物理专业英语文选

上　册

南京大学外文系普通英语教研组编

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南京大学外文系普通英语教研組編

内 容 提 要

物理专业英语文选上册共三十课，所选材料内容由浅
而深，由短而长，以每周四学时的课常讲授计算，足供一
年使用. 本书每课除正文外，还有词汇及语法注释，书末
附有总词汇表.

本书可用作高等学校物理系学生培养阅读有关专业的
英语书籍能力的教本，也可作为有志研究物理学的英语读
者进行提高物理知识的参考读物.

物 理 专 业 英 语 文 选

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前　言

1958 年以来，工农业在大跃进，文教事业也在大跃进，一切都在大跃进，一切都是为了多快好省地建设社会主义．作为生产斗争和阶级斗争工具之一的外语，自然也要为社会主义建设服务．我們教研組所編的英語教材就是为了这个目的，它也就是在这伟大的建設高潮中产生的．

这部物理专业的文选是专为培养物理系的学生及一切需要物理知識的人閱讀英語参考書的能力而編的．書分上下二册，各有三十课，每課可供每周四学时的課堂講授之用，二年可以敎完．課文由浅而深，由短而长，学者可以循序漸进．每課后附有詞汇表及課文注释，以免学者翻检辞典之劳．可以集中精力先讀熱詞汇，再閱讀課文，使注意力集中在語法現象上，以便既掌握語法又巩固詞汇．詞汇表里也包括了中学里的普通詞汇，对普通中学毕业生来說可以起复习作用，对自学的人来說可以起帮助作用．課文和詞汇增多的速度較快，有二三年英語基础的人学生可以用它，但前面不妨进度快一些，其他有相当英語基础的人也可以用它，但进度宜乎慢一些．

在采用这部書的时候，最好花一二周时间先敎英語語音，特別注意語音与拼法的关系，音节与重音的作用，以后在讀詞汇时巩固語音的知識．接着花十几周时間一面进行重点复习和概括英語語法的基本知識，一面进行少量的閱讀，使語法与閱讀結合起来．敎語法时要特別注意与汉語語法作比較．具体安排是：大約二周敎句子的成分，一周敎名詞、代詞的性、数、格的变化，一周敎形容詞和副詞級的变化，四、五周敎动詞的主要形式、时态、語态、語气和非限定动詞，二、三周敎复介句及連接詞、关系代詞和关系副詞等，二周敎前置詞，二周敎句子分析．基本語法知識有了基

础或者經过复习之后，即应着重将已有的語法知識运用到課文閱讀上去，一面抓句子的結构、前置詞的意义、非限定动詞的用法三个重点，一面补充一些遇到的語法現象．第二年即着重較大量的閱讀，扩大詞汇的数量，来迅速培养学生独立閱讀专业参考書的能力．

我們选材的来源，上册多半选自英美中学物理教本，下册則多半选自大学物理教本，有时略加删节或改写．选材的范圍較广，来源也不是一两本書，这样詞汇的面可以比較全面，語法的現象和文体的类别也比較丰富而多样．学完这部文选，大致可以独立閱讀一般物理专业参考書．如果在这基础上再自行閱讀，則英語的知識水平一定会大大地提高．

这部文选由于編輯时間的仓卒，加上水平的限制，一定有着不少的缺点和錯誤．希望在使用的过程中，得到从事公共英語教学的同志們的帮助，不断加以改正和充实．

<div align="right">南京大学外文系普通英語教研組</div>

CONTENTS

本书所用語法术語略語

a.	adjective (形容詞)
adv.	adverb (副詞)
conj.	conjunction (連接詞)
n.	noun (名詞)
num.	numeral (数詞)
p. a.	participial adjective (分詞形容詞)
pl.	plural (复数)
prep.	preposition (前置詞)
pron.	pronoun (代詞)
sing.	singular (单数)
v.	verb (动詞)
v. aux.	verb auxiliary (助动詞)
v. i.	verb intransitive (不及物动詞)
v. t.	verb transitive (及物动詞)

1. PHYSICS AND MATTER

The world is made of matter. Air, water, coal and everything on the earth are different kinds of matter. Matter is in constant motion[1] and in constant change. Air, water, coal and everything on the earth are in constant motion and in constant change.

Physics is the science of phenomena. It studies the properties of matter. It also studies the changes of matter in position[2] and in state.

Different kinds of matter have different properties. But all matter occupies space. Air occupies space. Water and coal also occupy space.

All matter has weight. Water has weight. Air has weight too, but it is very light. Coal also has weight. It is heavy.

All matter is indestructible. When coal burns, part of it is carried away in smoke[3] and part of it is left as ash.[4] When a drop of water disappears, it only changes into[5] water vapor.

詞　匯

physics ['fiziks] n. 物理学
and [ænd, ənd] conj. 和，及
matter ['mætə] n. 物質
the [ðiː, ðə] (定冠詞) 这 (个)
world [wəːld] n. 世界
is made of 用...做成
made [meid], (make 的过去詞和过去分詞)
make [meik] v. t. 做
of [ɔv, əv] prep. 由...，用...
air [ɛə] n. 空气
water ['wɔːtə] n. 水
coal [koul] n. 煤
everything ['evriθiŋ] n. 每样东西

on [ɔn] prep. 在...之上
earth [əːθ] n. 地球，土地
are [aː] v. i. 是
different ['difrənt] a. 不同的
kind [kaind] n. 种类
in [in] prep. 在...中
constant ['kɔnstənt] a. 永恒的，不变的
motion ['mouʃən] n. 运动
change [tʃeindʒ] n., v. i. 变化
science ['saiəns] n. 科学
phenomena [fi'nɔminə] n. 現象
　(phenomenon [fi'nɔminən] 的复数)
it [it] pron. 它
study ['stʌdi] v. t. 研究，学习

property ['prɔpəti] n. 性质, 特性
also ['ɔ:lsou] adv. 也
position [pə'ziʃən] n. 位置
state [steit] n. 状态
have [hæv] v.t. 有
but [bʌt] conj. 但是
all [ɔ:l] a. 所有的
occupy ['ɔkjupai] v.t. 估有
space [speis] n. 空间
weight [weit] n. 重量
too [tu:] adv. 也
very ['veri] adv. 很
light [lait] a. 轻的
heavy ['hevi] a. 重的
indestructible [indis'trʌktibl] a. 不
  灭的, 不能破坏的
when [hwen] conj. 当...时候

burn [bə:n] v.i. 燃烧
part [pa:t] n. 部分
carry ['kæri] v.t. 携带
away [ə'wei] adv. 离开
smoke [smouk] n. 烟
left [left] v.t. 留下, 剩下
  (leave [li:v] 的过去时和过去分词)
as [æz, əz] prep. 作为
ash [æʃ] n. 灰
a [ei, ə] (不定冠词) 一
drop [drɔp] n. 一滴
disappear [disə'piə] v.i. 不见, 消失
only ['ounli] adv. 只有, 仅仅
into ['intu] prep. ...为
vapor ['veipə] n. 蒸汽
  water vapor 水蒸汽

课 文 注 释

1. in motion (在运动中). 这里的 in 表示在某种状态之中. in change 便是在变化中.
2. in position (在位置上). 这里的 in 表示在什么方面. 同样地, in state 便是在状态中.
3. When coal burns, part of it is carried away in smoke. (当煤燃烧的时候, 它的一部分在烟里带走了.) 在这句里 when coal burns 是表示时间的状语从句, 用连接词 when 把它连接到主句上去. in smoke 里的 in 表示在什么东西里面.
4. Part of it is left as ash. (它的一部分作为灰烬留下下来.) 这句里的 as 用作前置词, 意为 "作为".
5. change into 里的 into 表示变化的结果.

2. MEASUREMENT

We measure the sides, the area and the volume of a substance to find out the amount of space it occupies.[1] The most commonly used system of measurement is the centimeter-gram-second (C.G.S.) system. The C.G.S. table of length is as follows:[2]

A kilometer (km) equals	1,000 meters.
A decimeter (dm) equals	0.1 of a meter.

A centimeter (cm) equals 0.01 of a meter.

A millimeter (mm) equals 0.001 of a meter.

The unit of area in the metric system is the square centimeter (cm²). It is the area of a square with all sides one centimeter long.[3]

The unit of volume in the metric system is the cubic centimeter (cm³). It is the volume of a cube with all sides one centimeter long.

The C.G.S. unit of weight is the gram.

A kilogram (kg) equals 1,000 grams.

A decigram (dg) equals 0.1 of a gram.

A centigram (cg) equals 0.01 of a gram.

A milligram (mg) equals 0.001 of a gram.

詞　汇

measurement ['meʒəmənt] *n.* 度量
we [wi:, wi] *pron.* 我們
measure ['meʒə] *v.* 度量
side [said] *n.* 边
area ['ɛəriə] *n.* 面积
volume ['vɔljum] *n.* 体积, 容积
substance ['sʌbstəns] *n.* 物質, 实質
to [tu] (动詞不定式符号)
find [faind] *v. t.* 找
out [aut] *adv.* 出
　find out 找出
amount [ə'maunt] *n.* 量, 总数
most [moust] *a.* 最
commonly ['kɔmənli] *adv.* 通常
use [ju:z] *v. t.* 用, 使用
system ['sistim] *n.* 制度, 系統
centimeter ['sentimi:tə] *n.* 厘米, 公分
gram [græm] *n.* 克
second ['sekənd] *n.* 秒
table ['teibl] *n.* 表

length [leŋθ] *n.* 长度
as follows ['fɔlouz] 如下
kilometer ['kiləmi:tə] *n.* 千米, 公里
equal ['i:kwəl] *v. t.* 等于; *a.* 相等的
meter (或 metre) ['mi:tə] *n.* 米
decimeter ['desimi:tə] *n.* 分米
millimeter ['milimi:tə] *n.* 毫米
unit ['ju:nit] *n.* 单位
metric ['metrik] *a.* 公制的
square [skwɛə] *a.* 平方的; *n.* 正方
　形, 平方
with [wið] *prep.* 有
one [wʌn] *num.* 一
long [lɔŋ] *a.* 长 (的)
cubic ['kju:bik] *a.* 立方的
cube [kju:b] *n.* 立方体
kilogram ['kiləgræm] *n.* 公斤
decigram ['desigræm] *n.* 分克
centigram ['sentigræm] *n.* 厘克
milligram ['miligræm] *n.* 毫克

课 文 注 释

1. We measure the volume of a substance to find out the amount of space it occupies. (我們度量物体的体积来求出它所佔的空間。) 这里的 to find out

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the amount of space 是不定式短語，由不定式 to find out 和它的宾语构成，表示目的. 譯成汉語时，不定式短語可以用 "求" 或 "去"做什么来表达，这句里的 it occupies 是定語从句，修飾 space，从句前的关系代詞 which 省略了.

2. as follows 是成語，意为 "如下"，这里的 as 是连接詞兼关系代詞.

3. It is the area of a square with all sides one centimeter long. (它 (公制的面积单位) 是一个每边都是一厘米长的正方形的面积.) 这里的 with 是 "有" 的意思.

3. MOTION

Motion is the continuous change in the position of a body. The motion of a body is rectilinear or curvilinear. When a body moves along a straight line, the motion is rectilinear. When a body moves along a curved line, the motion is curvilinear.

When a body moves over equal spaces in equal periods of time, the motion is said to be uniform.[1] The equation of uniform motion is $d = vt$. That is, the distance passed over by a body in uniform motion is equal to the velocity multiplied by the time.[2] The characteristics of velocity are its speed and direction. These may be represented by the length and direction of a straight line. This line is called a vector.

The velocity of a body in motion may increase or decrease. The rate of change in velocity[3] is called acceleration. When the velocity increases, the acceleration of a body is positive. When the velocity decreases, the acceleration of a body is negative.

A body has uniformly accelerated motion when its velocity changes at a uniform rate.[4] The velocity of a body starting from rest may be found from the equation $v = at$. The distance passed over is given by the equation $d = \frac{1}{2} at^2$.

The resultant of two simultaneous motions (or velocities) along the same straight line is their sum when the directions are the same. The resultant of two simultaneous motions

along the same straight line is their difference when they are opposite.

The resultant of two simultaneous motions (or velocities) not in the same straight line is represented in speed and direction by the diagonal of a parallelogram. The adjacent sides of the parallelogram represent the two motions.

The resultant of more than two[5] simultaneous motions (or velocities) is found by compounding the resultant of any two of them with a third motion, then this new one with a fourth, and so on until each motion has been used.[6]

词 汇

continuous [kən'tinjuəs] a. 连续的

body ['bodi] n. 物体

rectilinear [rekti'linjə] a. 直线的

or [ɔ:] conj. 或者

curvilinear [kə:vi'liniə] a. 曲线的

move [mu:v] v. i. 移动

along [ə'lɔŋ] prep. 沿着

straight [streit] a. 直的

line [lain] n. 线

curved [kə:vd] a. 弯曲的

over ['ouvə] prep. 越过

period ['piəriəd] n. 一段 (时间)

time [taim] n. 时间

is said to be 即是, 称为

(said [sed], 是 say 的过去时和过去分词)

uniform ['ju:nifɔ:m] a. 等速的

equation [i'kweiʃən] n. 方程式

that is (插入语) 即, 那就是

pass [pɑ:s] v. i. 经过

by [bai] prep. 被

is equal to 等于

velocity [vi'lɔsiti] n. 速度

multiply ['mʌltiplai] v. t. 乘

characteristic [kæriktə'ristik] n. 特征, 特性

its [its] pron. 它的 (it 的所有格)

speed [spi:d] n. 速度

direction [di'rekʃən] n. 方向

these [ði:z] pron. 这些

may [mei] v. aux. 可以

represent [repri'zent] v. t. 表示

call [kɔ:l] v. t. 叫做, 称为

vector ['vektə] n. 向量, 矢量

increase [in'kri:s] v. i. 增加

decrease [di'kri:s] v. i. 减少, 降低

rate [reit] n. 比率, 速率

acceleration [ækselə'reiʃən] n. 加速度

positive ['pɔzətiv] a. 正的

negative ['negətiv] a. 负的

has [hæz] v. t. 有 (第三人称单数现在时)

at [æt, ət] prep. 以, 按

start [stɑ:t] v. i. 开始

from [frəm] prep. 从

rest [rest] n. 静止

found [faund] v. t. (find 的过去时和过去分词) 找到

over ['ouvə] adv. 越过

given ['givn] v. t. (give 的过去分词) 给予

resultant [ri'zʌltənt] n. 合力

two [tu:] num. 二

simultaneous [siməl'teiniəs] a. 同时的

🐾

same [seim] *a.* 同一的
their [ðɛə] *pron.* 他們的
sum [sʌm] *n.* 总和
difference ['difɪəns] *n.* 差
they [ðei] *pron.* 他們
opposite ['ɔpəzit] *a.* 相反的
not [nɔt] *adv.* (或各定小品詞) 不
diagonal [dai'ægənəl] *n.* 对角綫
parallelogram [pærə'leləgræm] *n.* 平行四边形
adjacent [ə'dʒeisənt] *a.* 接近的，邻接的
more [mɔ:] *a.* 敕多，更多
than [ðæn] *conj.* 比較

compound [kəm'paund] *v. t.* 合成，組合
any ['eni] *a.* 任何
them [ðem] *pron.* 他們 (they 的宾格)
with [wið] *prep.* 和
third [θə:d] *num.* 第三
then [ðen] *adv., conj.* 然后
new [nju:] *a.* 新的
fourth [fɔ:θ] *num.* 第四
and so on 等等
until [ʌn'til] *conj.* 直到
each [i:tʃ] *a.* 每一个
been [bi:n] be 的过去分詞

課 文 注 釋

1. When a body moves over equal spaces in equal periods of time, the motion is said to be uniform. (当一物体在相等的时間里移动过相等的空間时，这运动就叫做等速运动。) 这里的 over 是前置詞，它后面有宾語 spaces，它和它的宾語合成前置詞短語，用作状語，修飾 moves.

2. The distance passed over by a body in uniform motion is equal to the velocity multiplied by the time. (在等速运动中物体所經过的距离等于速度乘以时間。) 这里的 passed 和 multiplied 都是过去分詞，用作定語，分別修飾 distance 和 velocity.

3. in velocity (在速度方面)，这里的 in 表示 "在...方面".

4. at a uniform rate (以等速)，这里的 at 表示 "以...标准".

5. more than two (两个以上)，more than... 的意思是 "...以上".

6. The resultant of more than two simultaneous motions is found by compounding the resultant of any two of them with a third motion, then this new one with a fourth, and so on until each motion has been used.

(两个以上的运动的合运动可以用以下的方法求得：先将其中任何两个运动的合运动和第三个运动求得合运动；再将新的运动——即求出的三个运动的合运动——和第四个（运动）求得它們的合运动；如此类推，直到每一运动都已用过为止。) 这句里的 by 表示 "用...方法". compound...with... 意思是 "把甲和乙合成". 这句里的 compounding 是动名詞，它做 by 的宾語，用作名詞，同时它有动詞的作用，有 resultant 做它的宾語，还有 with a third motion 做状語来修飾它。这句里的 one 是代詞，代表 resultant. 前置詞短語 with a fourth 后面省略了 motion.

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4. FORCE

The momentum of a body is measured by the product of its mass and velocity. It is represented by the expression mv. Force is the name given to the cause producing acceleration, retardation, or a change in the direction of the motion of a body.[1] The equation of force is $f = \dfrac{mv}{t}$, $f = ma$.

To every action there is always an equal and opposite reaction. That is, for every push or pull of one body upon a second body there is always an equal push or pull of the second body upon the first.

The resultant of two or more forces acting in the same direction[2] along a straight line is equal to their sum; but when two forces act in opposite directions in the same line, their resultant is equal to their difference and has the direction of the greater force.

The resultant of two forces acting at an angle[3] is represented by the diagonal of a parallelogram. The sides of this parallelogram represent the component forces. This law is known as the Principle of the Parallelogram.

The moment of a force about a point[4] is the effectiveness of the force in producing a rotation.[5] It is measured by the product of the magnitude of the force and the perpendicular distance from the point to the line of the direction of the force.

A system of two equal and opposite parallel forces acting along different lines is called a couple. The moment of a couple is the product of one of the forces multiplied by the distance between the two forces.

When a body is in curvilinear motion, a force is required to deflect the body continuously from a straight line.[6] This is called centripetal force. The equation of centripetal force is $f = \dfrac{mv^2}{r}$.

force [fɔːs] *n.* 力

momentum [mou'mentəm] *n.* 动量

product ['prɔdəkt] *n.* 乘积

mass [mæs] *n.* 质量

expression [iks'preʃən] *n.* 表示式

name [neim] *n.* 名称

cause [kɔːz] *n.* 原因

produce [prə'djuːs] *v. t.* 产生

retardation [riːtɑː'deiʃən] *n.* 减速度

to [tu] *prep.* 对于

action ['ækʃən] *n.* 作用

there [ðɛə] (引导词)

always ['ɔːlweiz] *adv.* 总是,始终

reaction [ri'ækʃən] *n.* 反作用

every ['evri] *a.* 每...

push [puʃ] *n.* 推

pull [pul] *n.* 拉

upon [ə'pɔn] *prep.* 在...之上

second ['sekənd] *num.* 第二

first [fəːst] *num.* 第一

act [ækt] *v. i.* 作用

greater ['greitə] *a.* 较大的

angle ['æŋgl] *n.* 角

component [kəm'pounənt] *a.* 合成的; *n.* 分力

law [lɔː] *n.* 定律

is known as 叫做,称为

known [noun] (know [nou] 的过去分词)

principle ['prinsipl] *n.* 原则,原理

moment ['moumənt] *n.* 矩

about [ə'baut] *prep.* 围绕

point [pɔint] *n.* 点

effectiveness [i'fektivnis] *n.* 效应

rotation [rou'teiʃən] *n.* 旋转

magnitude ['mægnitjud] *n.* (力的)大小

perpendicular [pəːpən'dikjulə] *a.* 垂直的

distance ['distəns] *n.* 距离

parallel ['pærəlel] *a.* 平行的

couple ['kʌpl] *n.* 力偶

between [bi'twiːn] *prep.* 在...之间

require [ri'kwaiə] *v. t.* 需要

deflect [di'flekt] *v. t.* 偏转

centripetal [sen'tripitl] *a.* 向心的

课 文 注 释

1. Force is the name given to the cause producing acceleration, retardation, or a change in the direction of the motion of a body. (力是给那个使物体的运动产生加速、减速或方向改变的原因所起的名字.) 这里的 given 是过去分词,它和 to the cause 构成分词短语,用作定语,修饰 name. 这句里的 producing 是现在分词,它和 acceleration 等构成分词短语,用作定语,修饰 cause. 要注意:及物动词的过去分词有被动意义,而现在分词有主动意义. of the motion of a body 是前置词短语,用作定语,修饰 acceleration, retardation 和 change.

2. in the same direction (向同一方向),in opposite directions (向相反方向) 里的 in 表示方向.

3. at an angle 成某种角度.

4. about a point 对某一点而言.

5. in producing a rotation (在产生旋转时) 里的 producing 是动名词. in 表示过程.

6. When a body is in curvilinear motion, a force is required to **deflect**

the body continuously from a straight line. （当物体作曲线运动时　需要有力来使这物体不断从直线偏斜。）注意: a force is required 是被动式，但在汉语里很少用被动语态，不说 "力被需要"，而说 "需要有力"。

5. MASS

The term mass,[1] as used in mechanics,[2] refers to that property of matter which in everyday language[3] is described by the word inertia. We know from experience that[4] an object at rest[5] will never start to move of itself[6] — a push or pull must be exerted on it by some other body. In more technical language, an external force is required to accelerate the body,[7] and we say the force is needed[8] because the body has inertia.

It is also a familiar fact that[9] a force is required to slow down or stop a body which is already in motion, and that a sidewise force must be exerted on a moving body to deviate it from a straight line. In these instances also, we say the force is necessary because the body possesses inertia.

It[10] will be seen that the processes above (i.e., speeding up, slowing down, or changing direction) involve a change in either the magnitude or the direction of the velocity of the body. In other words, in every case the body is accelerated. We may therefore say: inertia is that property of matter because of which[11] a force must be exerted on a body in order to[12] accelerate it.

To assign a numerical value to the inertia of any given body, we choose as a standard some one body whose inertia is arbitrarily taken as unity, and state the inertia of all other bodies in terms of this standard. The inertia of a body, when stated[18] in this quantitative way, is called its **mass**. **Mass is a quantitative measure of inertia.**

The mass of a body is an invariant property of the body independent of its velocity, acceleration, position on the earth's surface or height above the earth's surface. In the

latter two respects it differs from the weight of the body, which varies with position and elevation.

The standard of mass in both the M.K.S. (meter-kilogram-second) and C.G.S. systems is a platinum-iridium cylinder called the **standard kilogram**. The original standard is, presumably, kept in Sevres, France, and one or more accurate duplicates are possessed by most other countries. They are not all identical in mass with the original standard, but this is not of importance since their masses relative to the standard are accurately known.

The unit of mass in the M.K.S. system is the mass of the standard kilogram. The unit of mass in the C.G.S. system is 1/1000 as great as[14] the mass of the standard kilogram and is called one gram.

There[15] is no mass standard in the English gravitational system of units. That is, government laboratories do not preserve in their vaults a certain piece of matter whose mass is equal to the unit mass. The English system is based on standards of force, length, and time, and the unit of mass is defined in terms of these standards.

The pound of force was defined as the force of the earth's gravitational attraction at sea level and 45° latitude on a specified body called the standard pound. To avoid the unnecessary duplication in maintaining two such standard bodies, the standard kilogram and the standard pound, the latter is now **defined** in terms of the standard kilogram by the relation that its mass shall equal 0.4535924277 kilograms.

詞　匯

term [tə:m] *n.* 名辭,項目
mechanics [mi'kæniks] *n.* 机械学,力学
refer [ri'fə:] to 指, 說明
everyday language ['leggwidʒ] 日常 的話
describe [dis'kraib] *v.t.* 描述

inertia [i'nə:ʃiə] *n.* 慣性, 惰性
know [nou] *v.t.* 知道
experience [iks'piəriəns] *n.* 經驗
object ['obdʒikt] *n.* 物体
never ['nevə] *adv.* 决不
start [sta:t] *v.i.* 开始

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