

普通高等教育测绘类规划教材

测绘专业英语

曲建光 编

测绘出版社

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前 言

本教材供专科学校工测专业学生使用,也可作为本科测绘专业学生及有关工程技术人员学习专业英语的参考书。

本书课文选自于近年来英美两国出版的测绘著作和文献,所选文章包括了专科工测专业各有关专业课的基本内容和一些当前测绘学科发展的新内容。

本教材每篇课文后都有词汇表、注释、语法与翻译技巧和练习。生词以大纲规定的二级水平为基础,并侧重于专业意义。注释主要是长句和语法复杂的难句及一些词的特殊用法的说明。习题采用了三种形式,主要是检查学生对课文的内容、结构、关键词及翻译技巧的理解程度。语法和翻译技巧部分结合语法介绍了翻译的基本技巧和一些具体句子的译法,同时为了突出专业特点,例句主要选自原版测绘著作和文献。另外,为了帮助学生掌握好词汇,每两篇文章后附有一篇 word study,主要介绍近义词或同义词之间的区别和用法。书后附有总词汇表。

由于编者水平有限,书中难免有错误和不妥之处,恳请批评指正。

曲建光

1994 年 1 月

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Lesson one

Introduction to Surveying

Surveying is the art of making such measurements of the relative positions of points on the surface of Earth that, on drawing them to scale, natural and artificial features may be exhibited in their correct horizontal or vertical relationships^①.

Less comprehensively, the term, "Surveying", may be limited to operations directed to the representation of ground features in plan. Methods whereby relative altitudes are ascertained are distinguished as "leveling", the results being shown either as vertical section or by conventional symbols on a plan^②.

Plane, Aerial and Geodetic Surveying A plan is projection upon a horizontal surface, and in its construction all linear and angular quantities used must be horizontal dimensions. It is impossible to give a complete representation of distances following the undulations of the ground other than by a scale model^③. Now a horizontal surface is normal to the direction of gravity as indicated by a plumb line, but, on account of the form of the Earth, the direction of plumb lines suspended at different points in a survey are not strictly parallel, and the plane horizontal at one point does not precisely coincide with that through any other point. It is not the irregular shape of the Earth's physical surface that is referred to here, but the almost regular curvature of a level surface which is necessarily perpendicular to the vertical everywhere.

In surveys of small extent the effect of curvature is quite negligible, and it is justifiable to assume that a level surface of

the Earth is a horizontal plane within the area covered. Surveying methods based on this supposition are comprised under the head of Plane Surveying. The assumption becomes invalid in the accurate survey of an area of such extent that it forms an appreciable part of the Earth's surface. Allowance must then be made for the effect of curvature, and the operations belong to Geodetic Surveying.

No definite limit it can be assigned for the area up to which a survey may be treated as plane, since the degree of accuracy required forms the controlling factor. The sum of the interior angles of a geometrical figure laid out on the surface of the Earth differs from that of the corresponding plane figure only to the extent of one second for about every 200 square km (76 sq. miles) of area^④, so that, unless extreme accuracy is required, plane surveying is applicable to areas of some thousands of square kilometers.

Plane Surveying Plane Surveying is of wide scope and utility, and its methods are employed in the vast majority of surveys undertaken for various purposes, such as engineering, architectural, legal, commercial, scientific, geographical, exploratory, military, and navigational. As applied to civil engineering, all surveying methods are utilized in the various surveys required for the location and construction of the different classes of works within the province of the engineer. These surveys may be rapid reconnaissance s of an exploratory character undertaken to facilitate the selection of an approximate site for the work. They are followed by more detailed surveys of the selected region, in witch a much greater degree of accuracy is sought, and from which the best location is ascertained^⑤. The obtaining of various data required in the design of the proposed works forms part of

the preliminary operations, and may involve surveying methods of a specialised character. Previous to and during construction, the surveyor's duties also include the routine of setting out the lines and levels of the works and the measurement of areas and volumes.

Aerial Surveying An engineer may have air-photographs of a site on which he has to design or set out works. It is important that he should understand their uses and limitations.

Though an air-photograph will probably show all the details the engineer requires, and indeed probably very much more, it must not be treated as a map because it is not possible to ensure that the axis of an air-camera is exactly vertical. The tilt may be several degrees in a so-called vertical photograph, so there may be appreciable differences of scale between opposite sides of a photograph. In any case, even if the camera axis is vertical, the relative positions of points at different heights will not be correctly shown.

The most valuable property of an air-photograph is that angles round a point at or close to its center may be regarded as correct, and in making maps from air-photographs this property is exploited. In other words, a near-vertical air-photograph may be regarded as a record of angles taken at its center point or any point very close to the center.

If air-photographs from two different positions cover an area of common ground, and they are viewed by means of a suitable stereoscope, a three-dimensional picture is seen and can be of very great value[®], especially in the preliminary stages of design of a project.

The production of accurate maps from air photographs involves the use of techniques and equipment which will not nor-

mally be available to an engineer-surveyor. These mapping processes, called photogrammetry, are outside the scope of this book. However, mapping from air-photographs requires some control by ground-survey methods.

Geodetic Surveying Geodetic surveys are usually of a national character, occasionally works of international co-operation, and they are undertaken as a basis for the production of accurate maps of wide areas, as well as for the furtherance of the science of Geodesy, which treats of the size and form of the Earth. The most refined instruments and methods of observation are employed, and the operations are directed to the determination of the positions on the Earth's surface of a system of points which serve as controls for all other surveys.

New Words and Expressions

surveying [sə:'veɪɪŋ] *n.* 测量学; 测量; 调查

measurement ['meʒəmənt] *n.* 测量; 测量结果

position [pə'zɪʃən] *n.* 位置, 方位 *vt.* 定位, 配置

artificial [ˌɑ:tɪ'fɪʃəl] *a.* 人工的, 人造的

feature ['fi:tʃə] *n.* 特征, 要素, 地物

exhibit [ɪg'zɪbɪt] *vt.* 展览; 显示

horizontal [ˌhɒrɪ'zɒntl] *a.* 水平的; 地平的 *n.* 水平面, 水平线

vertical ['vɜ:tɪkəl] *a.* 垂直的; 顶点的 *n.* 垂直线, 垂直面

operation [ˌɒpə'reɪʃən] *n.* 操作, 工作; 作用

representation [ˌreprɪzen'teɪʃən] *n.* 描写, 表示; 图形

altitude ['æltɪtju:d] *n.* 高度, 高程

ascertain [ˌæsə'teɪn] *vt.* 确定, 查明

distinguish [dɪs'tɪŋgwɪʃ] *vt., vi.* 区别, 辨别

leveling ['levəlɪŋ] *n.* 水准测量; 抄平

conventional [kən'venʃənl] *a.* 惯用的, 不依比例尺的
 plane surveying 平面测量
 geodetic [ˌdʒi:ou'detik] *a.* 大地测量(学)的
 geodetic surveying 大地测量
 projection [prə'dʒekʃən] *n.* 设计, 规划; 投影
 construction [kən'strʌkʃən] *n.* 建设, 施工; 结构; 建筑物
 linear ['liniə] *a.* 直线的, 线性的
 angular ['æŋgjulə] *a.* 角的, 角形的
 dimension [di'menʃən] *n.* 维(数); 尺寸, 大小; 面积
 undulation [ˌʌndju'leɪʃən] *n.* 起伏; 波动
 scale [skeɪl] *n.* 比例尺; 标尺; 度盘
 indicate ['ɪndikeɪt] *vt.* 指示, 表明; 象征; 暗示
 on account of 因为
 plumb [plʌm] *n.* 垂球, 铅垂 *a.* 垂直的
 plumb line 铅垂线
 parallel ['pærəlel] *a.* 平行的 *n.* 平行线(面), 纬圈
 coincide [ˌkəʊɪn'saɪd] *vi.* 恰好重合, 一致
 irregular [i'regjulə] *a.* 不规则的, 不整齐的
 curvature ['kə:vətʃə] *n.* 弯曲; 曲率
 perpendicular [ˌpə:pən'dɪkjulə] *a.* 垂直的 *n.* 垂直; 垂直线
 extent [ɪks'tent] *n.* 范围; 程度; 大小
 negligible ['neglɪdʒəbl] *a.* 可忽略的, 很小的
 invalid [ɪn'vælɪd] *a.* 无效的
 accuracy ['ækjʊrəsi] *n.* 准确度; 精度
 geometrical figure 几何图形
 extreme [ɪks'tri:m] *a.* 末端的; 极端的
 architectural [ˌɑ:kɪ'tektʃərəl] *a.* 建筑上的, 建筑学的
 exploratory [eks'plɔ:rətəri] *a.* 勘探的, 探索的
 navigational [ˌnævi'geɪʃənəl] *a.* 航行的; 导航的
 location [lou'keɪʃən] *n.* 位置, 地点; 定位, 放样; 地物

province ['prɒvɪns] *n.* 领域, 范围; 省
 reconnaissance [ri'kɒnɪsəns] *n.* 选点, 踏勘, 草测
 character ['kærɪktə] *n.* 特性, 性质, 字体; 字符
 facilitate [fə'sɪlɪteɪt] *vt.* 使容易; 推进
 approximate [ə'prɒksɪmɪt] *a.* 近似的, 大约的
 detail [di'teɪl] *n.* 地物, 碎部, 细节; 清晰度; 详图
 region ['ri:dʒən] *n.* 区域, 范围; 地区, 地带
 preliminary [pri'limɪnəri] *a.* 预备的, 初步的
 specialised ['speʃəlaɪzd] *a.* 专门的, 专科的
 aerial surveying 航空测量
 air photograph 航空像片, 航摄像片
 air camera 航摄仪, 航空摄影机
 vertical photograph 垂直摄影像片
 angle [æŋɡl] *n.* 角度, 角
 stereoscope ['stiəriəskəʊp] *n.* 立体视镜
 photogrammetry [ˌfəʊtə'græmɪtri] *n.* 摄影测量学
 furtherance ['fədərəns] *n.* 促进, 推动
 determination [di,tə'mi'neɪʃən] *n.* 确定, 测定; 决心

Notes to the Text

① *Surveying is the art of making such measurements of the relative positions of points on the surface of the earth that, on drawing them to scale, natural and artificial features may be exhibited in their correct horizontal or vertical relationships.*

测量是测定地面上各点的相对位置, 以便根据它们之间正确的水平或垂直关系, 按比例展示出天然地物和人工地物的一种技术。

such...that... 的意思是“如此的(那样地)...以至于(因此)...”。

如: He is such a lovely child that everybody loves him. 他是个非常可爱的孩子,(因此)人人都喜欢他。

② *the results being shown either as vertical sections or by conventional symbols on a plan.*

其结果被表示成纵断面或在平面上用惯用符号表示。

这是一个分词独立结构,表示伴随情况。

③ *It is impossible to give a complete representation of distances following the undulations of the ground other than by a scale model.*

除了用一个比例模型,否则是不可能完整地表示出地面起伏下的距离。

it 是形式主语, to give ... 是主语, following 是分词短语作 distances 定语。

④ *The sum of the interior angles of a geometrical figure laid out on the surface of the earth differs from that of the corresponding plane figure only to the extent of one second for about every 200 square km of area.*

地球表面上几何图形的内角和,与相应的平面图形的内角和,在大约 200 平方公里的区域内,只相差 1 秒。

that 在这里指代 The sum of the interior angles. laid out ... earth 是过去分词短语作 geometrical figure 的定语。

⑤ *They are followed by more detailed surveys of the selected region, in which a much greater degree of accuracy is sought and from the best location is ascertained.*

其后,在所选区域内还要进行更详细的测量,从而获得更高的精度,确定最佳的位置。

in which 和 from which 引导的都是定语从句,修饰 detailed surveys。

⑥ *can be of very great value.*

可能非常有价值。

of + 名词与 be 连用, 构成表语, 表达性质、年龄、颜色、形状、材料、样式等相当于 be + 形容词。

如: Those old books are of no use. 那些旧书没用了。

His eyes are of a very dark-gray. 他的眼睛是深灰色的。

His temper is of the most cheerful and sociable. 他的脾气极为爽快和善。

Grammar and Translation Skills

词意引申 (1)

在翻译过程中, 经常会碰到这样的难题, 在原文中总有些词或词组, 在字典里找不到适当的词义, 如若按字典上的意义直译出来, 译文就显得不通顺, 不明确。为了使译文合乎汉语习惯, 可以根据上下文, 逻辑关系和用词搭配上的需要, 对词义加以引申。

(1) Perhaps the only *trouble* with this method was that it needs the known data too much.

这种方法的唯一**缺点**或许是需要的已知数据太多。(trouble 不译作“麻烦”)

(2) Universal theodolite seems *to offer more hope* than any others.

全能经纬仪似乎比其它类型的经纬仪**更有前途**。(to offer more hope 不译作“提出更多的希望”)

(3) Like any precision instrument, the theodolite requires careful *treatment*.

像任何精密仪器一样, 经纬仪也需要精心**维护**。(treatment 不译作“待遇”)

(4) Closed traverses *provide* checks on the measured angles and distances.

闭合导线能对所测的角和距离**进行检核**。(provide 不译作“提供”)

Comprehensive Exercises

1. Surveying is the art of measuring the relative positions of points which

- a) can be drawn to scale.
- b) are in the same horizontal plane.
- c) denote the feature of the surface of the earth.
- d) show natural and artificial feature in their correct relationships.

2. The distinction between plane surveying and geodetic surveying is in

- a) time b) speed c) extent d) location

3. In plane surveying the effect of curvature is

- a) small b) not existent c) not influential d) large

4. If the camera axis is _____, the relative positions of points at _____ heights will be correctly shown.

- a) vertical, same
- b) vertical, different
- c) horizontal, same
- d) horizontal, different

5. Which of the following was not mentioned in the text.

a) The most refined methods of observation are used in geodetic surveying.

b) The accuracy in geodetic surveying is higher than that in plane surveying.

c) In plane surveying, we don't consider the effect of curvature.

d) Geodetic surveying generally extend over large areas.

6. Fill each blank with the most appropriate word from the

words below.

coincide, assume, provide, treated, regarded

a) No definite limit can be assigned for the area up to which a survey may be ____ as plane.

b) It is justifiable to ____ that a level surface of the earth is a horizontal plane within the area covered.

c) Closed traverses ____ checks on the measured angles and distances.

d) Angles round a point at or close to its center may be ____ as correct.

e) The plane horizontal at one point does not precisely ____ with that through any other point.

Lesson Two

Bubble Tubes

Since nearly all field measurements, angular or linear, are made in either a horizontal or a vertical plane, it is essential to have some ready method of determining the positions of these planes through any point, so that particular lines or planes in an instrument may be made to lie in them^①.

The most convenient and sensitive device yet invented for doing this is the Bubble Tube, the action of which depends on the fact that the free surface of a still liquid, being at every point normal to the direction of gravity, is a level surface^②.

Construction The device consists of a glass tube, shaped and carefully ground on the inner surface so that a longitudinal section of this surface is a circular arc. The radius of curvature of the arc may be as much as 100 metres. Some bubble tubes have the curvature formed all round the tube, that is they are barrel-shaped, and then they will function if turned upside-down.

The tube is nearly filled with a liquid such as alcohol, chloroform or ether; these liquids, besides being very mobile, have the advantage of low freezing-points. However, they have rather high coefficients of thermal expansion, so the bubble space is shortened in hot weather.

To indicate a central position of the bubble, some equally spaced lines are etched on the tube on either side of the center, or sometimes on a separate but attached scale. The lengths of the divisions are usually 2 millimeters.