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高等学校教学用书

# 测绘专业英语

朱家钰 蒋芷华 马金凯 编  
马振利 孙绪义 林 敬

煤炭工业出版社

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## 内 容 提 要

本书共 50 课。第 1~40 课设课文和阅读材料,内容选自近年来英、美、苏等国测量英语教材,包括:误差理论和平差基础,普通测量,工程测量,大地测量和矿山测量等;第 41~50 课只设课文,内容大多选自近期国际测绘学会会议和期刊上发表的论文。

本书可作为测绘专业学生的科技英语教材,也可供有关专业学生和科技人员参考。

责任编辑:洪 镀

## 高 等 学 校 教 学 用 书 测 绘 专 业 英 语

朱家钰 蒋芷华 马金凯 编  
马振利 孙绪义 林 敬

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## 前 言

《测绘专业英语》是参照1985年理工科英语教学大纲编写的。为了使学生在基础英语学习的基础上加强和提高专业科技英语的阅读能力，我们总结了几年来测绘专业英语教学的经验合编了这本教材。

本教材专业特点鲜明，取材广泛新颖，各课之间既有联系又相互独立，具有较强的实用性。全书共50课。第1~40课设课文和阅读材料，内容选自近年来英、美、苏等国测绘英语教材，包括误差理论与平差计算，普通测量，工程测量，大地测量和矿山测量等。第41~50课只设课文，内容大多选自近期国际测绘学会会议或期刊上发表的介绍国外测绘理论与科研现状及发展趋势的论文，供学生课外阅读和参考。

本书共收集专业词汇约1500个。学生在修完本课程后能达到掌握5000个词汇，科技英文阅读速度每分钟约50~80个单词的大纲要求。本教材教学时数为80~120学时。本书除可作为测绘专业本科生的科技英语教材外，也可供有关专业学生与测绘科技人员参考。

本教材由阜新矿业学院朱家钰教授主编。参加编写工作的有：西安矿业学院蒋芷华副教授（第2，20，22，26，39，40，43，45课）；山东矿业学院马金凯（第1，7，15，21，23，35，36，47，48课），林敬（第9，16，17，19，24课）；阜新矿业学院孙绪义（第5，6，8，10-14，18课），马振利（第3，4，25，27-34，37，38，41，42，44，46，49，50课）。全书由马振利、孙绪义统稿，最后由主编审定。

由于我们水平有限，加之时间仓促，书中难免存在错误和缺点，希望各院校师生和读者提出批评和指正。

编 者

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# Lesson 1

## surveying

Surveying is used for two purposes. The first is to make maps, charts and profiles, and therefore to find exactly the relative positions and elevation of existing objects<sup>①</sup>. It is thus the basis of plans for nearly all engineering projects and a means of checking conformity to a plan. The second purpose is to lay out or mark the desired positions and elevations of objects, to be built or placed as directed by a completed plan<sup>②</sup>. In this capacity, surveying is the first step in any actual building process, and it is essential if the work is to be held to close tolerances or if any of the work is to be built in other places.

Surveying is based on method and on the two main instruments used, the transit and the level. By use of the method and the instruments, almost any measurement problem can be solved and the work made easy. In other words, it is difficult to solve any problem of relatively large measurement with easiness without using of surveying methods and surveying instruments.

Surveying is obviously a fundamental element<sup>③</sup> in civil engineering. Most civil-engineering projects are large in size, and surveying presents the only means of planning or controlling them. But the method and instruments have been so developed that they usually present the best means of measurement for any work. All types of engineers must use surveying to determine or lay out the position of a plant site or a construction, etc. <sup>④</sup>.

### New Words and Expressions

- |  |   |
|--|---|
| 1. surveying [sə'veiɪŋ] <i>n.</i> 测量, 测量学                | 11. transit ['trænsɪt] <i>n.</i> 经纬仪 <i>ad.</i> 旋转      |
| 2. map [mæp] <i>n.</i> 地图, 图                             | 12. level ['levl] <i>n.</i> 水准器, 水准仪 <i>v.</i> 整平, 使成水平 |
| 3. chart [tʃɑ:t] <i>n.</i> 图, 曲线图                        | 13. measurement ['meʒəmənt] <i>n.</i> 观测, (复) 测量成果      |
| 4. profile ['prəʊfaɪl] <i>n.</i> 断面, 剖面, 断面图, 规化, 工程, 项目 | 14. civil ['sɪvl] <i>a.</i> 市民的, 民用的                    |
| 5. check [tʃek] <i>v.</i> 检核, 核算                         | 15. site [saɪt] <i>n.</i> 现场, 工地, 场所                    |
| 6. conformity [kən'fɔ:mɪti] <i>n.</i> 符合, 一致             | 16. construction [kən'strʌkʃən] <i>n.</i> 建筑物, 建筑       |
| 7. second ['sekənd] <i>n.</i> 秒, 第二                      | 17. lay out 布置, 设计, 放样, 标定                              |
| 8. mark [mɑ:k] <i>n.</i> 标志, 高程注记 <i>v.</i> 设标志, 树立标杆    | 18. close tolerance 精密限差, 允许闭合差                         |
| 9. tolerance ['tɒlərəns] <i>n.</i> 限差                    | 19. civil engineering 土木工程                              |
| 10. instrument ['ɪnstɹmənt] <i>n.</i> 仪器                 |   |

### Notes

① The first is to make maps, charts and profiles and therefore to find exactly the relative positions and elevations of existing objects. 句子中的动词不定式短语 “to make ……” 与 “to find ……” 是并列关系, 作表语。



“positions”指“平面位置”。全句可译为：第一个目的是绘制地图、海图和断面图，并进而准确地确定出现有地物的相互位置和高程。

- ② The second purpose is to lay out or mark the desired positions and elevations of objects to be built or placed as directed by a completed plan. 这是一个简单句。句子中的不定式短语“to be built or placed . . . . .”作定语，修饰名词“objects”。全句可译为：第二个目的是根据一个完整的设计方案放样或标定出建筑物的平面位置和高程。
- ③ “a fundamental element”可译为“基本组成部分”。
- ④ all types of engineers must use surveying to determine or lay out the positions of a plant site or a construction, etc. 各行各业的工程师都必须应用测量手段来确定或标定工厂或建筑物等的位置。

### Exercises

1. Questions (1) — (5) are incomplete sentences. Four words or phrases, marked (A), (B), (C) and (D) are given beneath each sentence. You are to choose the one word or phrase that completes the sentence.

- (1) The first is to make maps, charts, and profiles and therefore to \_\_\_\_\_ exactly relative positions and elevations of objects.
- (A) compute (B) determine  
(C) search for (D) yield
- (2) Surveying is the \_\_\_\_\_ of measuring and locating lines and angles on the surface of the earth.
- (A) technology (B) science  
(C) means (D) science and art
- (3) The second purpose is to \_\_\_\_\_ the desired positions and elevations of objects to be built or placed as directed by a completed plan.
- (A) lay out or mark (B) measure  
(C) locate (D) build
- (4) Surveying is obviously a fundamental \_\_\_\_\_ in civil engineering.
- (A) part (B) element  
(C) component (D) letter
- (5) Most civil engineering \_\_\_\_\_ are large in size.
- (A) tasks (B) works  
(C) porjections (D) projects

2. Translate the following sentences into Chinese:

- (1) In this capacity, surveying is the first step in any actual building process, and it is essential if the work is to be held to close tolerances or if any of the work is to be built in other places.
- (2) It is difficult to solve any problem of relatively large measurement with easiness without using of surveying methods and surveying instruments.
- (3) The method and instruments have been so developed that they usually present the best means of measurement for any work.
- (4) All types of engineers must use surveying to determine or lay out the position of a plant site or a construction.

3. Translate the following paragraph into Chinese.

The direction of gravity is used as a reference for all measurements. By vertical is meant the direction of gravity, and by horizontal is meant the direction perpendicular to gravity. Measurements are made of only four types of dimensions. They are horizontal lengths, vertical lengths, horizontal angles, and vertical angles.

## Reading Material

### More about Surveying

Surveying is the art of measuring and locating lines and angles on the surface of the earth. When the survey is of such limited extent that the effect of the earth's curvature may be neglected, it is called **PLANE SURVEYING**<sup>①</sup>. When the survey is so large that the effect of curvature of the earth must be taken into account to secure appropriate accuracy as, for example, in the survey of a state or a country, the refinements are made by applying the principles of **GEODETIC SURVEYING**.

Surveys are made for a variety of purposes such as the determination of areas, the fixing of boundary lines and the plotting of maps. Furthermore, engineering constructions, such as water-works, railroads, mines, bridges and buildings, all require surveys.

In surveying, all measurements of lengths are horizontal or else are subsequently reduced to horizontal distances. As a matter of convenience, measurements are often take on slopes, but the horizontal projection is afterward computed. The distance between two points as shown on a map then is always this horizontal projection<sup>②</sup>.

#### New Words and Expressions

- |  |   |
|--|---|
| 1. curvature ['kʌvətʃə] <i>n.</i> 曲率, 曲度<br>2. plane surveying 平面测量<br>3. accuracy ['ækjʊrəsi] <i>n.</i> 准(确)度, 精度<br>4. refinement ['ri'fainmənt] <i>n.</i> 改善, 改进<br>5. geodetic [dʒi(:)ou'detik] <i>a.</i> 测地学的, 大地测量学的 | 6. plotting ['plɒtɪŋ] <i>n.</i> 描绘, 测绘<br>7. mine [maɪn] <i>n.</i> 矿山(井)<br>8. horizontal distance 水平距离<br>9. projection [prə'dʒekʃən] <i>n.</i> 投影(图)<br>10. slope distance 斜距 |
|--|---|

#### Notes

- ① When the survey is of such limited extent that the effect of the earth's curvature may be neglected it is called **PLANE SURVEYING**. 句中 it is called **PLANE SURVEYING** 是主句, 前面由 when 引导的是条件状语从句, 从句中采用了 such...that 结构。全句可译为: 当测量的范围有限, 地球曲率可以忽略不计时, 就称为平面测量。
- ② The distance between two points as shown on a map then is always this horizontal projection. 可译为: 这样一来, 图上所示的两点之间的距离总是这样的水平投影。

## Lesson 2

# Importance of Surveying

Surveying is one of the oldest and most important arts practiced by man because from the earliest times it has been found necessary to mark boundaries and divide land. Surveying has now become indispensable to our modern way of life. The results of today's surveys are being used to (a) map the earth above and below sea level; (b) prepare navigational charts for use in the air, or land, and at sea; (c) establish property boundaries of private and public lands; (d) develop data banks of land-use and natural-resource information which aid in managing our environment; (e) determine facts on the size, shape, gravity, and magnetic fields of the earth; and (f) prepare charts of our moon and planets.

All engineers must know the limits of accuracy possible in construction, plant design and layout, and manufacturing processes, even though someone else may do the actual surveying. In particular, civil engineers who are called upon to design and plan surveys must have a thorough understanding of the methods and instruments used, including their capabilities and limitations. This knowledge is best obtained by making measurement with the kinds of equipment used in practice to get a true concept of the theory of errors, and the small but recognizable differences which occur in observed quantities.

In addition to stressing the need for reasonable limits of accuracy, surveying emphasizes the value of significant figures. An engineer must know when to work to hundredths of a foot instead of to tenths or thousandths, or perhaps the nearest foot, and what precision in field data is necessary to justify carrying out computation to the desired number of decimal places<sup>①</sup>. With experience, he learns how available equipment and personnel govern procedures and results<sup>②</sup>.

Neat sketches and computations are the mark of an orderly mind, which in turn is an index of sound engineering background and competence. Taking field notes under all sorts of conditions is excellent preparation for the kind of recording and sketching expected of engineers. Additional training having a carry-over value is obtained in arranging computations properly.

Engineers designing buildings, bridges, equipment, and so on, are fortunate if their estimates of loads to be carried are correct within 5 per cent. Then a factor of safety of two or more is applied. But except for topographic work, only exceedingly small errors can be tolerated in surveying, stresses both manual and computational precision.

### New Words and Expressions

- |   |   |
|---|---|
| 1. boundary ['baundəri] <i>n.</i> 边界                  | 3. navigation [nævi'geɪʃən] <i>n.</i> 导航, 航海术, 航空 |
| 2. indispensable [ɪndɪs'pensəbl] <i>a.</i> 不可缺少的, 必须的 | 4. environment [ɪn'vaɪənmənt] <i>n.</i> 环境        |

5. recognizable ['rekəgnəɪzəbl] a. 可认识的, 公认的  
 6. stress [stres] v. 强调  
 7. justify ['dʒʌstɪfaɪ] v. 证明……是正确的  
 8. neat [ni:t] a. 整洁的  
 9. competence ['kəmpɪtəns] n. 能力, 资格, 权限  
 10. tolerate ['tɒləreɪt] v. 允许, 承认  
 11. in turn 依次

### Notes

- ① An engineer must know when to work to hundredths of a foot instead of to tenths or thousandths, or perhaps the nearest foot, and what precision in field data is necessary to justify carrying out computations to the desired number of decimal places. 此句中 must know 是谓语, when to work …… the nearest foot 为不定式短语在句中作宾语, what precision …… 引导的名词从句仍是宾语 (与 when …… 并列)。the nearest foot 意思是“精确到英尺”, decimal place 意思是“小数位”。全句译为: 一个工程师必须知道什么时候应该精确到百分之一英尺, 而不是十分之一英尺或千分之一英尺, 也许凑整到整英尺就可以了, 他还必须知道外业数据必须具有何种精度, 以便能正确计算到所需的小数位。
- ② With experience, he learns how available equipment and personnel govern procedures and results. 此句中 how …… results 是谓语 learns 的宾语从句。从句中 equipment and personnel 是主语, govern 是谓语, how 是连接副词, 在句中作状语, 意思是“如何”。全句可译为: 具备了经验后, 他了解到如何根据现有的设备和人员来确定工作方法和结果。

### Exercises

1. Are these statements true or false according to the text?
- (1) One thousand years ago, people must mark the boundaries of private and public lands or divide lands, therefore, surveying is one of the oldest technique in the world.
  - (2) Only exceedingly small errors can be tolerated in topographic work.
  - (3) Surveying emphasizes the importance of significant figure, but does not require the reasonable limits of accuracy.
2. Choose the word that is nearest in the meaning to the word underlined in the following sentences.
- (1) In particular, civil engineers who are called upon to design and plan surveys must have a thorough understanding of the methods and instruments used.
 

(A) asked	(B) demanded
(C) visited	(D) invited
  - (2) An engineer must know when to work to hundredths of a foot instead of to tenths or thousandths, or perhaps the nearest foot.
 

(A) make	(B) operate
(C) calculate	(D) measure
  - (3) Engineers designing building, bridges, equipment, and so on, are fortunate if their estimates of loads to be carried are correct within 5 per cent.
 

(A) beared	(B) moved
(C) delivered	(D) spent
3. Translate the following sentences into Chinese.
- (1) Neat sketches and computation are the mark of an orderly mind, which in turn is an index of sound engineering background and competence.
  - (2) Surveying has traditionally been defined as the science and art of determining relative position of points above, on, or beneath the surface of the earth, or establishing such points,

- (3) Surveying is classified as a learned profession because the modern practitioner needs a wide background of technical training and experience, and must exercise independent judgement.

## Reading Material

### Future Challenge in Surveying

Many important tasks involving measurements and mapping lie ahead to challenge surveyors<sup>①</sup>. The National Geodetic Control Network must be maintained and readjusted to meet the requirements of high-order future surveys; new topographic maps with larger scales are necessary for future planning and design; existing topographic maps of our rapidly expanding urban areas need revision and updating to reflect changes; long-range planning and assessment of environmental impacts of proposed construction projects call for maps of natural resources and land usage; cadastral surveys of the yet unsurveyed public lands are essential; monuments set many years ago by the original land surveyors have to be recovered and re-monumented for preservation of property boundaries; appropriate surveys having very demanding accuracy are prerequisites for positioning drilling rigs as mineral and oil exploration press farther offshore; and in the space program, the desire for maps of neighboring planets will continue.

These and other opportunities offer a professional rewarding indoor or outdoor life, or both, for numerous people with suitable training in the various branches of surveying<sup>②</sup>.

### New Words and Expressions

- |   |   |
|---|---|
| 1. challenge ['tʃælɪndʒ] <i>n. &amp; v.</i> 任务, 向……提出挑战 | 8. prerequisite ['pri:'rekwɪzɪt] <i>n.</i> 必要条件, 前提 |
| 2. urban ['ʊəbən] <i>a.</i> 城市的                         | 9. rig [rɪg] <i>n.</i> 装备, 钻机                       |
| 3. assessment [ə'sesmənt] <i>n.</i> 估计, 评价              | 10. rewarding [ri'wɔːdɪŋ] <i>a.</i> 有意的, 值得做的, 收入高的 |
| 4. usage ['juːzɪdʒ] <i>n.</i> 使用, 利用率                   | 11. numerous ['njuːmərəs] <i>a.</i> 为数众多的, 无数的      |
| 5. cadastral [kə'dæstrəl] <i>a.</i> 地籍的                 |   |
| 6. preservation [prəzə'veɪʃən] <i>n.</i> 保存, 保持         |   |
| 7. property ['prɒpəti] <i>n.</i> 地产                     |   |

### Notes

- ① Many important tasks ..... to challenge surveyors. 此句可译为: 许多有关测量和绘图的重要任务, 摆在测量人员面前。
- ② These and other opportunities ..... the various branches of surveying. 此句可译为: 上述这些及其他方面的需要(机遇), 为测量专业各个分支中受过良好培训的许多人提供了收益高的专业工作岗位, 包括内业工作, 外业工作或者兼做内业和外业工作。

## Lesson 3

# Uses of Surveying

The earliest surveys known were for the purpose of establishing the boundaries of land, and such surveys are still the important work of many surveyors.

Every construction project of any magnitude is based to some degree upon measurements taken during the progress of a survey and is constructed about lines and points established by the surveyor. Aside from the land surveys, practically all surveys of a private nature and most of those conducted by public agencies are of assistance in the conception, design, and execution of engineering works<sup>①</sup>.

For many years the government, and in some instances the individual states, have conducted surveys over large areas for a variety of purpose. The principal work so far accomplished consists of the fixing of national and state boundaries; the charting of coastlines and navigable streams and lakes; the precise location of definite reference points throughout the country; the collection of valuable facts concerning the earth's magnetism at widely scattered stations; the establishment and observation of a greater network of gravity stations throughout the world; the establishment and operation of tidal and water level stations; the extension of hydrographic and oceanographic charting and mapping into the approximately three-fourths of the world which is essentially unmapped; and the extension of topographic mapping of the land surfaces of the earth, for which the United States has achieved coverage of nearly one-half of its surface area to map scales as large as 1:24 000 or 1 in. to 2000 ft<sup>②</sup>.

Observations of a worldwide net of satellite triangulation stations are made during the decade 1964—1974. Results of the computations expected to be completed by 1985. They will allow determination of the shape of the earth from one to two orders of magnitude better than has heretofore been known. Consequently, surveys of global extent have been performed and will become common in the future.

Thus surveys are divided into three classes: (1) those for the primary purpose of establishing the boundaries of land, (2) those providing information necessary for the construction of public or private works, and (3) those of large extent and high precision conducted by government and to some extent by the states. There is no hard and fast line of demarcation between surveys of one class and those of another as regards the methods employed, results obtained, or use of the data of the survey<sup>③</sup>.

## New Words and Expressions

1. magnitude ['mægnɪtʊd] *n.* 大小, 量, 宏大
2. aside from...除.....外(还), 与.....无关
3. private ['praɪvɪt] *a.* 私人的, 保密的, 民间的
4. agency ['eidʒənsɪ] *n.* 机构, 处, 所, 作用, 手段, 媒介
5. in some instances 在某些情况下
6. individual [ɪndɪ'vɪdʒuəl] *a. & n.* 个体(的), 专用(的), 单独(的)
7. principal ['prɪnsəpəl] *a. & n.* 主要(的)(人物), 基本(的)(财产), 主演, 校长
8. accomplish [ə'kɒmplɪʃ] *v.* 完成, 实行
9. charting ['tʃɔ:tɪŋ] *n.* 制图(表), 填图
10. navigable ['nævɪgəbl] *a.* 通航的
11. stream [stri:m] *n. & v.* 河流, 趋势
12. precise [pri'saɪs] *a.* 精密的, 精确的, 严谨的
13. definite ['defɪnɪt] *a.* 明确的, 限定的
14. reference ['refrəns] *n. & a.* 基准(点)(的), 参考(的)
15. scatter ['skæɪtə] *v.* 分散, 散布(开)
16. tidal ['taɪdl] *a.* 潮水的, 定期涨潮的
17. hydrographic [hɔɪdrou'græfɪk] *a.* (水文)地理的, 水道测量的
18. oceanographic [ouʃənou'græfɪk] *a.* 海洋(学)的
19. approximately [ə'prɒksɪmɪtli] *ad.* 近似, 大约
20. topographic [tɒpə'græfɪk] *a.* 地形测量学(的), 地志的
21. triangulation [traɪæŋɡju'leɪʃən] *n.* 三角测量
22. heretofore ['hɪətu'fɔ:] *ad.* 至今, 到现在止
23. consequently ['kɒnsɪkwəntli] *ad.* 因此, 必然
24. global ['gləʊbəl] *a.* 全球的, 世界的, 总共
25. extent [ɪks'tent] *n.* 范围, 程度, 大小, 量值
26. primary ['praɪməri] *a. & n.* 基本(事物)(的), 首位(的)
27. precision [pri'sɪʒən] *n. & a.* 精度, 精密(的)
28. demarcation [dɪ'mɑ:k'eɪʃən] *n.* 标界, 分界
29. as regards 至于, 在.....方面
30. employ [ɪm'plɔɪ] *v.* 使用, 雇用, 花费, 从事

## Notes

- ① Aside from land surveys, practically all surveys of a private nature and most of those conducted by public agencies are of assistance in the conception, design, and execution of engineering works. 句中, are of assistance 为 be + of + n. 结构, 相当于 be assistant. 类似用法如: It's very important 也可以改为: It's of importance. 全句译为: 除了土地测量之外, 实际上私人经营和多数公众机构管理下的全部测量工作是各项工程的总体构思、设计与施工中的辅助部分。
- ② The principal work so far accomplished ..... as large as 1: 24, 000 or 1 in. to 2000 ft. 句中, 过去分词短语 so far accomplished 作定语, 修饰主语 The principal work. 谓语 consists of 译为“由...组成”, 后面的 8 个介词 (of) 短语为并列成分, 都是 of 的宾语。全句译为: 至今已完成的基工作包括: 国界与州界的测定; 海岸线, 通航河道与湖泊的成因; 全国范围内有限控制参考点的精确定位; 在广泛分布的测站上有关地球磁力的重要数据的采集; 全球范围内较大的重力点控制网的建立与观测; 海洋水准面验潮站的建立与作业; 水道与海洋绘图已扩展至世界上大约 3/4 的基本无图区域; 地球表面地形图的不停绘制, 美国几乎在一半国土上完成了 1/24, 000 即 1 英寸: 2000 英尺比例尺地形图。
- ③ There is no hard and fast line of demarcation between surveys of one class and those of another as regards the methods employed, results obtained, or use of the data of the survey. 译为: 在使用的方法、获得的成果和测量数据的应用诸方面, 各种测量工作之间没有严格又明显的分界线。

## Exercises

1. Choose the one word or phrase which would best keep the meaning of the original sentence if it were substituted for the underlined part.
  - (1) Aside from the land surveys, all the other surveys are widely used in the engineering works.
 

(A) Beside	(B) Except for
(C) Instead of	(D) Apart from
  - (2) There are no clear lines of demarcation between different surveys as regards the working methods.
 

(A) regards as	(B) as against
(C) as for	(D) as if
  - (3) Every engineering project is based upon the measurements.
 

(A) gone with	(B) stood with
(C) settled with	(D) started with
2. Are the statements below true (T) or false (F) according to the text?
  - (1) The work of establishing the boundaries of land is not an important task for any surveyor nowadays. ( )
  - (2) The observations of a world-wide net of satellite triangulation stations did not finish until 1974. ( )
  - (3) About half of the surface area has been mapped with the scale of 1: 24 000 in the U. S. A. ( )
3. A component word is made up of two or more words to have one meaning. Now figure out the meaning of each word below.
 

(1) coast + line = coastline	(6) fore + sight = foresight
(2) net + work = network	(7) back + sight = backsight
(3) world + wide = worldwide	(8) cross + hair = crosshair.
(4) lay + out = layout	(9) base + line = baseline
(5) note + book = notebook	(10) bench + mark = benchmark
4. Match each word on the left with its corresponding definition on the right.
 

(1) boundary	(9) a heavenly body moving around a planet
(2) charting	(10) limitation or separation
(3) topography	(11) made with great exactness
(4) satellite	(12) the limiting or dividing line of surfaces or spaces
(5) global	(13) to make a map
(6) primary	(14) of or concerning the whole earth
(7) precision	(15) earliest in time or order of development
(8) demarcation	(16) the art of representing the character of a particular place in details

## Reading Material

### Duties of the Surveyor

The land surveyor should be expert in subdividing land, retracing old boundaries, analyzing evidence as to the legality of boundaries, identifying boundaries, and making surveys of properties<sup>①</sup>. He furnishes accurate descriptions of boundaries and areas which are required in preparing land ti-



ties. Such titles are usually drawn by an attorney called a conveyancer. The surveyor does not have the legal authority to determine property boundaries, but his expert knowledge and advice will often enable him to bring owners of adjoining land to an agreement as to boundaries and thereby avoid adjudication. For this reason he must know and be able to apply the legal principles governing competency and weight of evidence as to boundaries.

A large amount of a nation's wealth is either in land itself or in properties which are permanently fixed to the land. It is the responsibility of both the surveyor and the conveyancer to protect the public in the purchases and sales of lands.

The topographic surveyor uses the control points established by government or private surveys and fills in the details of the earth's surface and physical features, such as hills, valleys, streams, roads, railroads, buildings, and fences. For small surveys additional control is usually provided by a transit and tape survey which, wherever practical, is tied in to one or more government survey points. Presently most topographic information is obtained by means of photogrammetry.

The engineering or construction surveyor is responsible for an accurate determination of the terrain upon which engineering works are to be built. The design of the structure depends in many respects upon the information shown on the surveyor's plans. He has a further responsibility in physically laying out on the ground the design elements of the proposed construction. An error in the survey which is not discovered until the construction work begins may result in very costly changes in design and construction<sup>2</sup>. The surveyor also measures and computes the quantities of the different classifications of construction work designated by the contract.

The geodetic surveyor's field of interest includes practical astronomy, terrestrial magnetism, oceanography, gravity, the figure of the earth, and seismology. His service to the ordinary surveyor lies in locating, with high precision, survey stations for horizontal control, and "bench marks" (permanent points of elevation) for vertical control of detailed surveys.

### New Words and Expressions

- |  |   |
|--|---|
| 1. subdivide ['sʌbdɪ'vaɪd] v. 分小类, 细分      | 限   |
| 2. retrace ['ri'treɪs] v. 检测, 重查           | 14. wealth [welθ] n. 财富, 资源, 丰富                   |
| 3. evidence ['eɪdɪns] n. 数据, 证据, 迹象        | 15. responsibility [rɪ'spɒnsə'bɪlɪtɪ] n. 责任, 义务   |
| 4. legality [li:'gælɪtɪ] n. 合法性            | 16. purchase ['pɜ:tʃəs] n. & v. 购买, 收益            |
| 5. furnish ['fɜ:nɪʃ] v. 提供, 装备             | 17. valley ['væli] n. 山谷, 盆地                      |
| 6. accurate ['ækjʊrɪt] a. 精密的, 准确的         | 18. transit ['trænsɪt] n. & v. 经纬仪, 中天(仪), 通过, 转变 |
| 7. attorney [ə'tɔ:nɪ] n. 代理人, 律师           | 19. photogrammetry [fəʊtə'græmɪtri] n. 摄影测量学      |
| 8. conveyancer [kən'veɪənsə] n. 财产转让者, 运输者 | 20. terrain ['tereɪn] n. 地势, 领域                   |
| 9. authority [ə'θɔ:rɪtɪ] n. 权力, 管理机构       | 21. error ['erə] n. 误差                            |
| 10. adjoin [ə'dʒɔɪn] v. 连接, 邻近             | 22. contract [kən'trækt] n. & v. (订) 合同, 承包       |
| 11. avoid [ə'vɔɪd] v. 避免, 取消               | 23. terrestrial [tɪ'restriəl] a. 地球的, 陆地上的        |
| 12. adjudication [ədʒʊdɪ'keɪʃən] n. 判决, 取消 |   |
| 13. competency ['kɒmpɪtənsɪ] n. 能力, 资格, 权  |   |