5. Noorderkwartier in Holland, with its numerous lakes and stretches of water, was　particularly suitable for land reclamation and one of the biggest projects undertaken　there was the draining of the Beemster lake which began in 1608.

6. Forty-three windmills powered the drainage pumps so that they were able to lease the　reclamation to farmers as early as 1612, with the investors receiving annual leasing　payments at an interest rate of 17 percent.

**托福TPO23阅读长难句TPO23: Rock Art of the Australia Aborigines**

1. Early in the nineteenth century, encounters with Aboriginal rock art tended to beinfrequent and open to speculative interpretation, but since the late nineteenth century,　awareness of the extent and variety of Australian rock art has been growing.

2. In order to create a sense of structure to this picture, researchers have relied on a　distinction that still underlies the forms of much indigenous visual culture—a distinction　between geometric and figurative elements.

3. The frequency with which certain simple motifs appear in these oldest sites has led　rock-art researchers to adopt a descriptive term—the Panaramitee style—a label which　takes its name from the extensive rock pavements at Panaramitee North in desert SouthAustralia, which are covered with motifs pecked into the surface.

4. Certain features of these engravings lead to the conclusion that they are of great　age—geological changes had clearly happened after the designs had been made and local　Aboriginal informants, when first questioned about them, seemed to know nothing of　their origins.

5. Lesley Maynard, the archaeologist who coined the phrase “Panaramitee style,” suggested that a sequence could be determined for Australian rock art, in which a　geometric style gave way to a simple figurative style (outlines of figures and animals),　followed by a range of complex figurative styles that, unlike the pan-Australian geometric　tradition, tended to much greater regional diversity.

6. While accepting that this sequence fits the archaeological profile of those sites, which　were occupied continuously over many thousands of years a number of writers have　warned that the underlying assumption of such a sequence—a development from the　simple and the geometric to the complex and naturalistic—obscures the cultural　continuities in Aboriginal Australia, in which geometric symbolism remains　fundamentally important.

**托福TPO22阅读长难句TPO22: Spartina**

1. As the seaweed and marsh grass leaves die, bacteria break down the plant material, and　insects, small shrimplike organisms, fiddler crabs, and marsh snails eat the decaying　plant tissue, digest it, and excrete wastes high in nutrients.

2. It spreads primarily by underground stems; colonies form when pieces of the root　system or whole plants float into an area and take root or when seeds float into a suitable　area and germinate.

3. Once established, a stand of Spartina begins to trap sediment, changing the substrate　elevation, and eventually the stand evolves into a high marsh system where Spartina is　gradually displaced by higher-elevation, brackish-water species.

4. Leaving its insect predators behind, the cordgrass has been spreading slowly and　steadily along Washington’s tidal estuaries on the west coast, crowding out the native　plants and drastically altering the landscape by trapping sediment.

5. Efforts to control Spartina outside its natural environment have included burning,　　flooding, shading plants with black canvas or plastic, smothering the plants with dredged　materials or clay, applying herbicide, and mowing repeatedly.

6. Even with a massive effort, it is doubtful that complete eradication of Spartina from　nonnative habitats is possible, for it has become an integral part of these shorelines and　estuaries during the last 100 to 200 years.

**TPO22: The Birth of Photography**

1. The images produced by the camera obscura, a boxlike device that used a pinhole or　　lens to throw an image onto a ground-glass screen or a piece of white paper, were already　familiar—the device had been much employed by topographical artists like the Italian　painter Canaletto in his detailed views of the city of Venice.

2. Because the medium was so prolific, in the sense that it was possible to produce amultitude of images very cheaply, it was soon treated as the poor relation of fine art,　　rather than its destined successor.

3. The rapid technical development of photography—the introduction of lighter and　　simpler equipment, and of new emulsions that coated photographic plates, film, and　　paper and enabled images to be made at much faster speeds—had some unanticipated　consequences.

4. The new candid photography—unposed pictures that were made when the subjects　were unaware that their pictures were being taken—confirmed these scientific results,　　and at the same time, thanks to the radical cropping (trimming) of images that the　camera often imposed, suggested new compositional formats.

**托福TPO22阅读长难句TPO22: The Allende Meteorite**

1. Sometime after midnight on February 8,1969, a large, bright meteor entered Earth's　　atmosphere and broke into thousands of pieces, plummeted to the ground, and scattered　over an area 50 miles long and 10 miles wide in the state of Chihuahua in Mexico.

2. When broken open, Allende stones are revealed to contain an assortment of small,　　distinctive objects, spherical or irregular in shape and embedded in a dark gray matrix　(binding material), which were once constituents of the solar nebula—the interstellar　　cloud of gas and dust out of which our solar system was formed.

3. A few chondrules contain grains that survived the melting event, so these enigmatic　　chondrules must have formed when compact masses of nebular dust were fused at high　temperatures—approaching 1,700 degrees Celsius—and then cooled before these　surviving grains could melt.

4. However, studies of the textures of inclusions reveal that the order in which the　　minerals appeared in the inclusions varies from inclusion to inclusion, and often does not　match the theoretical conden[**sat**](http://sat.zhan.com/)ion sequence for those metals.

5. However, detailed studies of the chondrite matrix suggest that much of it, too, has been　formed by condensation or melting in the nebula, although minute amounts of surviving　　interstellar dust are mixed with the processed materials.

6. Since practically all the solar system's mass resides in the Sun, this similarity in　chemistry means that chondrites have average solar system composition, except for the　most volatile elements; they are truly lumps of nebular matter, probably similar incomposition to the matter from which planets were assembled.

**托福TPO21阅读长难句TPO21:Geothermal Energy**

1. Geothermal energy becomes available in a practical form when underground heat is　transferred by water that is heated as it passes through a subsurface region of hot rocks (a　heat reservoir) that may be hundreds or thousands of feet deep.

2. Geothermal energy is in a sense not renewable, because in most cases the heat wouldbe drawn out of a reservoir much more rapidly than it would be replaced by the very slow　geological processes by which heat flows through solid rock into a heat reservoir.

3. Although the potential is enormous, it is likely that in the near future geothermal　energy can make important local contributions only where the resource is close to the　user and the economics are favorable, as they are in California, New Zealand, andIceland.

**TPO21: The Origins of Agriculture**

1. It would appear that the instability of the climatic conditions led populations that had　originally been nomadic to settle down and develop a sedentary style of life, which led in　turn to population growth and to the need to increase the amount of food available.

2. It is archaeologist Steven Mithen's thesis, brilliantly developed in his book The　Prehistory of the Mind (1996), that approximately 40,000 years ago the human mind　developed cognitive fluidity, that is, the integration of the specializations of the mind:　technical, natural history (geared to understanding the behavior and distribution of　natural resources), social intelligence, and the linguistic capacity.

3. Mithen proposes the existence of four mental elements to account for the emergence of　farming: (1) the ability to develop tools that could be used intensively to harvest and　process plant resources; (2) the tendency to use plants and animals as the medium to　acquire social prestige and power; (3) the tendency to develop "social relationships" with　animals structurally similar to those developed with people—specifically, the ability to　think of animals as people (anthropomorphism) and of people as animals (totemism);　and (4) the tendency to manipulate plants and animals.

4. The fact that some societies domesticated animals and plants, discovered the use of　　metal tools, became literate, and developed a state should not make us forget that others　developed pastoralism or horticulture (vegetable gardening) but remained illiterate and　at low levels of productivity; a few entered the modern period as hunting and gatheringsocieties.

**托福TPO21阅读长难句TPO21: Autobiographical Memory**

1. Perhaps the explanation goes back to some ideas raised by influential Swiss　psychologist Jean Piaget—namely, that children under age two years represent events in a　qualitatively different form than older children do.

2. When researchers had one year olds imitate an action sequence one year after they first　saw it, there was correlation between the children's verbal skills at the time they first sawthe event and their success on the later memory task.

3. A final suggestion is that children must begin to develop a "theory of mind"—an　awareness of the concept of mental states (feelings, desires, beliefs, and thoughts), their　own and those of others—before they can talk about their own past memories.

**托福TPO20阅读长难句TPO20: Westward Migration**

1. The story of the westward movement of population in the United States is, in the main,　the story of the expansion of American agriculture—of the development of new areas for　the raising of livestock and the cultivation of wheat, corn, tobacco, and cotton.

2. The European ancestors of some Americans had for centuries lived rooted to the same　　village or piece of land until some religious, political, or economic crisis uprooted them　and drove them across the Atlantic.

3. In American society, however, the class structure was less rigid; some people changed　occupations easily and believed it was their duty to improve their social and economic　position.

4. The West had plenty of attractions: the alluvial river bottoms, the fecund soils of the　　rolling forest lands, the black loams of the prairies were tempting to New England　farmers working their rocky, sterile land and to southeastern farmers plagued with soil　depletion and erosion.

**TPO20: Early Settlements in the Southwest Asia**

1. Pollen samples from freshwater lakes in Syria and elsewhere tell us forest cover　expanded rapidly at the end of the Ice Age, for the southwestern Asian climate was still　cooler and considerably wetter than today.

2. Thanks to extremely fine-grained excavation and extensive use of flotation methods　　(through which seeds are recovered from soil samples), we know a great deal about the　foraging practices of the inhabitants of Abu Hureyra in Syria's Euphrates valley.

3. Many complex factors led to the adoption of the new economies, not only at Abu　Hureyra, but at many other locations such as 'Ain Ghazal, also in Syria, where goat toe　bones showing the telltale marks of abrasion caused by foot tethering (binding) testify to　early herding of domestic stock.

**TPO20: Fossil Preservation**

1. Water containing dissolved silica, calcium carbonate, or iron may circulate through the　enclosing sediment and be deposited in cavities such as marrow cavities and canals in　bone once occupied by blood vessels and nerves.

2. Among the superbly preserved Messel fossils are insects with iridescent exoskeletons　(hard outer coverings), frogs with skin and blood vessels intact, and even entire smallmammals with preserved fur and soft tissue.

**托福TPO1阅读长难句TPO19: The Roman Army's Impact on Britain**

1. In the wake of the Roman Empire's conquest of Britain in the first century A.D., a large　number of troops stayed in the new province, and these troops had a considerable impact　on Britain with their camps, fortifications, and participation in the local economy.

2. The army also provided a mean of personal advancement for auxiliary soldiers　recruited from the native peoples, as a man obtained hereditary Roman citizenship on　retirement after service in an auxiliary regiment.

3. The reverse process brought young men to Britain, where many continued to live aftertheir 20 to 25 years of service, and this added to the cosmopolitan Roman character of　the frontier population.

**TPO19: Succession, Climax, and Ecosystems**

1. Their major point was that the distribution of a given species was controlled by the　habitat requirements of that species and that therefore the vegetation types were a simple　consequence of the ecologies of individual plant species.

2. With "climax," "biome," "superorganism," and various other technical terms for the　association of animals and plants at a given locality being criticized, the term "ecosystem"　　was more and more widely adopted for the whole system of associated organisms　together with the physical factors of their environment.

**TPO19: Discovering The Ice Ages**

1. In the middle of the nineteenth century, Louis Agassiz, one of the first scientists to　　study glaciers, immigrated to the United States from Switzerland and became a professor　at [**Harvard University**](http://college.zhan.com/list/2.html), where he continued his studies in geology and other sciences.

2. From this analysis of marine sediments, geologists have learned that there were many　shorter, more regular cycles of glaciation and deglaciation than geologists had recognized　from the glacial drift of the continents alone.

**托福TPO18阅读长难句TPO18: Industrialization in the Netherlands and Scandinavia**

1. In view of their later start and their lack of coal—undoubtedly the main reason they　were not among the early industrializers—it is important to understand the sources of　their success.

2. The people of the Netherlands, with a long tradition of fisheries and mercantile　　shipping, had difficulty in developing good harbors suitable for steamships: eventually　they did so at Rotterdam and Amsterdam, with exceptional results for transit trade with　Germany and central Europe and for the processing of overseas foodstuffs and raw　materials (sugar, tobacco, chocolate, grain, and eventually oil).

3. In Denmark and Sweden agricultural reforms took place gradually from the late　eighteenth century through the first half of the nineteenth, resulting in a new class of　peasant landowners with a definite market orientation.

4. The key factor in the success of these countries (along with high literacy, which　contributed to it) was their ability to adapt to the international division of labor　determined by the early industrializers and to stake out areas of specialization in　international markets for which they were especially well suited.

5. This meant a great dependence on international commerce, which had notorious　fluctuations; but it also meant high returns to those factors of production that were　fortunate enough to be well placed in times of prosperity.

**TPO18: The Mystery of Yawning**

1. According to conventional theory, yawning takes place when people are bored or sleepy　and serves the function of increasing alertness by reversing, through deeper breathing,the drop in blood oxygen levels that are caused by the shallow breathing that　accompanies lack of sleep or boredom.

2. About the closest any research has come to supporting the tiredness theory is to　confirm that adults yawn more often on weekdays than at weekends, and that school　children yawn more frequently in their first year at primary school than they do inkindergarten.

3. But, while accepting that not everything in life can be explained by Darwinian　evolution, there are sound reasons for being skeptical of theories like this one, which　avoid the issue of what yawning does for adults.

4. Such yawning is often referred to as "incongruous" because it seems out of place, at　least on the tiredness view: soldiers yawning before combat, musicians yawning before　performing, and athletes yawning before competing.

**托福TPO18阅读长难句TPO18: Lightning**

1. Below this large, cold, negatively charged region, the cloud is warmer than -15℃, and at　these temperatures, collisions between ice crystals and falling ice pellets produce positively charged ice pellets that then populate a small region at the base of the cloud.

2. However, as the storm cloud develops, the ground beneath the cloud becomes　positively charged and lightning can take place in the form of an electrical discharge　between the negative charge of the cloud and the positively charged ground.

3. Once a channel has been formed, it is usually used by several lightning discharges, each　of them consisting of a stream of electrons from the cloud meeting a stream of positive　particles along the established path.

**托福TPO17阅读长难句TPO17：Europe's Early Sea Trade with Asia**

1. In the fourteenth century, a number of political developments cut Europe's overland　trade routes to southern and eastern Asia, with which Europe had had important and　highly profitable commercial ties since the twelfth century.

2. Widely reported, if somewhat distrusted, accounts by figures like the famous traveler　from Venice, Marco Polo, of the willingness of people in China to trade with Europeans　and of the immensity of the wealth to be gained by such contact made the ideairresistible.

3. In the largest caravels, two main masts held large square sails that provided the bulk of　the thrust driving the ship forward, while a smaller forward mast held atriangular-shaped sail, called a lateen sail, which could be moved into a variety of　positions to maneuver the ship.

4. A maritime code known as the Consulate of the Sea, which originated in the western　Mediterranean region in the fourteenth century, won acceptance by a majority of sea　goers as the normative code for maritime conduct; it defined such matters as the　authority of a ship's officers, protocols of command, pay structures, the rights of sailors,and the rules of engagement when ships met one another on the sea-lanes.

**托福TPO17阅读长难句TPO17: Animal Signals in the Rain Forest**

1. In the green-to-yellow lighting conditions of the lowest levels of the forest, yellow and　green would be the brightest colors, but when an animal is signaling, these colors would　not be very visible if the animal was sitting in an area with a yellowish or greenish　background.

2. This species, which lives in the rain forests and scrublands of the east coast of Australia,　has a brown-to-black plumage with bare, bright-red skin on the head and neck and a neck　collar of orange-yellow loosely hanging skin.

3. During courtship and aggressive displays, the turkey enlarges its colored neck collar by　inflating sacs in the neck region and then flings about a pendulous part of the colored　signaling apparatus as it utters calls designed to attract or repel.

**TPO17: Symbiotic Relationship**

1. The third type of symbiosis, mutualism, benefits both partners in the relationship　Legume plants and their nitrogen-fixing bacteria, and the interactions between flowering　plants and their pollinators, are examples of mutualistic association.

2. When the ants are removed, the trees usually die, probably because herbivores　　damage them so much that they are unable to compete with surrounding vegetation forlight and growing space.

**托福TPO16阅读长难句TPO16：Trade and the Ancient Middle East**

1. This has been so since ancient times, partly due to the geology of the area, which is　mostly limestone and sandstone, with few deposits of metallic ore and other useful　materials Ancient demands for obsidian (a black volcanic rock useful for making mirrors　and tools) led to trade with Armenia to the north, while jade for cutting tools was broughtfrom Turkistan, and the precious stone lapis lazuli was imported from Afghanistan.

2. Records show merchant caravans and trading posts set up by the Sumerians in the　　surrounding mountains and deserts of Persia and Arabia, where they traded grain for raw　materials, such as timber and stones, as well as for metals and gems.

3. In these shops differences of rank were blurred as artisans and masters labored side by　side in the same modest establishment, were usually members of the same guild and　religious sect, lived in the same neighborhoods, and often had assumed (or real) kinshiprelationships.

4. The growth of independent guilds was furthered by the fact that surplus was not a　　result of domestic craft production but resulted primarily from international trading; the　government left working people to govern themselves, much as shepherds of tribal　confederacies were left alone by their leaders.

5. In the multiplicity of small-scale local egalitarian or quasi-egalitarian organizations for　　fellowship, worship, and production that flourished in this laissez-faire environment,　individuals could interact with one another within a community of harmony and　ideological equality, following their own popularly elected leaders and governing　themselves by shared consensus while minimizing distinctions of wealth and power.

6. As among tribespeople, personal relationships and a careful weighing of character have　always been crucial in a mercantile economy with little regulation, where one's word is　one's bond and where informal ties of trust cement together an international trade　network.

7. Nor have merchants and artisans ever had much tolerance for aristocratic professions　of moral superiority, favoring instead an egalitarian ethic of the open market, where　steady hard work, the loyalty of one's fellows, and ntrepreneurial skill make all the　difference.

8. The central state, though often very rich and very populous, was intrinsically fragile,　since the development of new international trade routes could undermine the monetarybase and erode state power, as occurred when European seafarers circumvented Middle　Eastern merchants after Vasco da Gama's voyage around Africa in the late fifteenth　century opened up a southern route.

**托福TPO16阅读长难句TPO16：Development of the Periodic Table**

1. When the elements known at the time were ordered by increasing atomic mass, it was　found that successive elements belonged to different chemical groups and that the order　of the groups in this sequence was fixed and repeated itself at regular intervals.

2. Thus when the series of elements was written so as to begin a new horizontal row with　each alkali metal, elements of the same groups were automatically assembled in vertical　columns in a periodic table of the elements.

3. Because there is no space in the periodic table between these two elements,　Mendeleyev suggested that the atomic mass of indium be changed to a completely　　different value, where it would fill an empty space between cadmium and tin.

4. Ramsay then studied a gas that was present in natural gas deposits and discovered thatit was helium, an element whose presence in the Sun had been noted earlier in the　　spectrum of sunlight but that had not previously been known on Earth.

TPO16：Planets in Our Solar System

1. Also, because the molecular motion of a gas depends on temperature, at the low　temperatures of the Jovian planets even the lightest gases are unlikely to acquire the　speed needed to escape.

2. The explanation may be that the terrestrial planets were once much larger and richer in　these materials but eventually lost them because of these bodies' relative closeness to the　Sun, which meant that their temperatures were relatively high.

**托福TPO15阅读长难句TPO15: The Warm-Blooded Turtle**

1. In a countercurrent exchange system, the blood vessels carrying cooled blood from　the flippers run close enough to the blood vessels carrying warm blood from the body to　pick up some heat from the warmer blood vessels; thus, the heat is transferred from the　outgoing to the ingoing vessels before it reaches the flipper itself.

**TPO15: Glacier Formation**

1. When the ice is thick enough, usually over 30 meters, the weight of the snow and　firn will cause the ice crystals toward the bottom to become plastic and to flow　outward or downward from the area of snow accumulation.

2. For a glacier to grow or maintain its mass, there must be sufficient snowfall to　match or exceed the annual loss through melting, evaporation, and calving, which　occurs when the glacier loses solid chunks as icebergs to the sea or to large lakes.

3. Glaciers move slowly across the land with tremendous energy, carving into even the　hardest rock formations and thereby reshaping the landscape as they engulf, push,　drag, and finally deposit rock debris in places far from its original location.

**TPO14: Maya Water Problems**

1. To understand the ancient Mayan people who lived in the area that is today southern　Mexico and Central America and the ecological difficulties they faced, one must firstconsider their environment, which we think of as "jungle" or "tropical rainforest."

2. While that made things hard for ancient Maya living in the south, it has also made　things hard for modern archaeologists who have difficulty understanding why ancientdroughts caused bigger problems in the wet south than in the dry north.

3. Making matters worse, most of the Yucatan Peninsula consists of karst, a porous　sponge-like limestone terrain where rain runs straight into the ground and where little or　no surface water remains available.

4. The explanation is that the Maya excavated depressions, or modified natural　depressions, and then plugged up leaks in the karst by plastering the bottoms of the　depressions in order to create reservoirs, which collected rain from large plastered　catchment basins and stored it for use in the dry season.

**TPO14: Pastoralism in Ancient Inner Eurasia**

1. Archaeological evidence suggests that by 3000 B.C., and perhaps even earlier, there　had emerged on the steppes of Inner Eurasia the distinctive types of pastoralism that　were to dominate the region's history for several millennia.

2. The remarkable mobility and range of pastoral societies explain, in part, why so many　linguists have argued that the Indo-European languages began their astonishing　expansionist career not among farmers in Anatolia (present-day Turkey), but among early pastoralists from Inner Eurasia.

3. Such theories imply that the Indo-European languages evolved not in Neolithic　(10,000 to 3,000 B.C.) Anatolia, but among the foraging communities of the cultures in　the region of the Don and Dnieper rivers, which took up stock breeding and began to　exploit the neighboring steppes.

4. Inequalities of wealth and rank certainly exist, and have probably existed in most　pastoralist societies, but except in periods of military conquest, they are normally too　　slight to generate the stable, hereditary hierarchies that are usually implied by the use of　the term class.

5. Inequalities of gender have also existed in pastoralist societies, but they seem to havebeen softened by the absence of steep hierarchies of wealth in most communities, and　also by the requirement that women acquire most of the skills of men, including, often,

their military skills

**托福TPO13阅读长难句TPO13: Types of Social Groups**

1. Sociologists view primary groups as bridges between individuals and the larger society　because they transmit, mediate, and interpret a society's cultural patterns and provide the　sense of oneness so critical for social solidarity.

2. For instance, some social groups employ shunning (a person can remain in the　community, but others are forbidden to interact with the person) as a device to bring into　line individuals whose behavior goes beyond that allowed by the particular group.

**TPO13: Methods of Studying Infant Perception**

1. Similarly, changes in the infant's general level of motor activity —turning the head,　blinking the eyes, crying, and so forth — have been used by researchers as visual　indicators of the infant's perceptual abilities.

2. Therefore, when observational assessment is used as a technique for studying infant　　perceptual abilities, care must be taken not to overgeneralize from the data or to rely on　one or two studies as conclusive evidence of a particular perceptual ability of the infant.

**TPO13: Biological Clocks**

1. The relations between animal activity and these periods, particularly for the daily　rhythms, have been of such interest and importance that a huge amount of work has　been done on them and the special research field of chronobiology has emerged.

2. Normally, the constantly changing levels of an animal's activity—sleeping, feeding,　moving, reproducing, metabolizing, and producing enzymes and hormones, for　　example—are well coordinated with environmental rhythms, but the key question is　　whether the animal's schedule is driven by external cues, such as sunrise or sunset, or is　　instead dependent somehow on internal timers that themselves generate the observed　biological rhythms.

3. Indeed, stability of the biological clock's period is one of its major features, even when　　the organism's environment is subjected to considerable changes in factors, such as temperature, that would be expected to affect biological activity strongly.

4. The disorienting effects of this mismatch between external time cues and internal　　schedules may persist, like our jet lag, for several days or weeks until certain cues such　as the daylight/darkness cycle reset the organism's clock to synchronize with the daily　　rhythm of the new environment.

5. Such an external cue not only coordinates an animal's daily rhythms with particular　　features of the local solar day but also—because it normally does so day after day-seems　　to keep the internal clock's period close to that of Earth's rotation.

**阅读长难句TPO12: Which Hand did they use?**

1. Most engravings, for example, are best lit from the left, as befits the work of　right-handed artists, who generally prefer to have the light source on the left so that theshadow of their hand does not fall on the tip of the engraving tool or brush.

2. Right-handers tend to have longer, stronger, and more muscular bones on the right side, and Marcellin Boule as long ago as 1911 noted the La Chapelle-aux-Saints　Neanderthal skeleton had a right upper arm bone that was noticeably stronger than the　left.

3. The part of the brain responsible for fine control and movement is located in the left　cerebral hemisphere, and the findings above suggest that the human brain was already　asymmetrical in its structure and function not long after 2 million years ago.

4. Among Neanderthalers of 70,000–35,000 years ago, Marcellin Boule noted that the La　Chapelle-aux-Saints individual had a left hemisphere slightly bigger than the right, and　the same was found for brains of specimens from Neanderthal, Gibraltar, and La Quina.

**TPO12: Water in The Desert**

1. This is useful for irrigation, but the high temperatures, low humidities, and different　day lengths of the dry season, compared to the normal growing season, can present　difficulties with some crops.

**TPO12: Transition to Sound in Film**

1. Despite all the highly visible technological developments in theatrical and home delivery　of the moving image that have occurred over the decades since then, no single innovationhas come close to being regarded as a similar kind of watershed.

2. In many instances, spectators in the era before recorded sound experienced elaborate　aural presentations alongside movies' visual images, from the Japanese benshi (narrators)　crafting multivoiced dialogue narratives to original musical compositions performed by　symphony-size orchestras in Europe and the United States.

3. In Berlin, for the premiere performance outside the Soviet Union of The Battleship　Potemkin, film director Sergei Eisenstein worked with Austrian composer Edmund Meisel　(1874-1930) on a musical score matching sound to image; the Berlin screenings with live music helped to bring the film its wide international fame.

4. Though it may be difficult to imagine from a later perspective, a strain of critical opinion　in the 1920s predicted that sound film would be a technical novelty that would soon fade　from sight, just as had many previous attempts, dating well back before the First World　War, to link images with recorded sound.

5. To be sure, their evaluation of the technical flaws in 1920s sound experiments was not　so far off the mark, yet they neglected to take into account important new forces in the　motion picture field that, in a sense, would not take no for an answer.

6. In 1929 the United States motion picture industry released more than 300 sound　films—a rough figure, since a number were silent films with music tracks, or films　prepared in dual versions, to take account of the many cinemas not yet wired for sound.

7. In Europe it took a little longer, mainly because there were more small producers forwhom the costs of sound were prohibitive, and in other parts of the world problems　with rights or access to equipment delayed the shift to sound production for a few more　years (though cinemas in major cities may have been wired in order to play foreign　sound films).

**托福TPO11阅读长难句TPO11：Ancient Egyptian Sculpture**

1. Without this knowledge we can appreciate only the formal content of Egyptian art,　and we will fail to understand why it was produced or the concepts that shaped it　and caused it to adopt its distinctive forms.

2. In fact, a lack of understanding concerning the purposes of Egyptian art has often　　led it to be compared unfavorably with the art of other cultures: Why did the　Egyptians not develop sculpture in which the body turned and twisted throughspace like classical Greek statuary?

3. When such statues are viewed in isolation, out of their original context and　without knowledge of their function, it is easy to criticize them for their rigid　attitudes that remained unchanged for three thousand years.

4. Other statues were designed to be placed within an architectural setting, for　instance, in front of the monumental entrance gateways to temples known as pylons,　or in pillared courts, where they would be placed against or between pillars: their　frontality worked perfectly within the architectural context.

5. By contrast, wooden statues were carved from several pieces of wood that were　pegged together to form the finished work, and metal statues were either made by　wrapping sheet metal around a wooden core or cast by the lost wax process.

6. Unlike formal statues that are limited to static poses of standing, sitting, and　kneeling, these figures depict a wide range of actions, such as grinding grain,　baking bread, producing pots, and making music, and they are shown in　appropriate poses, bending and squatting as they carry out their tasks.

**TPO11：Orientation and Navigation**

1. He then set up experiments with caged starlings and found that their orientation was, in　fact, in the proper migratory direction except when the sky was overcast, at which times　there was no clear direction to their restless movements.

2. If the artificial Sun remained stationary, the birds would shift their direction with　respect to it at a rate of about 15 degrees per hour, the Sun's rate of movement across the　sky.

**托福TPO1阅读长难句TPO11：Begging By Nestlings**

1. The hypothesis that begging calls have evolved properties that reduce their potential for　attracting predators yields a prediction: baby birds of species that experience high rates of　nest predation should produce softer begging signals of higher frequency than nestlings ofother species less often victimized by nest predators.

2. This prediction was supported by data collected in one survey of 24 species from an　Arizona forest, more evidence that predator pressure favors the evolution of begging calls　　that are hard to detect and pinpoint.

3. One possibility is that a noisy baby bird provides accurate signals of its real hunger and　good health, making it worthwhile for the listening parent to give it food in a nest where　several other offspring are usually available to be fed.

4. When experimentally deprived baby robins are placed in a nest with normally fed siblings,　the hungry nestlings beg more loudly than usual—but so do their better-fed siblings, though　not as loudly as the hungrier birds.

5. Indeed, if you take baby tree swallows out of a nest for an hour feeding half the set and　starving the other half, when the birds are replaced in the nest, the starved youngsters beg　more loudly than the fed birds, and the parent birds feed the active beggars more than those　who beg less vigorously.

6. The answer lies apparently not in the increased energy costs of exaggerated begging—such　　energy costs are small relative to the potential gain in calories—but rather in the damage　that any successful cheater would do to its siblings, which share genes with one another.