地质英语

丘建国 编
许志平 审

地 质 英 语

丘建国 编

许志平 审

本教材为大学地质专业学生而编。用作大学英语第二阶段——专业阅读[illegible]段教材。

所选各篇均自英文版原著。十五课课文内容为地质学基础知识。其后为两篇翻译参考资料。供学生练习用。教材之后附有一份录相片及一份幻灯片的文字材料。该材料系根据音象带记录。经外籍教师审定而成。

水平有限。漏误不免。企盼各方专家不吝赐教。

编　者

Contents

Lesson 1 Text: Geologic Methods

Reading Material: Scope Geology

Lesson 2 Text: Some Historical Notes About Geology

Reading Material: An Overview of the Third Planet

Lesson 3 Text: Chemical Weathering

Reading Material: Mechanical Weathering

Lesson 4 Text: Movement of Groundwater

Reading Material: Wells

Lesson 5 Text: Evironments of Deposition

Reading Material: Detrital Sedimentary Rocks

Lesson 6 Text: Sedimentary Structure

Reading Material: Features of Sedimentary Rocks

Lesson 7 Text: Folded and Tilted Strata

Reading Material: Folds

Lesson 8 Text: Faults

Reading Material: Faulting

Lesson 9 Text: Correlation and Dating of Rocks

Reading Material: Fossils and Correlation

Lesson 10 Text: The Paleozoic Era

Reading Material: Late Paleozoic History

Lesson 11 Text: Energy Resources (1)

Reading Material: The Earth's Geologic Resources

Lesson 12 Text: Energy Resources (2)

Reading Material: Geology in Coal Mining and Coal Utilization

Lesson 13 Text: Characterization of coal

Reading Material: Megascopic Features of low-rank coals

Lesson 14 Text: Map Compilation

Reading Material: Design of an Exploration Programme

Lesson 15 Text: Some Fundamental Concepts of Evironmental Geology (1)

Reading Material: Some Fundamental Concepts of Evironmental Geology (2)

Supplemental Materials for Translation

(A) The Depositional Environment for coal

(B) Evironments of Erosion, Equilibrium and Deposition

Script for the Narrate of the video Film "Drifting Continents"

Script for the Narrate of the Slides "The Eruption of Mount St, Helens"

英语地质著作的阅读及翻译特点

Vocabulary

地质年代及统一地层表

Lesson 1

Text

Geologic Methods

Geology is based mainly on observations and seeks to determine the history of the earth by explaining these observations logically, using other sciences such as physics, chemistry, and biology. Only a small part of geology can be approached experimentally. For example although the important use of fossils to date or establish contemporaneity of rock strata is based on the simple, basic principle that life has changed during the history of the earth, this principle could not be established experimentally; it was the result of careful observations and analyses over a long period of time by many people of varied backgrounds.

Geologic problems are many, diverse, and complex; almost all must be approached indirectly, and in some cases, different approaches to the same problem lead to conflicting theories. It is generally difficult to test a theory rigorously for several reasons. The scale of most problems prevents laboratory study; that is, one cannot bring a volcano into the laboratory, although some facets of volcanoes can be studied indoors. It is also difficult to simulate geologic time in an experiment. All of this means that geology lacks exactness and that our ideas change as new data become available. This is not a basic weakness of geology as a science, but means only that much more remains to be discovered; this is a measure of the challenge of geology.

Reasoning ability and a broad background in all branches of science are the main tools of geologists. Geologists use the method of multiple working hypotheses to test their theories and to attempt to arrive at the best-reasoned theory. This thought process requires as many hypotheses as possible and the ability to devise ways to test each one. Not always is it possible to arrive at a unique solution--but this is the goal. In the sense that geologists use observation, attention to details, and reasoning, their methods are similar to those of fictional detectives.

The most important method used by the geologist is to plot on maps the locations of the rock types exposed at the earth's surface. The rocks are plotted according to their type and age on most maps. (See Fig. 1-6.) From such maps it is possible to interpret t the history of the area. The early geologists had to make their own maps, and work in a remote area was very difficult in many cases. Now, excellent maps produced from from aerial photographs are available for mosf areas. Much geologic mapping is done directly on either black and white or color aerial photographs, which have proved tobbe unexcelled for accurate location of rock units. In addition, the out crop pattern of the rock units generally shows well on air photos. (See Fig. 1-7.) Radar images that show the surface beneath thick forest cover now extend the use of aerial photographs into such areas. (See Fig. 1-8) Helicopters and jeeps have largely, but not entirely, replaced pack animals and back packing. (See Fig. 1-9) However, in spite of all of these advances that have accelarated geologic mapping, much of the earth is not mapped geologically or

at best has been mapped only in reconnaissance fashion.

Recent advances have extended classical geologic mapping by providing new things to map. As an example, it is possible to obtain, with some complex instrumentation , aerial views of areas in infrared or heat wavelengths rather than visible light. These are used in the study of active volcanic areas and ground water studies as well as other types of studies. (See Fig. 1-10.) Other examples of the types of data now mapped include the earth's magnetic field, radioactivity, heat flow, seismic properties, and many more. Mapping this new data is giving geologists new insights in understanding the earth.

The other more obvious method used extensively by the geologist is the detailed study of rocks themselves. (See Figs. 1-11 and 1-12.) This can be done at several levels, and the first chapters of this book are largely concerned with these topics. The first methods applied were optical microscopy and chemical analysis, and these are both still in wide use. Newer methods such as the electron microscope; X-ray analysis; optical, infrared, and X-ray spectroscopy; and the electron microprobe now permit very detailed studies of rocks.

New Words and Expressions

establish [is'tæbliʃ] vt. 建立，制定；确立；划定

contemporaneity [kətempərə'ni:iti] n. 同时代，同时发生；同时性

diverse [dai'və:s] a.（性质、种类）不同的，多种多样的

rigorously ['rigərəsli] adv. 严格地，精确地

facet ['fæsit] n. 面，小面；（事情的某一）方面，侧面

simulate ['simjuleit] vt. 模拟，仿真

challenge ['tʃælindʒ] vt.（向一）挑战；（提出复杂）问题

n.（造成的）困难，（复杂的）课题

hypothesis [hai'pɔθisis] n. pl. hypotheses 假说

multiple working hypotheses 多种工作假说，多种可能假说

unique [ju:'ni:k] a. 唯一的，无（双）比的；单值的

fiction ['fikʃən] a. 虚构的，小说式的

detective [di'tektiv] n. 侦探，探测

a. 侦探的，探测的

plot [plɔt] v. 阴谋；区划；标绘

remote [ri'məut] a. 遥（远、控）的；偏（疏，久）远的

unexcel ['ʌnik'sel] vt. 不比…强

vi. 不比别人强，不突出好

rock unit 岩石地层单位

image ['imidʒ] n. （图。肖。形。景。映。影）象

radar image 雷达影象

accelerate [æk'selə reit] v. 加速。促进

reconnaissance [ri'kɔnisəns] n. 侦察；勘测（查）。踏（草）勘

infrared ['infrə'red] a. 红外（线。区）的

n. 红外线（区）

heat [hi:t] n. 热。热辐射

radioactivity [reidiəuæk'tiviti] n. 放射性

seismic (al) ['saizmik(l)] or : seismal

a. 地震（所引起）的

optical ['ɔpti kl] a. 光学的

microscope ['maikrəuskəup] n. 显微。显微镜

microscopy ['maikɔ'skəupi] n. 显微（镜）学。显微技术。显微检查法

x-ray ['iks'rei] n. x－射线

electron [i'lectrɔn] n. 电子

microprobe ['maikrəprəb] n. 显微探针

be a measure of ... 是衡量…的尺度

in the sense that (of) 在…意义上

Notes

1. Geology is based mainly on ..., using other sciences ... .

句中 "using ..." 为现在分词短语，作 explaining 的方式状语。

2. it was the result of careful observations ... by many people of varied backgrounds.

句中 "backgrounds" 指基础知识，经历 "many people of varied backgrounds" 指各路学者，各方面的人们。

3. This is not a basic weakness ... challenge of geology.

句中 "that much more remains to be discovered" 相当于 "that there are much more remains to be discovered in the field of geology than in others."

句中 "this is a measure of challenge of geology" 译为：这就是地质学的难度所在。

4. The early geologists had to make their own maps,... 早期的地质学家不得不自己测绘地图。意指没有前人绘制的地图可借用。

5. Radar images that show the ... into such areas.

句中 "that show ... forest cover" 为定语从句，修饰 "radar images."

句中 "such areas" 指 "the areas which are covered with thick forest."

句中 "extend the use of ... into such areas"，意为将航空摄影技术的应用扩大到这样一些地区。

Reading Material

Geology is concerned both with the processes operating in and on the earth, and with the history of the earth including the history of life. In the broadest sense, geology includes the study of the continents, the oceans, the atmosphere, and the earth's magnetic and radiation fields. Clearly, this scope is too broad for any one scientist, so geologists generally, but not exclusively, limit themselves to the solid earth that can be studied directly. Other specialties have developed to study the other aspects of the earth. Geophysicists study the deep parts of the earth and its fields, mainly by indirect methods; oceanographers study the hydrosphere; and meteorologists study the atmosphere.

Even with this restriction, geology is a very broad field. Most geologists specialize in one or more facets of geology, much as engineers specialize in various fields of physical science such as electronics or construction. However, geology is even broader than engineering because it encompasses both physical and biological science.

Mention of a few of the specialties in geology will illustrate. Those who study minerals and rocks need specialized training in chemistry and physics, as does the geochemist who is concerned with chemical processes in the earth. Those who study fossils must be trained in biology of plants and animals, both vertebrate and invertebrate. Those who study deformed rocks must know mechanics. Ground water and petroleum geologists must be familiar with hydrodynamics. A Complete listing would be very long, but these examples will illustrate the point. All of these specialties overlap somewhat, and no matter what the specialty, a geologist must be familiar with all facets of geology.

New Words and Expression

specialty [ˈspeʃəlti] =speciality n. 特性；专门研究，专长，专业（化）

oceanographer [ˌəuʃənɔgˈræfə] n. 海洋学家

hydrosphere [ˈhaidrəsfiə] n. 水圈

restriction [risˈtrikʃən] n. 限制，约束

meteorotogist [mi:tjəˈɔlə dʒist] n. 气象学家

encompass [inˈkʌmpəs] vt. 拥有；围绕；包含（括，围）

vertebrate [ˈvə:tibrit] a. n. 有脊椎（的）；脊椎动物（的）

deformed [diˈfɔ:md] a. 畸形的，变（了）形的

mechanics [məˈkæniks] n. 机械（部份），机构；力学，机械学

hydrodynamics [ˌhaidrəudaiˈnæmiks] n. 流体力学

overlap [əuvəˈlæp] 叠加，超叠，重叠

Lesson 2

Text

Some Historical Notes About Geology

Catastrophism

During the seventeenth and eighteenth centuries the doctrine of catastrophism strongly influenced the formulation of explanations about the dynamics of the earth. Briefly stated, catastrophists believed that the earth's landscape had been developed primarily by great catastrophes . Features such as mountains and canyons, which today we know take great periods of time to form, were explained as having been produced by sudden and often worldwide disasters produced by unknowable causes that no longer operate. This philosophy was an attempt to fit the rate of earth processes to the then-current ideas on the age of the earth. In 1654, Archbishop James Ussher, a scholar of the Bible, concluded that the earth was approximately 6000 years old, having been created in 4004 B.C. Later, another biblical scholar named Lightfoot was even more specific, declaring that the earth had been created at 9:00 A.M. on October 26, 4004 B.C.

The relationship between catastrophism and the age of the earth has been summarized nicely as follows:

That the earth has been through tremendous adventures and had seen mighty changes during its obscure past was plainly evident to every inquiring eye; but to concentrate these changes into a few