

Федеральное агентство по образованию
ГОУ ВПО «Братский государственный университет»

Л. Ф. Чернявская

АНГЛИЙСКИЙ ЯЗЫК

ТЕРМИНЫ И ТЕРМИНООБРАЗОВАНИЕ

Рекомендовано Сибирским региональным учебно-методическим центром высшего профессионального образования для межвузовского использования в качестве учебного пособия для студентов неязыковых вузов

Братск 2007

ББК 81.2 (Англ)

Чернявская, Л. Ф. Английский язык. Термины и терминообразование: учебное пособие / Л. Ф. Чернявская. – Братск: ГОУ ВПО «БрГУ», 2007. – 99 с.

Учебное пособие содержит теоретические сведения по теме «Термины современного английского языка», необходимые для точного перевода научно-технической литературы и периодических изданий. Пособие включает упражнения, тексты для развития навыков работы с научно-технической литературой и приложения.

Рецензенты: *Добрыдина Т.И.*, канд. пед. наук,
зав. кафедрой иностранных языков,
Кемеровский государственный университет
Махоткина Е.Р., доцент кафедры английского языка,
Иркутский государственный лингвистический ун-т

СОДЕРЖАНИЕ

Введение.....	4
Раздел I. Термины и терминообразование.....	5
Раздел II. Фирменные названия (brandnames / trade marks), правила их образования и перевода.....	11
Раздел III. Практика перевода на основе упражнений.....	16
Раздел IV. Научно-технические тексты (практика перевода).....	39
Список литературы.....	68
Приложение 1. Ключи к упражнениям.....	70
Приложение 2. Словообразование с помощью аффиксации.....	72
Приложение 3. Список наиболее употребительных союзов.....	78
Приложение 4. Особые случаи образования множественного числа существительных.....	82
Приложение 5. Использование простых и однозначных слов в качестве технических терминов.....	83
Приложение 6. Список наиболее часто встречающихся сокращений.....	85
Приложение 7. Единицы измерения.....	88
Приложение 8. Латинизмы.....	91
Приложение 9. Фонетика. Правила чтения.....	92
Приложение 10. Список неправильных глаголов.....	97

Введение

Бурное развитие науки, техники и увеличение объема научно-технической информации в мире заметно подняло практическое значение научно-технического перевода. Основное назначение данного учебного пособия состоит в том, чтобы способствовать выработке у студентов умений и навыков грамотного перевода терминов и терминологических словосочетаний. Рассматриваются наиболее распространенные правила терминообразования и правила перевода.

При составлении пособия использовались общетехнические и специализированные словари, справочная литература по современному английскому языку, общетехнические тексты.

Данное пособие состоит из следующих разделов:

- I. Термины и терминообразование.
- II. Фирменные названия (brandnames / trademarks), правила их образования и перевода.
- III. Практика перевода на основе упражнений.
- IV. Научно-технические тексты (практика перевода).
- V. Приложения.

Учебное пособие рекомендуется студентам технических специальностей дневной и заочной форм обучения, а также аспирантам и преподавателям вузов для работы с научно-технической литературой.

РАЗДЕЛ I

Термины и терминообразование

Термин – слово или словосочетание, являющееся названием определенного понятия какой-нибудь специальной области науки, техники, искусства [4].

Все термины по своему строению делятся:

- на **простые** – path (контур электрической цепи), feeder (фидер);
- **сложные** – clock-work (часовой механизм);
- **термины-словосочетания** – circuit breaker (выключатель, автомат).

При работе с *терминами-словосочетаниями* следует помнить, что основной компонент, как правило, стоит всегда в конце. Можно выделить следующие наиболее часто встречающиеся конструкции:

- а) существительное + существительное
earth core – заземляющая жила
suspension bridge – подвесной мост
goods traffic – грузооборот
- б) прилагательное + существительное
electric circuit – электрическая цепь
magnetic force – магнитная сила
soft currency – неконвертируемая валюта
- в) существительное + причастие
gas-burned furnace – топка, работающая на газе
foil-covered dielectric – диэлектрик, покрытый фольгой
semi-finished products – полуфабрикаты
- д) словосочетания
long distance traffic – перевозки на длинные расстояния
traffic light system – система светофоров
gross national product (GNP) – валовой национальный продукт (ВНП)

Конверсия широко используется при образовании новых слов. В случае конверсии слово может «перейти» из одной части речи в другую. Чаще всего наблюдается явление образования глаголов от имен существительных. Обратный процесс наблюдается реже. Например:

form, n – форма, вид
to form, v – принимать форму; образовывать

house, n – дом
to house, v – вмещать, содержать

place, n - место
to place, v – размещать, ставить

water, n – вода
to water, v – поливать; снабжать водой

table, n – стол; доска
to table, v – ставить на стол; составлять списки

to hold back, v – сдерживать
hold-back, n – задерживающее устройство

to make up, v – составлять
make-up, n – грим; косметика; состав

to follow up, v – упорно (пре) следовать
follow-up, n – «следящая» система (автоматика)

Термины можно образовать с помощью **словосложения**, т.е. путем соединения двух слов в одно. Иногда между словами может быть предлог. Слова, возникающие данным способом, пишутся слитно или через дефис. Например:

pony-size (малого размера)
stand-by (резервное оборудование)
out-of-service (вне работы, выключенный из работы)
horsepower (лошадиная сила)
trailer-on-flat (трейлер на платформе)
skinhead – «бритоголовый»
fly-on-the-wall – документальный (о фильмах)

Путем **сокращения** существующих слов или словосочетаний можно получить новые слова. Такой способ словообразования очень распространен. Сокращения могут быть выражены множест-

венным числом, употребляться с определением и в притяжательном падеже, например:

Oxbridge (Oxford + Cambridge) – Оксбридж, привилегированное высшее учебное заведение

sci-fi (science + fiction) – научная фантастика

stagflation (stagnation + inflation) – стагфляция (застой при одновременной инфляции)

hi-tech = high-tech (high + technology) – современная / передовая технология

lunarsurf (lunar + surface) – лунная поверхность

gaser (gamma-ray + laser) – гамма-лучевой лазер

В научно-технической литературе встречаются **сокращенные словосочетания**, которые произносятся как названия букв, составляющих сокращения. Нужно отметить, что написание буквенных сочетаний может быть разным, т.е. с точкой и без нее и т.д., например:

a/g (air – to – ground) – класса «воздух-земля»

fpm (feet per minute) – футов в минуту

h-v (high voltage) – высокое напряжение

M&H (mechanical and hydraulic) – механический и гидравлический

MAP (Military Assistance Program) – программа военной помощи (другим странам)

m.o. (manually operated) – с ручным управлением

Так как сокращения широко употребляются, то возникает много **омонимических** (одинаково звучащих, но имеющих разное значение) вариантов и создаются известные трудности при выборе нужного значения. Однако следует в таких ситуациях обращаться к контексту, например:

HE (high explosive) – взрывчатое вещество

HE (human engineering) – инженерная психология

HE (helium) – гелий

Частое использование **сокращений** и **аббревиатур** является характерной чертой научно-технической литературы, например:

D.C. (direct current) – постоянный ток

A.C. (alternating current) – переменный ток

in. (inch) – дюйм, H.P. (horsepower) – лошадиная сила

b.p.f. (band-pass filter) – полосовой фильтр

v. (volt) – вольт

W. (watt) – ватт

yd (yard) – ярд

l.p. (low pressure) – низкое давление, низкое напряжение

S.c. (short circuit) – короткое замыкание

V.H.F. (very high frequency) – частота УКВ

Нужно знать, что принятые сокращения являются официальными и не подлежат никаким произвольным изменениям и заменам.

Особого внимания заслуживают способы образования и пополнения терминологического состава языка за счет **аффиксации**, т.е. образования новых однословных терминов путем прибавления к корневым словам заимствованных из греческого и латинского языков префиксов и суффиксов, например:

а) с помощью приставок:

obstruction – заградительный сигнальный огонь

substation – подстанция

comprise – вмещать, заключать (в себе)

inductance – индуктивность

distribution – распределение

expend – расширять(ся), растягивать(ся)

reopen – открывать (заново)

transformation – преобразование

misprint – сделать опечатку

proactive – профилактический и т.д.

б) с помощью суффиксов:

fruitful – плодотворный

useless – бесполезный

weightlessness – невесомость

transistorer – передатчик

absorbent – поглотитель

splitting – расщепление

explosion – вспышка

existence – жизнь, бытие, существование

momentous – важный, влиятельный

frequency – частота

prognosticate – прогнозировать, и т.д.

Нередки случаи употребления в технической литературе *простых и однозначных слов в качестве терминов*. Например, в английском языке:

horse – рама
pig – болванка
frog – крестовина
fly – маховик
tree – вал

Такое же явление наблюдается и в русской технической литературе, например:

паук – рыболовная снасть
мушка – часть прицельного приспособления
бык – устой моста
улитка – часть слухового аппарата
чушка – болванка

Термины-неологизмы представляют большую трудность для перевода. Особенно много неологизмов встречается среди фирменных названий, т.е. специфических названий тех или иных изделий или деталей, выпускаемых данной фирмой или предприятием. При их переводе необходимо, прежде всего, уяснить, что представляет из себя данное изделие и переводить его название, руководствуясь общепринятой терминологией.

Неологизмы возникают с помощью разных способов словообразования (стяжения, словосочетания, слоговых сокращений, апокопического сокращения и т.д.). Например:

Biline – мобильная система связи

Great Eight – «Большая восьмерка» (США, Великобритания, Франция, Германия, Япония, Канада, Италия, Россия)

AWACS (Airborne Warning and Control System, АВАКС) – система раннего обнаружения и предупреждения

Немалую трудность в процессе перевода научно-технической литературы представляют случаи несовпадения значения сходно звучащих русских и иноязычных терминов – то, что обычно называется *«ложными друзьями» переводчика*, например:

английский язык

instrument – прибор, аппарат,
орудие, документ (юридич.)

paragraph – абзац,
газетная заметка

magazine – склад боеприпасов,
журнал

русский язык

инструмент – tools

параграф – item, point,
section

магазин – shop, store

Международный язык вычислительной техники имеет свои специфические особенности, но подчиняется общепринятым правилам терминообразования. Он содержит аббревиатуры, неологизмы, заимствования из латинского языка и т.д. Например:

CPU – Central Processing Unit – центральный блок обработки данных, центральный процессор

VDU – Visual Display Unit – блок визуальной индикации

RPG – report program generator – генератор программы печати результатов анализа данных

gigabyte – Greek gigas (giant) and variant of bit - гигабайт

database – база данных, набор таблиц

software – программное обеспечение

Internet – «сеть сетей», объединяющая более 50 тыс. сетей, etc.

Следует обратить внимание на использование **графических символов** (в некотором смысле тоже терминов), которые также служат для передачи определенной информации. Например, smileys – «смайлики», известные всем пользователям компьютеров:

:(- хмурый

:| - суровый

:-| - серьезный

%-) - программист

:-) – улыбающийся

:-% - банкир

:~))) - радостный

Нельзя оставить без внимания **особенности написания и прочтения чисел** на английском и русском языках, т.е. в использовании точки и запятой. Нужно запомнить, что в английском языке точка отделяет десятые доли от целых чисел в десятичных дробях, т.е. играет ту роль, которую в русском языке играет запятая. Запятые в английском языке отделяют разряды и при переводе чисел во внимание не принимаются. Например: 7,342,856 переводим 7 342 856; 9.144 3 в переводе 9,1443.

РАЗДЕЛ II

Фирменные названия (brandnames / trademarks)

Вопрос о принадлежности *brandnames / trademarks* (торговых марок) к категории терминов пока не имеет четкого ответа. Однако не стоит забывать, что некоторые фирменные обозначения товаров со временем превращаются в общепринятые, например, *plexiglas* (*acrylic plastic*) – прозрачная пластмасса из акриловой смолы.

Brandnames можно отнести к группе неологизмов. Они образуются:

a) от имен собственных: McDonalds (сеть предприятий быстрого питания), MaxFactor (парфюмерия);

b) от географических названий: Riviera (побережье Лигурийского моря во Франции (Лазурный берег)) и Италии. Riviera – (надувные лодки);

c) путем сокращения, акронимии, аффиксации;

d) названий книг: Arabian Nights (торговый знак духов), имен фольклорных и литературных персонажей – Paul Bunyan (замороженные овощи), названий кораблей: Cutty Sark (виски) и т.д.

Отдельную трудность для перевода и понимания brandnames представляют названия, образованные с нарушением правил орфографии:

Kleenex (бумажные косметические салфетки)

Jell-O (полуфабрикаты желе и муссов)

Sanka (растворимый кофе без кофеина) и т.д.

Диапазон средств словообразования очень широк и говорит о безграничности появления неологизмов.

Очень часто в названии brandnames умышленно допускаются ошибки в написании слова – названия товара, фирмы и т.д., например: EAZIWASH (easy wash) – a launderette, FIZZEEK (physique) – a gymnasium and health club и т.д. Следует выделить:

1. Brandnames, образованные от соответствующих существительных, прилагательных и глаголов:

Ambassador

Tight

Bliss

Quick

Dove

Centaur

Banish

2. Brandnames-словосочетания:

Angel Skin	Desert Dry	Flight Lights
Angel Face	Sable Soft	White Hunter
High Sierra	British Rogue	Black Knight

3. Brandnames, образованные от повелительных предложений:

Dip It, Hold It, Weed-B-Gone («да исчезнут сорняки»)
Wash'n Wear («стирай и носи»)
Wash'n Dry («стирай и суши»)

4. Brandnames, образованные от утвердительных предложений:

I-Heal-U ('I heal you.' – «я лечу вас»)
U-C-It ('you see it' – «вы видите это»)
U-Do-It ('you do it' – «вы делаете это»)

5. Brandnames, образованные с нарушением фонетико-морфологического облика слова, его формы выражения:

a) изменение гласных графем:

ay > a	Sa – So – say so (signs and lecterns)
ea > a, e	BigHed - big head (pins)
ee > e	Super Seffy Go – super see fly go (insecticide)
ew > u	Chugum – chew gum (chewing gum)
ow > o	Stop-Kof – stop cough (cough syrup)

b) изменение согласных графем:

c > k	Kan Master – can master (can opener)
ck > k	Nok – a – Bout – knock about (safety shoes)
wr > r	Ristmaster – wrist master (watch bands)

c) использование слитного написания двух или несколько слов:

Kodekall – code call (code signal system)
Holdzit – holds it (card holder)
JetCool – jet cool (quick cool)
Speedry – speed dry

d) дефисное написание:

No-Nox – no knocks (gasoline)

Dari – Kool – dairy cool (milk coolers)

Less – Toil – less toil

е) апокопическое сокращение исходного слова, т.е. отпадение конечных звуков:

Lux (luxury)

Pic (picture)

Vel (velvet)

Prem (premium)

ф) буквенные сокращения:

BT – breakfast treat («лакомство для завтрака»)

H-A – Hair Arranger («прибор для укладки волос»)

MO – mineral oil («смазочное масло»)

QT – quick tanning lotion («жидкость для загара»)

6. Brandnames, образованные с помощью акронимии – создания сокращенных слов, сходных по своей структуре с общеупотребительными словами:

RAP – removes all paint («удаляет всю краску» - пятновыводитель)

TAG – tasted, approved, guaranteed («опробовано, одобрено, гарантировано»)

DOC – denture oxygen cleaner («препарат для чистки искусственных зубов»)

7. Brandnames, образованные с помощью сокращения первого компонента двучленного или большего по составу словосочетания, а конечный компонент не сокращается:

B-Killer – bottle («средство для чистки бутылок»)

HT-1 – high temperature-1 (изготавливаемая фирмой Дюпон первая ткань, отличающаяся сверхневосприимчивостью к высоким температурам)

KAMCLAD – от фамилий Keaskey and Mattiso и слова clad («одетый»)

LOFGLASS – от фамилий Libby, Owens, Ford и слова glass («стекло»).

8. Brandnames, образованные с помощью аффиксации:

a) слова, образованные с приставками **ex-, ultra-, de-, bi-, bio-**:

Bi-Fidelity – «двойная точность»

Bicillin – медикамент, содержащий два типа пенициллина

Bioshampoo – от греч. bios – «жизнь»

Decaf – марка кофе без кофеина

b) слова, образованные с суффиксами:

-cide:

Gallicide – средство от насекомых, образовано от фамилии предпринимателя, выпускающего это средство

Jetocide – название дезодоратора для быстрого уничтожения любого запаха

-or, -er:

Hibernator – название одежды для сна, от hibernate - находится в зимней спячке

Deglosser – название жидкости, уничтожающей глянец, лоск

Drizzler – пальто для ненастной погоды, от drizzle – моросить

Tanette – название легко смываемого грима цвета загара, от tan – загар

-ine, -in образуют, как правило, названия лекарств и различных фармацевтических препаратов:

Sugarine, Nitrine, Stimulin, Arrestin, Instantin и т.д.

-el, -an для образования названий различных синтетических тканей:

Acrilan, Taralan, Fortisan, Arnel, Fortrel и т.д.

-on (-lon) – встречаются в названиях синтетических тканей:

Nylon, Rayon, Banlon, Accolon, Crion, Kimlon, Dacron и т.д.

-ex, (-x) – входят в названия различных химических препаратов:

Dirtex – средство для удаления грязи

Blistex – средство от волдырей

Scratchex – средство от чесотки

Имена собственные в образовании brandnames

1. Личные имена:

а) в автомобиле- и самолетостроении: Boeing, Douglas, Lockheed, Ford, Cooper, RollsRoyce, Austin, Morris;

б) продовольственные товары, напитки, табачные изделия:

Philip Morris, Gallaher's, Rothmans, Roger and Gallet, Givenchy, Guinness, Worthington, Whitbread, Courage, McEwan's, Young's, Bell's, Haig и т.д.

2. Географические названия:

Monterey, Salem, Newport, Capri, Dakota, York;

Champagne (шампанское), Camembert (сыр), Port (портвейн), Cognac (коньяк) и т.д.

Biaritz – моторные лодки

Monaco – одеколон

Savoy – сигареты

Seville - электрокамины

3. Символические имена, характерные для какой-либо страны (например, Англии):

Whitehall – товарный знак пластинок

Big Ben – товарный знак курительных трубок

Victory – товарный знак пастилок от кашля

Pall Mall – товарный знак сигарет

Cutty Sark – товарный знак шотландского виски

Lady Godiva – товарный знак женской парфюмерии

Simple Simon (простак) – товарный знак замороженных пирогов

РАЗДЕЛ III

Практика перевода (упражнения)

Упражнение 1. Прочитайте, переведите и запомните происхождение некоторых терминов.

bit – **b**inary + **d**igit
emoticon – **e**motion **i**con
server – servire (лат.)
pixel – **pix** + **e**lement
scanner – scandere (лат.) – to climb
shareware – **share** + **software**
network – nett (knot) + weorc (act) – Old English
FAX – facsimile – fac simile (лат.)
ETX – **e**nd of **t**ext
KISS-principle – **keep it simple, stupid**
endec – **e**ncoder + **d**ecoder
SMS – **S**hort **M**essage (paper) **S**ervice
ICQ – I Seek You («Аська»)
E-mail – **e**lectronic + **mail**
DVD – **D**igital **V**ideo **D**isk
mailbot – **mail** + **robot**

Упражнение 2. Переведите следующие слова и словосочетания:

climate-controlled office
video display terminals (VDTs)
eyestrain, keyboard
age-old back problem
carpal tunnel syndrome = repetitive-action injury
screens with built-in protection
ergonomically designed workstation
to reduce glare
garbage collection
keyboard input
overhead lights
jump table
on a tilt-and-swivel base

pneumatically adjustable chair
to avoid arm and wrist fatigue
raised wrist rest
immune system diseases
radiation protection devices (a glare reflector)
a computer-literate person
a system analyst
personal data base
pica face
cellular phone
raw data
software engineering

Упражнение 3. Переведите следующие слова, обращая внимание на правила образования неологизмов:

electromatic (electric + automat)
laundromat (laundry + automat)
chemurgy (chemistry + metallurgy)
Sigma (shielded inert gas metal arc welding)
radsta (radio + station)
intercom (intercommunication)
maxcap (maximum + capacity)
quink (quick + drying + ink)
luncheonteria (lunch + cafeteria (ит.))
expand-o-sock
perm-a-lift
Radar (radio detection and ranging)
Laser (light amplification by stimulated emission of radiation)
org-man (organization + man)
OPEC (petroleum-exporting countries organization)
Fringlish (French + English)

Упражнение 4. Переведите следующие предложения:

A.

1. The engine is the source of power that makes the wheels go round and the car move.

2. The fuel system is designed to store liquid gasoline and to deliver it to the engine cylinders in the form of vapour mixed with air.

3. A fuel pump which pulls the gasoline through the fuel line is being repaired.
4. Semiconductor theory, junction theory and circuit theory are integrated to explain the behavior of existing devices in circuits.
5. According to W.H.O. (World Health Organization) statistics, heart diseases were the No.1 Killer.
6. This system is conducive to high volumetric efficiency.
7. This type of mixing is often incidental to other stages of the industrial process, e.g. size reduction.
8. Protective clothing and dry-chemical-type fire extinguisher should be readily available in the area.
9. Not only laboratories, but pilot-type manufacturing plants are included in the center.
10. The Negro ghettos of the central cities became increasingly crowded in 1969 and the conditions of ghetto life showed no dramatic change.

B.

1. First developed in Europe, the cashomats are also in use at banks in New York, Massachusetts, etc.
2. The bottom line of all the hullabaloo over whether cellular phones cause brain cancer – nobody knows.
3. They say Europe’s new dead-end generation has lost faith in the future.
4. Mr. Black was old money and never accepted his hillbilly relations.
5. Those who use more French terms speak Fringlish.
6. Mr. Smith used a Global Positioning System (G.P.S.) in his work to install a cellular phone system.
7. Slovakia’s parliament overturned a government decision to impose 23% value added tax (VAT) on newspapers.
8. UN may use RDF.
9. My friends are fond of sci-fi.
10. There is simultaneous “brain-drain” inside the USA, with thousands of scientists and engineers moving back and forth like particles in an atom.

Упражнение 5. Переведите слова, используя указанные части речи. Обратите внимание на конверсию:

а) существительные и глаголы

model – модель, моделировать

Sunday, measure, value, control, heat, start, stop, store, name, sun, corner, iron, letter, doctor, motor, power, trip, wire, cause, trigger, handle, land, time, echo, chair;

б) прилагательные и глаголы

slow – медленный, замедлять

warm, cool, correct, copper, iron, salt, home, lame, last, stable, empty, double, staff, blanch, black, manifest;

Упражнение 6. Переведите, обратите внимание на чередование ударения.

`envelope, n – en`velope, v

`inlet, n - in`let, v

`contrast, n - con`trast, v

`concrete, n - con`crete, v

`inland, n - in`land, adv

`instinct, n - ins`tinct, v

`desert, n - de`sert, v

`export, n - ex`port, v

`contract, n - con`tract, v

`confines, n - con`fine, v

`conduct, n - con`duct, v

`contest, n - con`test, v

`forecast, n - fore`cast, v

`content, n - con`tent, v

Упражнение 7. Прочитайте, переведите и запомните наиболее употребительные паронимы (слова, близкие по написанию или звучанию, но имеющие разное значение).

Пример: accept - принимать, except - исключать

adapt – adopt

white – wait

pick out – peek out

knight – night

than – then

hair – here

butter – better

cup – cap

affect – effect

luck – lack

see – sea

soap – soup

vary – very

much – match

ship – sheep

hole – whole

same – some

air – ear

include – exclude

flour – flower

weel – will

Упражнение 8. Прочитайте и переведите производные слова.

а) прилагательное - существительное – глагол:

primary – prime – prime
local – location – locate
deep – depth – deepen
weak – weakness – weaken
long – length – lengthen
hard – hardness – harden
wide – width – widen
successful – success – succeed
magnetic – magnet – magnetize
real – reality – realize
considerable – consideration – consider

б) глагол-существительное-прилагательное:

emit – emission – emissive
apply – appliance – applicable
succeed – success – successful
weigh – weight – weightless
operate – operation – operative
mean – meaning – meaningless
invent – inventor – inventive
adjust – adjustment – adjustable
oppose – opposition – opposite
desire – desire – desirable
consider – consideration – considerable
move – movement – movable

Упражнение 9. Переведите сокращения, состоящие из начального элемента слова (читаются как несокращенные слова):

Fig; fig – figure
Gal; gal – gallon
amp – ampere

MAX; max – maximum
No – number
OX; oxy – oxygen

IN; in – inch
deg – degree
E. – east
DEP – department

sec – section; secondary
LAB; lab – laboratory
cal - calorie
high-tech – high technology

Упражнение 10. Переведите сокращения, состоящие из согласных букв (читаются как несокращенные слова):

APRX; aprx – approximately
FT; ft – foot
C. – Centigrade
H; h – hour
KG; kg – kilogram
F. - Fahrenheit
M; m – mark
mm – millimeter
gr. - gramme
YD; yd – yard
s/n – signal to noise
hp – horse power
P. – production
R. – retarder
TV - television
HL – half-life
NCR – nuclear
PR – public relations

Упражнение 11. Переведите сокращения, состоящие из начальных букв сокращенных слов (каждая буква читается как в алфавите):

FA – Football Association
WTO – World Trade Organization
D.C. – direct current
AA – American Airlines
GE – General Electric
USAF – United States Air Force
JV – joint venture

UN – United Nations
LD – Labor Department
NBC – National Bureau of Standards
A.C. – alternating current

Упражнение 12. Переведите сокращенные слова построенные по модели: «начальный элемент первого слова + целое второе слово» (такие слова читаются слитно).

propfun (propeller + fun) – винтовентиляторный газотурбинный двигатель

radnote (radio + note)
anglophone (English + phone)
paramedic (paraschut + medic)
newsmaker (news + maker)
paraboy (paraschute + boy)
synfuel (synthetic + fuel)
prep – school (preparatory + school)
ostpolitic (east + politic)
newsboy (newspaper + boy)
orgman (organization + man)
motorail (motor + rail)

Упражнение 13. Переведите сокращенные слова, образованные по модели: «начальный элемент первого слова + конечный элемент второго слова» (такие слова читаются слитно).

neutron (neutral + electron)
motel (motor + hotel)
motorcade (motor + caval/ cade)
transistor (transfer + resistor)
positron (positive + electron)
slurb (slum + suburb)
brunch (breakfast + lunch)
smog (smoke + fog)

Упражнение 14. Назовите русские слова, имеющие общий корень со следующими английскими словами:

solar	social
service	industry
transport	illustrate
demonstrate	mechanics
second	element
biography	lecture
magnet	form
fact	mass
moment	motor
result	institute

Упражнение 15. Переведите без словаря следующие английские слова, имеющие общий корень с русскими словами:

pole	port
signal	base
organ	ideal
contact	control
revolution	plan
civilization	conductor
material	problem
secret	laboratory
illustrate	fact
energy	lift

Упражнение 16. Переведите словосочетания «существительное + существительное», обратите внимание на последовательность расположения слов в английских и русских словосочетаниях.

1	2	1	2
<i>test flight</i> - испытательный полет			
<i>wing thickness</i> – толщина крыла			
1	2	2	1

traction capacity
horse power
human being
control system
civil service
survey party
earth core
gas turbine
burning time
building stone
watch pocket

heat treatment
house accommodations
earth gravitation
aluminium smelter
production slump
emergency lighting
suspension bridge
high voltage
expansion ratio
stone building
pocket-watch

Упражнение 17. Переведите словосочетания «существительное + существительное + существительное».

flight control system – система управления полетом

1 2 3 3 2 1

mass production methods
excess body heat
gas turbine propulsion
oil-pressure failure
core-balance current transformer
iron reduction plant

building materials industry
orbit space laboratory
jet propulsion engine
flame proof apparatus
electron beam set
fuel-air mixture

Упражнение 18. Переведите словосочетания «прилагательное (причастие) + существительное + существительное».

total wing area – общая площадь крыла

1 2 3 1 3 2

long distance train
a spectacular cosmic event
prefabricated ferro-concrete blocks
advanced engineering method
main-haulage road long distance call
dry battery block

mobile sea platform
fixed contact
short-time rating
good combustion
fast food lunch
accelerating field

boiling point
natural gas reserves

exhaust velocity
long-term plan

Упражнение 19. Прочитайте и запомните наиболее употребляемые составные глаголы.

<i>bring</i>	bring about – приводить (к результату) bring out - выявлять bring down – сбивать bring in – 1) выносить 2) приносить доходы bring up – поднимать (вопрос)
<i>do</i>	do away – избавляться do without – обходиться без (чего-/кого-либо) do for – 1) заботиться 2) испортить do up – приводить в порядок
<i>make</i>	make out – доказывать, выявлять make up – устанавливать make for – направляться, содействовать
<i>get</i>	get up - организовать get round - распространяться get out – выходить get on – делать успехи get at – понять, выяснить
<i>put</i>	put out – гасить, выключать put off – избегать, уклоняться put down - записывать put in – проводить (газ, электричество)

Упражнение 20. Переведите существительные, соответствующие составным глаголам.

cut in – включать
cut off – выключать

cut - in
cut - off

take off – взлетать	take - off
slow down – снижать (скорость)	slow – down
lay out – размещать	lay-out
fall out – выпадать	fall-out
hold up – задерживать	hold-up
break down – сломать	break-down
break in – врывать	break-in
fill in – заполнять	fill-in
get up – вставать	get-up
make up – составлять	make-up

Упражнение 21. Прочитайте и переведите сложные существительные. Назовите существительные, от которых они образованы.

airspeed (air + speed) - воздушная скорость

runway	highway	test-tube	booby-trap
textbook	time-table	gas-meter	trap-door
hardware	hydropower	spaceship	yardstick
radiocontrol	carmaker	blockbuster	benchmark
homebird	order-book	middle-man	landmark
moonstone	world-ruler	tradesman	bombshell
footleg	flashbulb	timekeeper	beach-head
brain-drain	loophole		

Упражнение 22. Переведите сложные прилагательные, образованные по модели «существительное + прилагательное».

oxygen-rich (oxygen + rich) - с избытком кислорода

world-famous	sidelong	clay-cold
world-wide	meter-deep	gas-electric
trouble-free	light-sensitive	workaholic
sea-green	navy-blue	fire-free

Упражнение 23. Переведите сложные прилагательные, образованные по модели «существительное + причастие II».

sun-warmed (sun + warmed) - согреваемый солнцем

programme-controlled	liquid-propelled	fat-brained
solar-heated	power-driven	clay-brained
wide-bodied	oil-fired	power-actuated
factory-built	wind-blown	stone-built
peace-devoted	worm-holed	star-oriented
rain-wetted	air-cooled	bow-backed

Упражнение 24. Переведите, обращая внимание на отрицательное значение префиксов *un-, in-, non-, a-*:

invisible	inefficient	amoral	acardiac
unequal	unstable	inconstant	indirect
nonlinear	nonmagnetic	asymmetry	incapable
undemocratic	achromatism	unacceptable	non-ability
non-stop	involuntary	awhile	non-alcoholic

Упражнение 25. Переведите, обращая внимание на префиксы со значением противоположности *counter-, anti-, de-, dis-, un-, contra-, mis-*.

anticentre	discard	mistrust
to decompress	disconnect	counter-current
to unbolt	antiparticle	misconnection
misconstruct	unmake	counterweight
misadvice	derange	counter-pressure
decolour	contra-rotation	contraposition
discharge	antiwar	deseed

Упражнение 26. Переведите, обращая внимание на префиксы пространственных и временных отношений *inter-, intra-, in-, cut-, up-, sub-, trans-, pre-, fore-*:

interdependence	intramolecular	inbuilt
outline	uplift	subclass
transformation	preheating	forecast
prearrange	pre-election	pre-chamber
interstellar	interconnection	intra-atomic
subassembly	transship	inboard
cutback	prefix	subsoil
transalpine	transcontinental	upbuild

Упражнение 27. Переведите, обращая внимание на префиксы количества, степени *uni-, mono-, multi-, semi-, under-, infra-, over-, super-, ultra-, micro-, macro-, mini-*:

uniform	monochrome	multicolour
monotype	semiconductor	undercapacity
infrared	supercool	overload
superpower	ultrasound	microscope
microstructure	macrostructure	undermaintenance
undercoupling	infrastructure	undervoltage
microfilm	superheated	semicircle
multimeter	overground	ultra-modern
overflow	superman	ultra-rich
minify	minimal	univalent
unidirection	monomial	

Упражнение 28. Переведите, обращая внимание на следующие латинские основы:

способность вмещать	cap-	capable, capacity
вести, провозить	duc-	conduct, induce
нести, движение	fer-	transfer, differ
бросать	ject-	inject, reject
собирать	lect-	select, collect

удар	lid-	collide, collision
давление	press-	pressure, expression
думать	put-	compute, dispute
стоять	sist-	consist, resist
строить	str-	construct, destroy
держатъ	tain-	contain, maintain
тянуть	tract-	attract, extract
вращать, вить	volv/volu	revolve, revolution

Упражнение 29. Переведите, обращая внимание на следующие латинские префиксы:

приближение	ap-, ac-, as (s)-	accept, assist, applicable
удаление, лишение	ex-	exclusion, explication
вместе с, усиление	col (l)-, con-, com-	contain, collide, compose
вперед, будущее	pro-	provide, protraction

Упражнение 30. Прочитайте и запомните формы единственного и множественного числа некоторых слов латинского и греческого происхождения.

ед.ч.	мн.ч.
-um (χm), -on datum criterion maximum phenomenon	-a (χ) data criteria (- ions) maxima (- ums) phenomena
-is (is) analysis basis crisis	-es (i : z) analyses bases crises
-us (χs) focus	-i (ai) foci

locus
radius
nucleus

loci
radi - (- uses)
nuclei

- a (χ)
abscissa
formula

- ae (i :)
abscissae (- as)
formulae (- as)

Упражнение 31. Запомните идентичные формы единственного и множественного числа существительных.

apparatus
means
news
series
species

apparatus
means
news
series
species

Упражнение 32. Прочитайте и переведите следующие словосочетания, обратите внимание на «ложных друзей» переводчика:

interest rates
social unrest
public sector
raw sugar
target language
style book
critical language center
panel of experts
idiot box (жарг.)

to stand (step) down
to reduce sentence
show rooms
processing industry
business and cultural background
national curriculum
to run for
double-speak

Упражнение 33. Словам из первого столбца подберите соответствующий перевод из второго столбца, не забывайте о «ложных друзьях» переводчика:

troops
guerilla
morale

журнал
футляр; кино- / фотоаппарат
сложный

securities	шкаф, ящик; музей; картинная галерея
party	цвет лица
player	пустота
critical	пеня
social	важный
interest	светский; вечерний, нарядный
period	участник
complex	подразделение; отряд
complexion	ценные бумаги
cabinet	дух (боевой)
camera	партизан
magazine	войска
partisan	фанатик; сторонник партии
arm	вечеринка (с поцелуями)

Упражнение 34. Прочитайте, переведите и составьте предложения со словами и словосочетаниями; помните о «ложных друзьях» переводчика:

target language document	contribution
data	decade
instance	simulation
box	boxing
lunatic	hospital
prospect	cession
fabric	progress
process	sputnik
revolution	element (техн.)
cabin	cable
flirt	ammunition
stopper	director
speculation	pathetic (person)
communication	

Упражнение 35. Подберите соответствующие эквиваленты:

**а) английским словам –
русские**

*accurate – точный, правильный
калиброванный;*

ammunition

balloon

benzene

camera

camouflage

commutator

compositor

contour

control

convoy

decade

decoration

detail

diagram

dislocation

diversion

elevator

fabric

matrass

multiplication

replica

resin

spectre

translate

**б) русским словам –
английские**

*аккуратный – neat, careful,
tidy*

амуниция

баллон

бензин

камера

камуфляж

коммутатор

композитор

контур (электр.)

контроль (техн.)

конвой

декада

декорация

деталь (машины)

диаграмма

дислокация (воен.)

диверсия

элеватор

фабрика

матрац

мультипликация

реплика

резина

спектр

транслировать

Упражнение 36. Много торговых марок стали широко известными (Coca-Cola). Проверьте свои знания торговых марок. Словам из правого столбика подберите соответствующие из левого.

- | | |
|-----------------|-------------------|
| 1. Purrfect | l. cat food |
| 2. Glass | c. shampoo |
| 3. Bodygold | a. suntan lotion |
| 4. Pearlwhite | k. toothpaste |
| 5. Saftie | j. washing powder |
| 6. Allbrite | e. window cleaner |
| 7. Lite-up | b. matches |
| 8. Sylph | f. slimming pills |
| 9. The Razzlers | d. pop group |
| 10. Choco-snack | i. chocolate bar |
| 11. Iron-out | m. wrinkle cream |
| 12. Aquacool | h. mineral water |
| 13. Aquafoam | g. bubble bath |
| 14. Chu-away | n. chewing-gum |

Упражнение 37. Дайте грамотное написание названий фирм и магазинов в списке слева и найдите в списке справа виды деятельности, которыми занимаются эти учреждения.

- | | |
|---------------------|-------------------------|
| a. LITE BITE | photo-processing shop |
| b. SHUSELLA | photo-copying firm |
| c. KEEP-A-CREASE | children's clothes shop |
| d. SUPASNAPS | snack bar |
| e. KWICK KOPY | shoe shop |
| f. KWALITI FASHIONS | dry cleaners |
| g. KUMFY KIDDY WEAR | taxi firm |
| h. HANDICARS | garage and repair shop |
| i. MR. KLEEN | women's clothes shop |
| j. SNAX | dry cleaners |
| k. MOTOR KARE | hairdressers |
| l. LOOKRITE | snack bar |

m. FLITE CENTRE
n. U-DRIVE

car-hire firm
travel agency

Упражнение 38. Продукцию часто называют, допуская ошибки в написании. Дайте грамотное написание названия продукции из левого списка и найдите в списке справа соответствующий вид изделия.

a. KLEENOFF	beds
b. KATTOMEAT	video and audio home entry system
c. ANSAFONE	cleaning fluids
d. SUPALOK	bathroom equipment
e. RESTRITE	rucksacks
f. KARRIM	strong glue
g. INSTAFLOW	telephone answering machines
h. ANSAD	pet food

Упражнение 39. Некоторые британские фирмы пользуются традиционным написанием названий фирм, но объединяют их в одно слово. Определите род деятельности фирм из данных названий и дайте их грамотное написание.

a. TRANSLAGENCY
b. AUTOCHECK
c. AUTOPASS
d. SECURICOR
e. QUICK – LETS
f. FIGURETRIM
g. SUNTOURS
h. DATAFLOW

Упражнение 40. С помощью словаря переведите на русский язык сложные слова:

bathroom
steamship
ammeter
timber-work

lightweight
icebreaker
thermo-stability
foot-path

magnetograph	magnetophone
flame-proof	wear-and-tear
radioactivity	thoughtful
newspaper	newboy
baggage car	wonderful
usefulness	transmitter
telephone	phonograph
dictograph	ship-building
steam-powered (machines)	hydropower
draughtsman	skilful
self-taught ship-builder	outstanding
likewise	equidistant
four-sided	quadrilateral
triangle	polygon
thickness	length
surface	household
atmospheric	variation
clock-work	self-registering
increase	decrease
downwards	outwards
regardless	dioxide

Упражнение 41. Дайте слова одного корня с нижеприведенными.

found – founder – foundation

discourage	capabilities
breadth	discover
outstanding	found (основывать)
draw	development
build	add (добавлять)
improve	represent
architecture	paint
installation (установка)	achieve
invent	scientist
art	begin

engineering
assist
important

description
practice

Упражнение 42. Переведите сочетания слов:

a) general use, temperature scale, the boiling point of water, molecular motion, civil life, mercury thermometers, temperature readings, room temperature, blood heat, heat measuring instruments, top end, a glass bulb, for these temperature extremes, the temperature recording device, in boiling water, melting point temperature, long-distance power transmission, radio transmitters, alternating current generators, wire cable, heat losses, power line, transmission line, at the city end;

b) the control system, the measuring unit, the recording millivoltmeter, semiconductor industry, measuring equipment, life time, effective life time, power consumption, voltage multiplier circuit, high voltage source, hardness meters, transistor tester, first-class quality, room temperature, voltage selector switch, power supply line, power supply voltage selector switch, normal operation conditions, rubber industry.

Упражнение 43. Переведите на русский язык сочетания слов, пользуясь «правилом ряда».

temperature measurement
distance type thermometer
hot water pipes
resistance elements
chain operations
calculation speed
power consumption
handle supports
pilot lamp housing
time and power settings
foot-controlled machine

mercury-in-glass thermometer
mercury-in-steel thermometer
centralized instrument panel
Diesel engine thermometer
right angle stem type
decimal point position
micro spot welder
constant factor calculations
decimal point setting
stainless steel top cover
top and bottom electrodes

Упражнение 44. Переведите на русский язык интернационализмы. Обратите внимание на перевод выделенных слов:

a) *person*, graphic, geometry, method, architect, mechanic, technician, national, practice, standard, assistant, talent, *principle*, *principal*, modern, interesting, plan, industry, document, monument, *artist*, form, *object*, *front*, history, military, material, papyrus, thermometer, construction, temperature, type, *condition*, special, industrial, precision, *distance*, *application*, gas, *Diesel engine*, metal, *location*, *centralize*, panel, *figure*, model, patent, guarantee, plastics, capillary, vibration, pyrometer;

b) pressure, vacuum, differential and absolute pressures, balance, diaphragm, metal, instrument, specially, recommend, phosphor, bronze, diameter, mechanism, operate, indicate, disc, maximum, principle, micro, machine, *precision machine*, steel, resistance, control, diameter, *perfect*, material, pedal, operator, electrode, *portable*, lamp, *combinations*, special, *indicator*, *class*, *accommodate*, *modify*, *selection*, *position*, press.

Упражнение 45. Переведите на русский язык интернационализмы. Найдите так называемых «ложных друзей» переводчика:

a) programme, planet, plan, instrument, radiation, theory, interesting, problem, type, satellite, orbit, expert, base, observatories, astronomer, distance, revolution, minute, circular, radius, equator, kilometre, unique, solar system, period origin, asteroid, position, deviation, sensational, atmospheric, resistance, progressive, confidently, agony, celestial, million, cosmic, fragments of rock, centre of gravity, spherical share, a constant, telescope, lecture, astrobiology, ammonia gas, optical instruments, the famous Martian Canals, brilliant points, scientific forum, gigantic Tungus explosion in 1908, visit, meteorites, comet, idea, fantasy, civilized communities, absolute, climate, climatic conditions, engineer, prospect, ambulatory, logic, student, massive, magazine, complexion, director, fact, legend, manifest, lecture, pioneer, president, nomenclature.

b) 1. They needed **a pilot** to take their ship into the harbour. 2. He entered an Air Force school to become **a pilot**. 3. All the pills are kept in the **medicine cabinet**. 4. With the help of a new **programme** scientists would be able to foretell the weather for **decades**. 5. You should give your **arguments** for the programme. 6. Let's use another **conductor** in the device. 7. She liked potatoes baked in their **jackets**. 8. The **jury** found the prisoner not guilty. 9. The surgeon extracted **the lens** of his left eye to replace it with an artificial one. 10. There was not much **harmony** in international affairs during these years. 11. He needed an **instrument** to extract the **stopper**.

Упражнение 46. Расшифруйте аббревиатуры:

AAMOF - as a m... of...

AFAIK - as f... as I k...

BTW - by t... w...

DIY - d... it y...

FAQ - f... a... q...

FYA - f... y... a....

FYI - For Y... I...

IMHO - in my h... o...

IMO - i... m... o....

IOW - in o... w...

LOL - l... o... l...

NRN - no r... n....

RTFM - r... the f... m....

TTBOMK - to the b.... of m... k...

WYSIWYG - what y... see is w... y... g...

Упражнение 47. Выберите, для смайлика соответствующее описание:

1. %-) 2. (-: 3. |-| 4. :-Q 5. :-@ 6. :-D

- a. I'm asleep.
- b. I'm laughing.
- c. I'm left-handed.

- d. I'm screaming.
- e. I'm sticking my tongue out at you.
- f. I have been staring at this screen for too long.

РАЗДЕЛ IV

Научно-технические тексты (практика перевода)

The History of Science

What do you think about when you hear the words “science”, “technology”, “achievement”? A man or a woman who sits at the desk and investigates the cell structure of life forms in an attempt to penetrate the mystery¹ of creation? An engineer who tries to work out a design of cars which run on solar energy? Or maybe you think about mobile phones, computers, television and other technological advances we enjoy in a modern society?

But science became the science in the modern sense only some centuries ago. The history helps us follow different stages in the development of science. This is very important otherwise we cannot be sure that one day past inventions will not be repeated.

On the simplest level, science is knowledge of the world of nature. There are many regularities² in nature that mankind has had to recognize for survival³ since the emergence of *Homo sapiens* as a species⁴. The Sun and the Moon periodically repeat their movements. Some motions, like the daily “motion” of the Sun, are simple to observe; others, like the annual “motion” of the Sun, are far more difficult. Both motions correlate with important terrestrial events. Day and night provide the basic rhythm of human existence; the seasons determine the migration of animals upon which humans depended for millennia⁵ for survival. With the invention of agriculture, the seasons became even more crucial⁶, for failure to recognize the proper time for planting could lead to starvation. Science defined simply as knowledge of natural processes in universal among mankind, and it has existed since the dawn of human existence.

Science is to be considered as knowledge of natural regularities that is subjected to some degree of skeptical rigour and explained by rational causes. One final caution is necessary. Nature is known only through the senses, of which sight, touch, and hearing are the dominant ones, and the human notion of reality is skewed towards the objects of these

senses. The invention of such instruments as the telescope, the microscope, and the Geiger counter has brought an ever-increasing range of phenomena within the scope of the senses. Thus, scientific knowledge of the world is only partial, and the progress of science follows the ability of human to make phenomena perceivable⁷.

Notes:

¹mystery, *n* – тайна

²regularity (*pl. - ies*), *n* – правильность; закон

³survival, *n* – выживание

⁴species, *n* – вид, разновидность; род, порода

⁵millennia, *n* (*pl. om millennium*) - тысячелетие

⁶crucial, *a* - решающий

⁷perceivable, *a* – заметный, осязаемый

About Physics...

Physics, the main natural science, appeared long before Christ and many physical discoveries were made and many laws were formed by the ancient Greeks. All of us have heard of Democritus and Archimedes.

“Physics” in the literal translation from Greek means “nature”. But centuries passed and modern physics greatly differs from “ancient” one.

Every day we encounter and use the achievements of physics of the 20th century: we use electricity which is generated by nuclear power plants; we try to penetrate into the depth of a cell¹ and understand everything about mechanisms of its work – it became possible with appearance of electronic microscopes, - we cut metals and treat for many diseases with the help of lasers; but besides positive results there are negative consequences and the main of them – nuclear weapon – a death-dealing thing which can annihilate² everything on the Earth.

The science of the 20th century is characterized by unprecedented rapid development. In 1993 the physicist Victor F. Weisskopf made an attempt to distinguish periods in its development.

Divisions of this kind are always somewhat arbitrary³ but the scientist thinks that there were three points in time when changes in the character of science took place: at the beginning of the 20th century, at the time of the Second World War, and during the last two or three decades.

These are the three periods of the development of science according to his point of view:

Period I from 1900 to World War II;

Period II from 1946 to about 1970;

Period III from 1970 to the end of the 20th century.

Having been a physicist, he reports mainly about the developments in physics and astronomy.

Notes:

¹cell, *n* – клетка (биол.)

²annihilate, *v* – уничтожать

³arbitrary, *a* – произвольный, случайный

A Liquid's Natural Shape

We are used to thinking that liquids have no shape of their own. That is not true.

The natural shape of any liquid is that of a sphere. As a rule, gravity prevents liquids from assuming this shape. A liquid either spreads in a thin layer of spilled out of a vessel, or takes the vessel's shape. But when inclosed in another liquid of the same specific gravity, it, according to Archimedes' principle, "loses" its weight, seeming to weigh nothing; now gravity has no effect on it and it assumes its natural spherical shape.

Holography

Holography – a three-dimensional photograph of an object – became possible only after the invention of lasers.

A holographic image is a three-dimensional photograph of an object; but unlike a photograph made by a camera, it is seen as a ghostly¹ image in space behind or in front of a photographic plate². On the plate is a hologram – a pattern³ of light and dark areas formed by beams of laser light. When pure light such as that from a laser is shone through the developed plate, the observer sees an exact three-dimensional image of the object beyond the plate. As the observer moves round the image, it changes its aspect as the object would have done. Using a curved plate, the top and bottom of an object can also be seen. In a development

of holographic technique, it is possible to create an image that appears between the observer and the plate.

Holography became practical after the laser, a source of sufficiently pure light, was invented in 1960. It was developed in 1963 by two University of Michigan scientists, Emmett Leith and Juris Upatnieks. Holography is used in industrial research to make three-dimensional pictures of rapidly moving objects such as turbine blades.

Notes:

¹ghostly, *a* – призрачный

²plate, *n* – пластина

³pattern, *n* – зд.: узор, рисунок

Chemistry

Chemistry proper appeared in the Universe and it had begun long before the stars and their planet systems formed.

On the Earth, chemical processes resulted in¹ forming rocks, soils, grounds, water systems, the atmosphere and finally beginnings of life.

People had started doing chemical experiments long before they thought of the word “chemistry”.

For example, people began to boil and fry food, to obtain metals, etc. When people realized that different substances could turn into each other, they started studying this phenomenon consciously² by investigating different compounds, processes of their obtaining and conversion and gave a name to their studies – alchemy.

Then people set³ to look for philosopher’s stone to obtain gold from any substance.

Gradually, acquiring knowledge and gaining experience, people arrived at a conclusion that the idea of obtaining gold from any substance was absolutely unrealizable and they renamed their studies into “chemistry”.

Chemistry in the modern sense appeared and formed in the 19-20th centuries. Many discoveries in physics and especially in the field of physics of elementary particles greatly influenced the development of chemistry and understanding of the nature and essence of chemical processes and methods, investigating them as well.

Having practical purposes chemistry merged with other fields of knowledge and as a result there appeared geochemistry, biochemistry and molecular biology, agrochemistry.

An engineer cannot manage without knowledge of fundamentals of chemistry and some other special branches of it. Only being armed with such kind of information it becomes possible to make predictions about properties and conduct⁴ of certain materials and constructions made of them. In general, M.V. Lomonosov was absolutely right, saying that “chemistry spreads its hands widely”.

Notes:

¹result in, *v* – приводить к

²consciously, *adv* - сознательно

³to set to, *v* – приниматься за что-либо, начать делать что-либо

⁴conduct, *n* – поведение

Early Computing Machines and Inventors

Today computers do much more than simply compute: supermarket scanners calculate our grocery bill while keeping store inventory; computerized telephone switching centers play traffic cop¹ to millions of calls and keep lines of communication untangled²; and automatic teller machines (ATM) let us conduct banking³ transactions from virtually anywhere in the world. But where did all this technology come from and where is it heading? To fully understand and appreciate the impact computers have on our lives and promises they hold for the future, it is important to understand their evolution.

No matter what people were doing in the past – they had to make calculations. Very often it took them a lot of time and they tried to make this process easier.

The abacus⁴, which emerged about 5,000 years ago in Asia Minor and is still in use today, may be considered the first computer. This device allows users to make computations using a system of sliding beads arranged on a rack. Early merchants used the abacus to keep trading transactions. But as the use of paper and pencil spread, particularly in Europe, the abacus lost its importance. It took nearly 12 centuries, however, for the next significant advance in computing devices to emerge. In 1642, Blaise Pascal (1623-1662), the 18-year-old son of a French tax

collector, invented what he called a numerical wheel calculator to help his father with his duties. The brass rectangular box, also called a Pascaline, used eight movable dials to add sums up to eight figures long. Pascal's device used a base of ten to accomplish this. For example, as one dial moved ten notches⁵, or one complete revolution, it moved the next dial-which represented the ten's column – one place⁶. When the ten's dial moved one revolution, the dial representing the hundred's place moved one notch and so on.

The drawback to the Pascaline, of course, was its limitation to addition.

Notes:

¹traffic cop, *n* – регулировщик

²to untangle, *v* – распутывать

³to bank, *v* – группировать; комплектовать

⁴abacus (*pl. abaci*), *n* – зд.: счеты

⁵notch, *n* – метка; бороздка; зубец

⁶place, *n* – зд.: разряд (мат.)

From the History of Electronic Desk Calculator

The electronic desk calculator is fully designed on integrated circuits. It provides a check of all numbers entered before and after calculations, automatic clearance in all operations; decimal point is selectable in any position. All numerical and function keys are rationally distributed on the keyboard with a logic evidence¹, easy to use in any operation. Thanks to its 2 memories permits the solution of quite complex calculations in the administrative and commercial field. At the same time the EDC enables to resolve a wide range of technical calculations.

Specifications²

Capacity: 12 digits in all registers. Overflow warning light.

Input of Figures: Reduced keyboard with electronic lock.

Decimal System: Floating-fixed decimal point. Ten positions automatic selection. This system allows maximum utilization of the capacity of the machine.

Operational Registers³: The three operational registers enable the data fed in to be subsequently verified.

Accumulating Registers: Additional accumulating registers in which all results can be stored directly or indirectly, the sign being likewise taken into account. An optical indication is given when the store is occupied.

Constant Factor: Automatic constant selection in multiplication (multiplicand) and division (divisor).

Clearance: Automatic clearing when starting a new operation.

Automatic Re-Entry: Any figure, on display, can be used for further calculation.

Algebraic Logic: Storage of the sign, algebraically correct values and indication of the negative sign in all registers.

Special Features: Visual check of numbers being entered and of the decimal point position. Ability to correct any data entered. Addition and subtraction.

Multiplication and division with automatic round-off of the least significant digit in any decimal point position. Raising to power of whole and decimal numbers. Progressive accumulation of results in the two auxiliary memories with reading of intermediate results. Multiplications and divisions with constant factor. Chain operations with or without reading of intermediate results.

Technical data

Dimensions: 28.5 cm X 32.8 cm X 110 cm (11!! ¼ X 13!! X 4!! ¼)

Weight: 5.0 kgf (11.00 lbs)

Power Consumption: 20 W

Calculation Speed: Average for simple calculation 0.1 sec. For an elementary addition 2 msec.

Notes:

¹evidence, *n* – данные; факты

²specification (s), *n* – спецификация, детализация; технические условия, технические характеристики

³register, *n* – регистр (устройство сверхбыстродействующей памяти в процессоре или СБИС, служащее для временного хранения

операндов и результата выполняемых данной микросхемой операций)

⁴ ∇ (inch) – дюйм (2∇ - два дюйма)

About Economics...

Economics in literal translation from Greek means “the skill of housekeeping”.

Nowadays the meaning of this word has rather changed. In the modern interpretation “economics” means relations of production in the aggregate¹ of a certain social and economic structure, the economic basis of a society. Besides, economics may be regarded as a national economy of a state or a separate part of it, including corresponding branches and kinds of production.

A national economy is the united complex of the economy of a certain country (state), covering all elements of the social production, distribution and exchange.

Economics is a social science. We can point out two main aspects of economics: micro- and macro- ones. Macroeconomics studies “macro” problems that is (i.e.) problems related to a national economy of a state in whole, for example, the national price policy, unemployment, the national credit and monetary systems, etc. Microeconomics studies “micro” problems. These problems are related not to a national economy but to an economy of a separate firm or enterprise, for example, competition between two firms, a price policy of an enterprise, etc.

Economics (the social science) is a study of the way in which wealth is produced and used. The achievements in the field of economics are very important for people because they concern material well-being².

Like any science economics has got its chronicles. And the history of economics and economic analysis is not an exception. J. Schumpeter, a great economist of the 20th century, the author of “The History of Economic Analysis” regarded it as “the history of the intellectual efforts that men have made in order to understand economic phenomena or, which comes to the same thing, the history of analytic or scientific aspects of economic thought”.

Notes:

¹(in the) aggregate, *n – зд.*: в совокупности, в целом

²well-being, *n – благополучие; благоденствие, процветание*

Hole in the Head

In 1962, a Peruvian brain surgeon, Dr. Francisco Grana, removed a paralyzing blood clot¹ from beneath the skull² of one of his patients. In opening the skull, he employed only stone instruments used by ancient Peruvian physicians. His patient survived the operation and recovered.

Thus Dr. Grana proved what many had known but scarcely believed – that physicians of ancient Peru were able to perform trepanation – or operations in which the skull was opened. Hundreds of ancient Peruvian skulls have been discovered with regularly cut holes. More than half of these skulls have shown signs of regrowth, indicating that the patient survived³ the operation.

Jürgen Thorwald tells this story in his book *Science and Secrets of Early Medicine*. He discusses medicine in the ancient societies of six countries: Egypt, Babylonia, India, China, Mexico and Peru.

In our European-centered culture, we like to think that medicine started with the Greeks, and before that all was darkness. Thorwald destroys this notion. The Greeks must have learned much from earlier societies.

The Egyptians used primitive forms of antibiotics, the Babylonians had operations for cataract of the eyes, the Indians knew of skin transplants and plastic surgery.

An examination of mummies⁴ shows that hardening of the arteries was very common among the upper classes in Ancient Egypt, even among the young.

One of the reasons for this is that despite the idealized slim portraits that have come down to us, many upper-class Egyptians were probably quite fat from overindulgence⁵ in the pleasures of the table. Medical researchers have also found physiological evidence to indicate that many of them also suffered from extreme nervous tension. “Intrigues, struggles for power, wars, religious disputes and internal dissension, attempts at poisoning and assassination⁶ and their own craving for excitement, must have caused a considerable part of the Egyptian upper class to lead a nerve-wracking life,” Thorwald comments.

It's fair to conclude that nothing among our cures⁷, diseases or even our tensions is exclusively a product of modern life.

Notes:

¹clot, *n* – сгусток; тромб (мед.)

²skull, *n* – череп

³to survive, *v* – остаться в живых, выжить, уцелеть

⁴mummy, *n* – мумия

⁵overindulgence, *n* – злоупотребление

⁶assassination, *n* – 1) убийство по политическим мотивам;
2) вероломное, предательское убийство

⁷cure, *n* – лекарство

Spare Parts Surgery

Steady progress is being made toward a medical objective of the highest importance: successful transplanting of life-sustaining organs from one individual to another.

Transplants were pioneered in 1951. For many years, however, the only successful transplants involved identical twins, whose body tissues¹ are alike. When surgeons tried to replace diseased organs with healthy ones from unrelated donors, the recipients' bodies invariably rejected the foreign tissues.

Then, some years later, Dr. Francis D. Moore reported a case of a man who had lived a year on a kidney² taken from a completely unrelated person.

Doctors have learned how, through the use of drugs, to control the body's tendency to destroy foreign tissue, a part of the body's defense against disease.

Experiments with animals indicate that some parts of the body, such as legs, can be preserved by freezing. Other parts can be kept for six hours or so by cooling them to just above freezing. This may prove to be a modest first step toward eventually solving the problem of obtaining and keeping a supply of spare³ body parts until needed.

Now kidney transplants are being performed in dozens of hospitals.

Surgeons are beginning to transplant other organs, too.

At the University of Mississippi surgeons transplanted a lung into a patient whose own lungs were destroyed by cancer and disease. The new lung⁴ functioned for 18 days before the patient died, ironically from kidney disease.

Doctors contend that even though some patients may die, their survival for a week or so indicates that successful transplants of lungs and livers⁵ are not far away. The fact that the livers functioned for some time after transplant, and in several cases were still functioning well long after the failure of the heart, shows that liver transplants are possible.

At other hospitals, the transplant of limbs, ovaries, pancreas and other organs are under study. Researchers at Cleveland's Metropolitan General Hospital are even looking into the remote possibility of eventual nerve or brain transplants. Already they have kept monkeys' brains alive for up to 12 hours totally outside the animal's bodies.

Doctors are exploring ways to control rejection. Some surgeons irradiate the transplant area with X-rays, and use chemotherapy.

The problem of establishing a supply of organs and other body parts is formidable⁶.

Sometimes critical minutes elapse, during which the needed organs may deteriorate⁷.

The problems are great indeed. But the promise is greater.

Notes:

¹tissues, *n* – ткань (биол.)

²kidney, *n* – почка (анат.)

³spare, *a* – запасной, резервный

⁴lung, *n* – легкое (анат.)

⁵liver, *n* – печень (анат.)

⁶formidable, *a* – труднопреодолимый

⁷deteriorate, *v* – ухудшать, портить

You Can Live on your Waste

Astronauts on long space voyages will be the most spectacular misers¹ of all time.

But instead of hoarding² string and crusts of bread and old newspapers, the spacemen will save such commodities³ as their breath and their perspiration⁴.

The spacemen will conserve everything – literally – in their spacecraft. This will be necessary because expendable supplies for long voyages would be much too heavy and bulky to be stored in the spacecraft.

Enough food, water, and compressed air to sustain a crew of four on an eight-month trip to Mars, for instance, would outweigh the spacecraft itself.

This means that long-distance spacemen will have to drink and re-drink the same water, over and over again. They will have to breathe and re-breathe the same air as long as the trip lasts. And, in essence⁵, they will have to eat and re-eat the same food.

Sounds distasteful? Not really, according to space scientists working on “closed ecology” – the creation of an earth away from earth.

There is a vital interdependence between plants and animals on earth. For instance, plants need carbon dioxide for growth. They can get it from the exhaled breath of animals and humans. At the same time, animals need food which they can get by eating the plants.

In the “closed ecology” of earth there is a continuing cycle of using and re-using the resources available. In the long run⁶, nothing is ever really thrown away.

Studies indicate it will be practical to create a miniature, self-supporting earth away from earth in which astronauts will be able to survive – even thrive⁷ – for very long periods without replenishment of a single molecule of food, air or water from earth.

Drinking the same water again and again may seem repugnant⁸, but it doesn't make any difference where it comes from – water is still H₂O. As long as it is purified properly there is no problem. Besides that, people have been re-drinking water for centuries – water made from the same elements present on earth when the dinosaurs drank it and wallowed⁹ in it.

Long-range space vehicles thus will have to recapture every molecule of moisture in the spacemen's breath and perspiration, as well as other body wastes, and reprocess the water for drinking.

The means of purification will include distillation plus a technique known as catalytic oxidation which takes advantage of the readily available vacuum of space. Toxic portions of the waste liquid are broken down by catalytic oxidation into simple elements which then are used in other portions of the closed ecological system.

The astronauts' oxygen supply will be replenished by photosynthesis in which plant life absorbs carbon dioxide (exhaled by man) and gives off oxygen plus carbohydrates (food).

This will take place in a "space garden" carried in the spacecraft in which algae¹⁰ will take the place of string beans, corn and lettuce. All that is required to make this system work is the sun's energy, without which, of course, farms on earth don't bloom.

Variations of this completely closed system are being developed for trips of intermediate length. On a moon exploration, for example, it would probably be more practical to use a "partially closed ecology".

In such a case, air and water could be purified and reprocessed by the means described above, while enough food for several weeks could be taken without using too much space or adding too much weight.

Notes:

¹miser, *n* – скупец, скряга

²hoard, *v* – накапливать, копить

³commodity, *n* – товар, предмет потребления

⁴perspiration, *n* – пот, испарина; потение

⁵in essence – по существу, в сущности

⁶run, *n* - поездка, рейс, маршрут

⁷thrive, *v* – процветать, преуспевать

⁸repugnant, *a* – противный, отвратительный

⁹wallowe, *v* – валяться, кататься (в ч.-л.)

¹⁰algae (*pl. om alga*), *n* - водоросль

Electricity from Nuclear Energy

Nuclear power stations differ from the conventional¹ installations in that, instead of burning coal or oil, the heat from nuclear energy is used to boil water and generate steam.

As is known each atom consists of protons (positively charged particles) and neutrons (uncharged particles), constituting the nucleus which is surrounded at relatively vast distances by electrons (negatively charged particles).

Nuclear fission² is the process whereby a free neutron is made to penetrate the nucleus so that it is caused to break up. This releases other neutrons and energy in the form of heat.

So great is this nuclear energy potential that the atoms in a piece of uranium the size of a pin-head could produce as much heat as the burning of 5,000 tons of coal.

The atoms of most materials are quite stable, but the nuclei of some very heavy elements are not. If a uranium nucleus is struck by a neutron it is liable to break up, and to release two or three free neutrons. If these are slowed down some of them will be caught by other uranium nuclei, which will then break down and continue the process of chain reaction. This slowing down of the freed neutrons is accomplished³ by using a moderator⁴.

This is material which slows down neutrons without capturing them. Graphite is such a material. Uranium fuel is prepared in the form of rods about one inch in diameter. These are encased⁵ in thin metal cans, and they are inserted into holes in the graphite about eight inches apart.

It is no good being able to start nuclear reaction and to obtain great heat output unless the process can be controlled. A chain reaction can be started by bringing together a “critical” amount of uranium fuel in a graphite moderator, but there must be at hand a means to reduce the speed of reaction when necessary, and this is done by installing, as part of the reactor, rods of boron⁶ steel. Boron has a remarkable capacity to absorb neutrons. When instruments indicate that nuclear fission is proceeding too fast, the boron rods can be dropped into the reactor. They quickly soak up⁷ free neutrons, so that the frequency of fission is immediately reduced and a steady rate of operation can be resumed.

The reason for using natural uranium as a fuel is that it is the only naturally occurring material which can produce a controlled chain reaction. Because of the escape of neutrons from the moderator, this process can only take place in a reactor of a certain minimum size. This is known as the critical size. If, in a reactor, the control rods are positioned so that power is neither increasing nor decreasing, the reactor is said to be critical.

Notes:

¹conventional, *a* – обычный, традиционный

²fission, *n* – атомный распад

³accomplish, *v* – выполнять

⁴moderator, *n* – замедлитель

⁵encase, *v* – вставлять

⁶boron, *n* – бор (хим.)

⁷soak up, *v* – впитывать, поглощать

Energy from the Ocean

Energy can be extracted not only from space or fusion but also from the sea.

Last year, in the chilly¹ waters off San Clemente Island, 60 miles out in the Pacific Ocean, Navy frogman² carried out an underwater mission at least as bizarre³ as anything the CIA⁴ has admitted to. Black-masked, goggled⁵, and finned⁶, divers from the Naval Undersea Center in San Diego anchored a horizontal, 500-by-600-foot grid-work of polypropylene ropes so that it hung 40 feet below the surface in 300 feet of water. Then, gingerly, using something aking⁷ to large darning⁸ needles, they attached to the mesh long, waving brown fronds of giant kelp⁹.

Giant kelp? Giant kelp.

The project was part of a farseeing plan to farm the seas – not just for food, but for energy as well. It represents one facet¹⁰ of the young but burgeoning conviction among scientist that the sea – mother of life on earth – may be one of the best answers to the energy shortage that threatens to stifle civilization as we know it.

There are different schemes to extract energy from various features of the oceans: mechanical energy from waves, tides, und currents; heat energy from water temperature differences. With the exception of the tides, the original energy input for these sources is the continuing flood of energy from the sun.

The two surprising sources of ocean energy also derive from the sun, one directly, one indirectly. The first – the kelp farm – uses fast-growing plants to trap the energy from solar photons and store it in a form that can conveniently be converted to fuels and other useful products. (The term for this, whether land- or sea-based, is bioconversion).

The second source, much further from reality than the first, is salinity¹¹ – the very saltiness¹² of the sea itself; it is a result of the massive movement of water from sea to atmosphere to land and back to sea again. And the energy that drives this hydrodynamic cycle is the sun.

Notes:

¹chilly, *a* – прохладный; холодный

²frogman, *n* – 1) легкий водолаз; водолаз-разведчик; 2) ныряльщик с аквалангом

³bizarre, *a* – странный, причудливый; эксцентричный

⁴CIA – Central Intelligence Agency – Центральное разведывательное управление, ЦРУ (США)

⁵goggled, *a* – в (защитных) очках

⁶finned, *a* – в ластах

⁷akin, *adv* – сродни; похоже, сходно

⁸darn, *n* – штопка

⁹kelp, *n* – бурая водоросль, перерабатываемая на золу

¹⁰facet, *n* – аспект

¹¹salinity, *n* – соленость, процентное содержание соли

¹²saltiness, *n* – вкус соли; соленость

Velocity has its Limits

Before the Second World War the speed of aircraft was far below the speed of sound. Today we have supersonic aircraft. Radio waves propagate¹ at the velocity of light. Could we perhaps create “superlight” telegraphy to send signals at velocities greater than the velocity of light? No, that is an impossible thing to do.

Since the experiment disproves² absolute nature of time we conclude that signal transmission cannot be instantaneous. The velocity of transmission from one point in space to another cannot be infinite, in other words, cannot be greater than some ultimate value, called the speed limit.

This speed limit concur³ with the light velocity.

Indeed, according to the principle of the relativity of motion the laws of nature will be the same for all the laboratories moving relatively to each other (rectilinearly⁴ and with the same uniform velocity). The affirmation that no velocity can be greater than the given limit is also the law of Nature and, therefore, the value of the speed limit should be exactly similar in different laboratories. The light velocity, as we know, possesses the same qualities. Thus, the speed of light is not merely the speed of propagation of natural phenomenon. It plays the important part of being the top velocity.

The discovery of the existence in the Universe of the top velocity is one of the greatest triumphs of human genius and of the experimental capacity of mankind.

In the 19th century physicists were unable to perceive that a top speed existed and that its existence could be proved. Moreover, if they would have stumbled upon it by chance in their experiments, they would not have been sure that it was a law of Nature and not merely the effect of their limited experimental capacity.

The principle of relativity reveals that the existence of a top velocity lies in the very nature of things. To assume that technological development will enable us to attain velocities greater than the velocity of light is just as ridiculous as to suggest that the absence of points on the Earth's surface more than 20 thousand kilometers apart is not a geographical law, but the upshot⁵ of our limited knowledge, and to hope that some day, when geography makes further advances, we shall be able to find points on the Earth that are still farther apart.

Light velocity plays such an exceptional part in Nature exactly because it is the top velocity for the propagation of anything. Light either outstrips⁶ all other phenomena, or, at the outside, arrives simultaneously with them.

If the Sun should split in two and form two stars, the motion of the Earth would, naturally, suffer a change as well.

The 19th-century physicist, who did not know that a top velocity existed in Nature, would certainly assume that the Earth changed its motion instantly after the Sun split in two. Yet it would have taken light all of eight minutes to cover the distance from the split Sun to the Earth.

The change in the Earth's rotary motion would begin eight minutes after the Sun split up. Until that moment, the Earth would continue to move as if the Sun had not split. Anything that may occur with or on the Sun will not affect the Earth or its motion until eight minutes later.

Notes:

¹propagate, *v* - распространять

²disprove, *v* - опровергать

³concur, *v* - совпадать

⁴rectilinearly, *a* - прямолинейный

⁵upshot, *n* - результат

⁶outstrip, *v* - обгонять, опережать, превосходить (в чем-либо)

Sizewell Power Station

All over the world the demand for electricity is steadily rising. Not only do modern industrial methods call for more and more electrically driven machinery but the rising standards of living are reflected in the domestic consumer's increasing use of the many forms of electrical labour-saving devices.

A big modern power station burns enormous quantities of coal; in full production, the furnaces¹ of a station like High Marnham, Nottinghamshire, consume 10,000 tons a day. Economic logic requires that this huge appetite should be met from the country's most productive coal-field – the East Midlands – and stations sited as near as possible to the fuel source. But Britain's population is increasing most rapidly in the south and there is a consequent sharp rise in demand for electricity from the coal-deficient area lying south of a line drawn from the Bristol Channel to the Wash.

Transport charges² for nuclear fuels are negligible and the siting of nuclear power stations is not governed by this economic consideration. Main factors, besides the all-important amenity³ consideration, affecting the choice of site are the availability of the large quantities of cooling water necessary, geological substrata⁴ which can support the very heavy station structure and plant, and a reasonable degree of remoteness, so that, in the extremely unlikely event of a mishap⁵, the temporary evacuation of people living close to the station could be easily achieved.

Sizewell nuclear power station is situated on the Suffolk coast between Aldeburg and Southwold.

The Station, when completed, will have a guaranteed net electrical output of 580 megawatts. The main plant consists of two natural uranium, carbon dioxide gas cooled, graphite moderated reactors, supplying heat to eight boiler units, four of which are associated with each reactor. Both reactors will be housed in one building, a feature which at present is unique to Sizewell. This has permitted much more compact reactor layout to be adopted, and will result in a saving of reactor building costs. The four boiler units associated with each reactor will be arranged in pairs on opposite sides of the reactor building. The total steam produced, which will exceed 5_{1/2} million lb. per hour, will be passed to two 324 ≈ 75 megawatt turbo-alternators⁶.

For condensing purposes 25 million gallons of cooling water per hour will be required and this will be drawn to the underground pumphouse from the sea through twin tunnels ten feet diameter, which will run from a point about 1,350 feet offshore. At this point two vertical intake shafts will be raised through the sea bed from each of the tunnels. To handle the screens which will be placed at the top of the intake shafts and to insert the shaft sealing plugs required when tunnel inspection is to be carried out, a crane mounted on a tubular steel structure is being provided. This structure will be built on the beach and subsequently floated out to its offshore location and fixed in position by steel piles. From the pumphouse the water will be circulated in concrete culverts⁷ to the condensers and returned through twin outlet tunnels to discharge to the sea 350 feet offshore.

Notes:

¹furnace, *n* – печь, топка

²charges, *n* – расходы, издержки

³amenity, *n* – прелесть; удобство

⁴substratum (*pl. -ta*), *n* — нижний слой; основа, основание

⁵mishap, *n* – несчастье; неприятное происшествие

⁶alternator, *n* - альтернатор, генератор переменного тока

⁷culvert, *n* – дренажная штольня

How Clean is Clean?

All things are relative.

The hospital operating room, with all its devices for ensuring cleanliness, may also look clean, but it would still not be considered clean enough in which to assemble a delicate gyro¹ or certain high-reliability electronic devices.

The hospital operating room is concerned to great extent with the problem of disinfection, and the use of germicides²; the electronics industry has come to be concerned with environment control (temperature, humidity, pressure) plus – the “plus” being the control of airborne contaminants³ and process-induced contaminants, also called “particular matter”, or matter existing in minute, separate particles in the air. An area so controlled has been called a “dust-free area”, but the term is not sufficiently inclusive, since there are many contaminants, including not

only dust, but smoke, odors, even noise – because noise is a sound that moves and thus can cause dust particle motion.

The best term for an enclosed area with controlled environment is probably “clean room”, though “white room” was also used several years ago, but is not as applicable now, since the dead, white walls, *a la* hospital operating rooms, looked so sterile they were depressing to the workers. Warmer tones are now used, in pleasing combinations.

Federal Standard 209 defines a clean room quite simply as one in which the environment is controlled – and goes on to set the standards for temperature, humidity, pressure and particulate matter in the air. The first three are comparatively simple. Temperature should be maintained between 67⁰ and 77⁰ F., except for special jobs requiring critical temperatures. Relative humidity should be 45 per cent maximum, generally ± 10 per cent, except for humidity-sensitive applications. Pressure should be maintained above that of surrounding areas, so that all leakage⁴ will be outward (in a reversed condition pressure would bring more contaminants into the area).

But the contaminants part of the clean room spec⁵. is much more detailed, and provides a sliding scale for arriving at an answer to the question: “How Clean Is Clean?” A rule of thumb⁶ answer is that, so far as industry clean rooms are concerned, the fewer contaminant particles present, the cleaner the room. The Federal Standard divides clean rooms into three classes, according to the number of particles of 0,5 micron in size or larger in each cubic foot of air: classes 100, 10,000 and 100,000. A secondary limitation is concerned with particles of 5 micron size or larger per cubic foot: class 10,000 limits the number of this size to 65; class 100,000 to 700. Some industrial firms use their own methods of classifying clean rooms, but most methods still involve varying numbers of particles per cubic foot having dimension greater than x microns (generally 1 to 5), with secondary limitation on number of particles of larger sizes (5, 10 or 20 microns).

In the Federal Standard, class 100 is 100 times cleaner than class 10,000, and is a cleanliness difficult to achieve. The use of the micron, which is a millionth of a meter, is a more convenient notation⁷ than the inch, since one micron is equivalent to. 00003937 inch (4/100,000 of an inch). To understand the size of a micron, it may be pointed out that a particle of even 50 microns is microscopic. The smoke from the filter

end of a cigarette is made up of particles of 10 microns; the human hair (.003 inch), is nearly 80 microns in diameter.

To achieve the standard, the particles must be counted periodically by one or more existing methods. This matter of sampling⁸ the clean room air is one of the most important parts of the entire operation. The Federal Standard states that all clean rooms shall use some particle counting method. There are two common methods: (1) by automatic equipment employing light-scattering techniques, for particles of 2 microns and larger; and (2) microscopic counting, for particles 5 microns and larger.

Notes:

¹gyro – компонент сложных слов-терминов; соответствует ги-ро-, авто-

²germicide, *n* – бактерицидное средство

³contaminant, *n* – загрязнитель

⁴leakage, *n* – утечка, просачивание

⁵spec. = special, *a* – специальный, особенный

⁶a rule of thumb – практический опыт

⁷notation, *n* – система обозначения

⁸sampling, *n* – взятие пробы

From the History of London's Underground

One of the things that struck him [Sippen] at once was the fact that in connection with two oldest undergrounds – the Metropolitan Railway and the District Railway, or Inner Circle, as it was called – there was a downtown¹ loop, similar to that which had made the Cowperwood system of Chicago so useful to himself and so irritating and expensive to his rivals². These two London lines, the first of the world's undergrounds, both badly built and operated by steam³, actually enclosed and reached all of the principal downtown points, and so served as a key to the entire underground situation. Paralleling each other at a distance of about a mile, and joining at the ends in order to afford mutual running rights, they covered everything from Kensington and the Paddington Station on the west to Aldgate in the Bank of England district on the east. In fact, everything of any importance – the main streets, the theatre district, the financial district, the shopping district, the great hotels, the railway stations, the houses of Parliament – was in this area.

Sippens was quick to learn that these lines, due to their poor equipment and management, were paying little more than their expenses. But they could be made profitable, for there was as yet, apart from buses, no other such convenient route to these districts.

Notes:

¹downtown, *n* – деловая часть города

²rival, *n* – соперник, конкурент

³steam, *n* – зд.: паровоз

Chicago's Transportation

For surface passenger transportation Chicago has steam, diesel and electrically operated railways, electrically operated street cars, gasoline driven motor coaches and private automobiles. In addition, there are double track elevated railways and subways.

Underneath downtown Chicago there are tunnels in which electrically operated trains bring merchandise¹ to the stores, coal and other heavy supplies to the office buildings, and remove cinders² and other refuse. The underground system of trackage³ connects industrial plants with the surface freight⁴ stations outside the central section of the city.

Notes:

¹merchandise, *n* – товары

²cinder, *n* – угольный мусор; шлак

³trackage, *n* – железнодорожная сеть

⁴freight, *n* – груз

The Working Primstone

From the top of the valley the sight of the town working normally, but without me, made me feel outcast, an outlaw. I wasn't allowed to live there any more. I stopped the car by Caulsby Castle. There was that smell of work in the air. The Road Services' lorries were beginning to move off down and out of the valley: the roads were black and moving, and the City itself was almost a forest with these insects moving amongst the scrubbed undergrowth¹ of the buildings and the stunted² trees of factory stacks³. The chemical works' six metal chimneys, joined

like band-aged fingers, filtered a thin red mist of nitrous fumes over the river. Alongside Harris's Mill a slim black pipe shot up a vivid bush of white steam, which stuck in the air for several minutes before subsiding to a lazy exhausted trickle⁴.

Occasionally one of the stocky chimneys jettisoned a great black termite steamer of smoke across the valley to go curling over the ridge⁵ and shroud the gloomy Riding Hospital overlooking Highfield. Close up to the valley side, where the road curved through the trees before ascending to Sand-wood, and just below the overflowing and overgrown cemetery⁶, the frantic panting of the steam boiler at the brickworks echoed like a railway engine dragging a long line of coaches to life. Its rapid puffs of steam mounted into the air in a bulging⁷ column, which burst and disappeared in the wind. And sprawling across the valley, down below the town, with its two huge sprouting limbs like a dead up-turned body, was the power station: the only new brick in sight. It seemed to dam up the town and stop it overflowing down the valley over the small, high-hedged fields to Stokeley.

Notes:

¹undergrowth, *n* – подлесок

²stunt, *v* – задерживать рост (растения, человека)

³stack, *n* – куча, груда

⁴trickle, *n* – струйка

⁵ridge, *n* – гребень горы

⁶cemetery, *n* – кладбище

⁷bulging, *a* - разбухший

How to Plan Town

Britain, far from being a “decadent democracy”, is a Spartan country. This is mainly due to the British way of building towns, which dispenses¹ with the reasonable comfort enjoyed by all the other weak and effeminate peoples of the world.

Medieval warriors² wore steel breast-plates and leggings not only for defence but also to keep up their fighting spirit; priests of the Middle Ages tortured their bodies with hair-shirts; Indian yogis take their daily nap lying on a carpet of nails to remain fit. The English plan their towns

in such a way that these replace the discomfort of steel breast-plates, hair-shirts and nail-carpets.

On the Continent doctors, lawyers, booksellers – just to mention a few examples – are sprinkled³ all over the city, so you can call on a good or at least expensive doctor in any district. In England the idea is that it is the address that makes the man. Doctors in England are crowded in Harley Street, solicitors⁴ in Lincoln's Inn Fields, second-hand- bookshops in Charing Cross Road, newspaper offices in Fleet Street, tailors in Savile Row, car-merchants in Great Portland Street, theatres around Piccadilly Circus, cinemas in Leicester Square, etc. If you have a chance of replanning London you can greatly improve on this idea. All greengrocers should be placed in Hornsey Lane (N.6), all butchers⁵ in Mile End (E.1), and all gentlemen's conveniences in Bloomsbury (W.G.).

Notes:

¹dispense (with), *v* – обходиться (без чего-либо)

²warrior, *n* – воин, боец

³sprinkle, *v* – разбрасывать; распылять

⁴solicitor, *n* – адвокат; юрисконсульт

⁵butcher, *n* – мясник; торговля мясом

New Symbols without Words

New symbols without words should make for safer and easier driving. But it will take about five years to change all the Britain's 1,600,000 traffic signs.

First to be changed will be the "mandatory" signs, in future to be within circles – "Stop" and "Give Way", for instance. This change is to be made within two years.

Apart from the "mandatory" circular signs, there will be "warning" triangular signs – an exclamation mark denoting danger, a man shovelling warning of road works or a black cross for crossroads.

The third type of outline will be rectangular and these will be "informatory" signs – no loading or unloading, entrances to controlled parking zones, one way traffic or no through road.

A new Highway Code to be produced within 18 months to two years will contain the new signs. Meanwhile both old and new signs will be legal.

A Note to Pedestrians

- walk on the pavements only;
- cross the street at special crossings when the light has changed to green;
- look to the left before stepping off the curb and to the right when you have reached the dividing line;
- don't stand between tram tracks;
- if you are caught in the middle of the street when the light changes, stay where you are. Drivers will thus have a better chance to steer clear of you;
- cross only in back of parked buses and trolley-buses and only in front of parked tram-cars, otherwise you may not notice moving vehicles;
- remember that it is against the rule for a driver to signal except in emergencies.

Do you know that...?

People learned to draw pictures of the objects around them long before they learned to write. The ability to make simple drawings helped man to develop his first written language. He used picture instead of letters, and in this way told about military campaigns, battles and hunting.

In Russia the people developed their own methods of representation of objects in drawing. Historical documents and the monuments of ancient architecture in Kiev, Vladimir and other cities show that the architects of Ancient Rus used drawings.

* * *

The method that Andrei Rublev, the famous Russian painter of the 14th – 15th centuries, used to depict¹ buildings in his pictures is very similar to one of the methods used in drawing today.

A plan of the city of Moscow was drawn in 1597. Many documents bear witness² to the great skill of the Russian graphic artists of those days. Among these documents are *A Map of Siberia*, *A Book of Drawings of the Towns and Lands of Siberia* and others.

* * *

Industry, mining and ship-building began to develop in Russia at the beginning of the 18th century. This was also a period of progress in the use and improvement of drawings.

Russian inventors also did much to develop methods of making mechanical drawings. Ivan Kulibin, the famous Russian inventor (1735-1818), made drawings of his numerous inventions.

* * *

The drawings of Russia's first steam-powered machines, invented by the outstanding Russian mechanic Ivan Polsunov, are likewise modern drawings.

Very complex drawings were made by Efim and Miron Cherepanov (father and son), the famous Russian mechanics and engineers who invented the first Russian steam engine.

* * *

It is interesting to note that Ivan Kulibin, Ivan Polsunov and many others made their drawings by methods which were first described by Gaspard Monge, the French engineer and scientist, only in 1795.

Kosma Frolov, a Russian inventor, made interesting drawings of his hydropower installations. It was in 1787.

* * *

Vasily Bazhenov, the noted Russian architect (1737-1799), was a very skilful draughtsman³. His pupil and assistant, Matvei Kasakov(1738-1812), who built many beautiful buildings that stand in Moscow to this day, was also very skilled in graphic art. Pyotr Titov, the

talented self-taught Russian ship-builder (1843-1894) made superb drawings of ships.

* * *

Modern mechanical drawing is based on scientific principles known as descriptive geometry. The founder of this science in Russia was Professor J.A. Sevastyanov, who solved many problems of descriptive geometry and showed how to apply it to mechanical drawing.

The famous Russian scientist V. I. Kurdumov (1853-1904) contributed much to Russian science. In his numerous works he gave a new scientific trend to many fields of descriptive geometry and developed methods for applying this science to technical drawing.

So the Russian school of engineering graphics was perfected by many Russian architects, mechanics, engineers, technicians and scientists.

* * *

The standard unit of mass is the Kilogramme, a block of platinum preserved at the International Bureau of Weights and Measures near Paris.

Two copies of this kilogramme are kept in the Vaults⁴ of the US Bureau of Standards. The kilogramme is divided into one thousand equal parts called grammes.

The standard metre is a platinum-iridium bar which is kept in the Vaults of the International Bureau of Weights and Measures near Paris (France).

When the standard metre was first devised it was intended that it has a length equal to one ten-millionth part of the distance from one of the earth's poles to the equator.

The standard metre is usually divided into 100 equal parts. Each of these parts is called centimetre.

The centimetre is divided into ten equal parts. Each of these parts is called millimetre.

$$1 \text{ centimetre} = 10 \text{ millimetres}$$

The millimetre is divided into 1000 equal parts. Each of these parts is called a micron.

$$1 \text{ millimetre} = 1000 \text{ microns.}$$

Notes:

¹depict, *v* – изображать, рисовать

²witness, *n* – свидетельство, доказательство

³draughtsman, *n* – чертежник; художник, рисовальщик

⁴ Vault, *n* – хранилище

How bright are you?

Who hears the speaker first, the people at the back of the auditorium, or the people 3, 000 miles away who are listening to the broadcast of the speech?

* * *

A bookworm¹ began to nibble through the pages of two books standing upright on a bookshelf. It started at page 1 of Volume One, and nibbled² through to the last page Volume Two. The pages of each book were exactly one inch thick and the bindings³ were 1/8 in. thick at the front and 1/8 in. thick at the back. How far did the bookworm travel?

* * *

A jet aircraft took off from London airport at 11.00 GMT on a Saturday morning. It flew at 30,000 feet at 500 miles per hour on its way to New York. At exactly the same time, another aircraft, “Boeing 707”, took off from Kennedy Airport, New York, on its way to London. It flew at 30,000 feet at 600 miles per hour. The distance from London to New-York is 3,000 miles. Over the Atlantic, the two planes passed each other. At that point which of the two planes was nearer to London?

Notes:

¹bookworm, *n* – 1) книжный червь; 2) буквоед

²nibble, *v* – зд.: потихоньку грызть, щипать маленькими кусочками

³binding, *n* – переплет

Test Bernoulli's Principle

Materials you'll need: 2 tennis balls, a string, a bicycle pump.

Bernoulli, a famous 18th century scientist, discovered a principle which has been very important in the field of aviation. Try this experiment and see if you can explain his contribution to science. It has to do with air pressure.

Suspend two tennis balls on a long string from a door frame or other firm support. Using a bicycle pump, direct a blast of air between the two balls. What happens to the position of the balls?

Testing for air.

Materials you'll need: glass of water, soil, brick, source of heat.

In order to discover whether there is air in the soil, put a handful of soil in a glass of water. What rises to the surface? When a brick is placed in a pan of water, what do you observe? What does this prove? The water is pushing the air out of the spaces in the brick.

To find out whether there is air in water, heat the water (but not to boiling) and watch the air bubbles rise to the surface. Test other materials as you did the soil and the brick.

A simple experiment.

The things you need for this experiment: a pencil and a piece of paper, a football, and a scale.

Do you know that air has weight? Weigh a small amount of air.

Let the air out of the ball and weigh the ball. Write down how much it weighs. Now blow up the ball as full of air as you can. Now weigh the ball again. It will weigh more. Write down how much it weighs now. Then subtract the amount which it weighed before and you will know how much the air in your ball weighs.

Список литературы

1. Айзенкоп, С.М. Учебное пособие по техническому переводу / С.М. Айзенкоп, Л.В. Багдасарова, Н.С. Васина, И.Н. Глушенко. - Ростов на/Д: Феникс, 1996. – 286 с.
2. Артемова, А.Ф. Английские товарные знаки / А.Ф. Артемова, О.А. Леонович; Иностранные языки в школе, №5. – 2005 г.
3. Банкевич, Л.В. 100 учебных заданий по словообразованию английского языка (общенаучная лексика) для студентов 1-2 курсов / Л.В. Банкевич, Л.Н. Иванкин. – Ленинград: ЛПИ им. М.И. Калинина. - 1986. – 102 с.
4. Ожегов, С.И. Словарь русского языка: Ок. 53000 слов / Сергей Ожегов; Под общ. Ред. Проф. Л.И. Скворцова. – 24-е изд., испр. – М.: ООО «Издательство Оникс»: ООО «Издательство Мир и Образование», 2005. – 1200 с.
5. Парахина, А.В. Пособие по переводу технических текстов с английского языка на русский: Для средних специальных учебных заведений / Азалия Парахина. – 2-е изд., испр. – М.: Высшая Школа, 1979. – 160 с., ил.
6. Пронина, Р.Ф. Перевод английской научно-технической литературы: Учебное пособие для втузов / Раиса Пронина. – 3-е изд., испр. и доп. – М.: Высшая Школа, 1986. – 175 с.
7. Полякова, Т.Ю. Достижение науки и техники XX века: Учебное пособие по английскому языку для студентов технических вузов / Т.Ю. Полякова, Е.В. Синявская, Г.А. Селезнева.. – 2-е изд., испр. – М.: Высшая школа, 2004. – 287 с.
8. Пумпянский, А.Л. Упражнения по переводу научной и технической литературы с английского языка и с русского языка на английский / Алексей Пумпянский. – Минск.: ООО «Попурри», 1997. – 400 с.
9. Волкова, Н.О., Англо-русский словарь сокращений / Н.О. Волкова, И.А. Никанорова. – 2-е изд., стереотип. – М.: Русский язык, 1999. – 464 с.

10. Гальперин, И.Р. Большой англо-русский словарь 1,2 т./ И.Р. Гальперин, Е.М. Медникова. - М: Русский язык, 1987.
11. Гейлер, Л.Б. Англо-русский электротехнический словарь / Л.Б. Гейлер, Н.И. Дозоров. - М.: Русский язык, 1976.
12. Пройдаков, Э.М. Англо-русский толковый словарь по вычислительной технике, Интернету и программированию / Э.М. Пройдаков, Л.А. Теплицкий. – 2-е изд., испр. и доп. – М.: Издательско-торговый дом «Русская Редакция», 2000. – 448 с.
13. Трофимова, З.С. Словарь новых слов и значений в английском языке / Зоя Трофимова. - М: Павлин, 1993. – 304с.
14. Чернухин, А.Е. Англо-русский политехнический словарь / Андрей Чернухин. - М: Русский язык, 1976.
15. Hornby, A.S. Oxford Advanced Learner's Dictionary of Current English 1,2 v. / A.S. Hornby. - М: Русский язык. Oxford University Press, Oxford, 1982.

Ключи к упражнениям

Упражнение 36.

- a) translating agency = translating
- b) automobile check = car repair
- c) automobile pass = driving school
- d) security corp(s) [k]:z] = security services
- e) quick lets = accommodation
- f) figure retrim = health and slimming studio
- g) sun tour (s) = travel agency
- h) data flow = computer services

Упражнение 37.

- a) little bite = snack bar
- b) shoe seller = shoe shop
- c) keep a crease = dry cleaners
- d) super snap = photo-processing shop
- e) quick copy = photo-coping firm
- f) quality fashions = women's clothes shop
- g) comfy kiddy wear = children's clothes shop
- h) handy cars = taxi firm
- i) Mister Clean = dry cleaners
- j) snacks = snack bar
- k) motor care = garage and repair shop
- l) look right = hairdressers
- m) flight center = travel agency
- n) you drive = car-hire firm

Упражнение 38.

- a) clean off = cleaning fluids
- b) meat to vat = pet food
- c) answer phone = telephone answering machines
- d) super lock = strong glue
- e) rest right = beds
- f) carry more = rucksacks

- g) instant flow = bathroom equipment
- h) answer door = video and audio home entry system

Упражнение 46.

AAMOF - As A Matter Of Fact; **AFAIK** - As Far As I Know; **BTW** - By the way; **DIY** - Do It Yourself; **FAQ** - Frequently Asked Questions; **FYA** - For Your Amusement; **FYI** - For Your Information; **IMHO** - In my humble opinion; **IMO** - In My Opinion; **IOW** - In Other Words; **LOL** - Laughing Out Loud; **NRN** - No Reply Necessary; **RTFM** - Read The Fuckin' Manual; **TTBOMK** - To The Best Of My Knowledge; **WYSIWYG** - What You See Is What You Get.

Упражнение 47.

1. f; 2. c; 3. a; 4. e; 5. d; 6. b

Ответы к тексту «How bright are you?»

1. The people 3000 miles away, because radio short waves travel 186 000 miles in a second, while sound waves travel only 1000 feet in a second.
2. Just over $\frac{1}{4}$ in., allowing for the end-papers stuck down.
3. The two planes are exactly the same distance from London.

ПРИЛОЖЕНИЕ 2

Словообразование с помощью аффиксации

В технической литературе встречаются префиксы, которые имеют международный характер, например:

anti- (анти-, противо-)	antibody - антитело
co- (со-)	co-exist - сосуществовать
de- (де-)	demilitarize - демилитаризовать
extra- (экстра-)	extraordinary - экстраординарный
ex- (экс-)	ex-champion – экс-чемпион
pre- (до-, пред-)	prehistoric - доисторический
	precondenser – предварительный конденсатор
super- (пере-, сверх-)	superconductivity – сверхпроводимость
	supercharge - перегружать
trans- (транс-)	transatlantic - трансатлантический
ultra- (ультра-)	ultrasonic - ультразвуковой

Основные префиксы и их значение

Префикс	К какой части речи добавляется	Основное значение	Примеры	Перевод
anti-	nouns, adjectives	анти-, противо-	antisocial	антиобщественный
be-	verbs, nouns, adjectives	изменяет часть речи	belittle	уменьшать
co-	nouns, verbs	со-, общность действия	cooperate coauthor	сотрудничать соавтор
counter-	nouns	контр-, противо-	countershaft	контрпривод

de-	verbs, nouns	де-	deformation	деформация
dis-	verbs, nouns, adjectives	раз-(рас), дез-, обез-	disorganize	дезорганизовать
en- (em-)	nouns, adjectives	изменяет часть речи	encourage	одобрить
ex-	nouns	бывший	ex-champion	бывший чемпи- он
extra-	adjectives	экстра-, сверх	extraordinary	экстраординар- ный
in- (im-, il-, ir-)	adjectives	не-	illogical invisible	нелогичный невидимый
inter-	verbs, ad- jectives	между-, взаимо-	interaction	взаимодействие
mis-	verbs, nouns	отрица- тельное значение	misunder- stand	неправильно понять
non-	nouns, adjectives	не-	noninterfer- ence	невмешательст- во
out-	verbs	пере-, пре- восходить что-либо. Изменяет часть речи	outbalance	перевешивать, превосходить
over-	verbs, adjectives	пере-, сверх-, чрезмерно	overdo	перестараться
post-	verbs, ad- jectives, nouns	после-	postaccelera- tion	послеускорение
pre-	verbs, nouns, adjectives	до-, перед, раньше	prehistoric	доисторический
re-	verbs	снова, вновь	rewrite	переписать
sub-	verbs, nouns, adjectives	суб-, под-, ниже	subtropical subconscious	субтропический подсознатель- ный

super-	verbs, nouns, adjectives	пере-, сверх-	superheat	перегрев
trans-	verbs, ad- jectives	транс-, пере-	transplant	пересадить
ultra-	nouns, adjectives	превосхо- дящее обычное, ультра-	ultrasonic ultraviolet	ультразвуковой ультрафиолето- вый
un-	verbs, nouns, adjectives	раз-(рас-), не-, без-(бес-)	uncoupling unkind	расцепка недобрый
under-	verbs, ad- jectives	недо-, ни- же нормы	undervalue	недооценивать

Основные суффиксы существительных

Суффикс	К какой части речи добавляется	Основное значение	Примеры	Перевод
-age	verbs, nouns, adjectives	<i>действие, состояние</i>	shortage	нехватка, некомплект- ность
-al	verbs	<i>действие</i>	removal	удаление
-ance (-ence)	verbs, adjectives	<i>действие, состояние</i>	silence	молчание
-ant (-ent)	verbs	<i>принадлеж- ность к про- фессии</i>	assistant	ассистент
-dom	nouns, adjectives	<i>состояние, качество</i>	freedom	свобода
-er (-or)	verbs	<i>действующее лицо или ме- ханизм, про- изводящий действие</i>	reader visitor	читатель посетитель

-er	nouns	<i>имя существительное, обозначающее жителя</i>	Londoner	лондонец
-hood	nouns	<i>состояние</i>	childhood	детство
-ian	nouns	<i>профессия</i>	technician	техник
-ics	nouns	<i>название науки</i>	physics	физика
-ing	verbs	<i>процесс, действие, состояние</i>	shunting	шунтирование, параллельное включение
-ion (-tion, -ation)	verbs	<i>процесс, название действия, состояние</i>	revolution formation	революция формирование
-ism	nouns, adjectives	<i>учение, теория, направление, качество</i>	marxism modernism heroism	марксизм модернизм героизм
-ist	nouns	<i>имя существительное, обозначающее последователя учения</i>	communist darwinist	коммунист дарвинист
-ty	adjectives	<i>качество или состояние</i>	legality	легальность
-ment	verbs	<i>результат действия</i>	settlement equipment	поселение оборудование
-ness	adjectives	<i>качество или состояние</i>	softness	мягкость
-ship	nouns	<i>состояние</i>	comradeship	товарищество

Основные суффиксы прилагательных

Суффикс	К какой части речи добавляется	Основное значение	Примеры	Перевод
-able	verbs, nouns	<i>способный что-либо сделать или испытывающий действие</i>	countable workable	поддающийся счету пригодный для работы
-al	nouns	<i>наличие качества</i>	electrical	электрический
-ant, -ent	verbs	<i>наличие качества, свойства</i>	different resistant	различный сопротивляющийся
-ary	nouns, verbs	<i>наличие качества, свойства</i>	revolutionary	революционный
-ful	nouns	<i>наличие качества</i>	forgetful	забывчивый
-ish	nouns	<i>наличие признака в слабой степени</i>	childish	детский
-ive	verbs	<i>наличие качества, свойства</i>	creative	созидательный
-less	nouns	<i>отсутствие качества</i>	seamless	бесшовный
-ous	nouns	<i>наличие качества, свойства</i>	famous	известный

Основные суффиксы наречий

Суффикс	К какой части речи добавляется	Основное значение	Примеры	Перевод
-ly	adjectives	<i>изменяет часть речи</i>	happily	счастливо
-ward	nouns, adverbs	<i>направление</i>	backward (s)	назад

Основные суффиксы глаголов

Суффикс	К какой части речи добавляется	Примеры	Перевод
-ate	nouns, adjectives	activate	активизировать
-ene	— ” —	harden	закалывать
-fy	— ” —	intensify	усиливать
-ize	— ” —	summarize	суммировать

ПРИЛОЖЕНИЕ 3

Список наиболее употребительных союзов

Сочинительные союзы

and-	и, а
as well as –	также, как
both ... and –	и ... и; как ..., так и
not only but also –	не только ..., но и ...
but –	но, а
or –	или, иначе
either ... or –	или ..., или; либо ..., либо
neither ... nor –	ни. .. ни

Подчинительные союзы

а) времени

after –	после того, как
as –	в то время как; когда; по мере того, как
as long as –	пока; до тех пор, пока
as soon as } –	как только
no sooner } –	
before -	прежде чем, перед тем, как
since -	с тех пор как; после того как
till, until –	до тех пор пока... (не)
while –	в то время, как

б) причины

as –	так как
because –	потому что; так как
since –	так как; поскольку

в) условия

if –	если
-------------	------

provided –	при условии, если
unless –	если не
<i>г) образа действия</i>	
lest –	чтобы не
in order that –	для того, чтобы; чтобы
<i>д) образа действия</i>	
as –	как
as if –	как будто; как если бы
so ... that –	так (такой) ..., что
such ... that –	такой ..., что
<i>е) сравнения</i>	
as ... as –	такой же ..., как; так ..., как
not so ... as –	не так ..., как; не такой ..., как
than –	чем
<i>ж) следствия</i>	
so that –	так, что
<i>з) уступительные</i>	
in spite of –	несмотря на то, что
though (although) –	хотя
since -	поскольку

**Список наиболее употребительных предлогов
и совпадающих с ними по форме союзов и наречий**

about	о, про, относительно; около, примерно; вокруг, по
above	выше, над
<i>above all</i>	прежде всего
across	поперек, через, на другой стороне
<i>(to) come across</i>	найти или встретить (случайно)
after	после; за; после того как (<i>союз</i>)
after all	в конце концов

against	против
along	вдоль, по
among	среди
around (round)	вокруг
at	<i>при обозначении места:</i> в, на, у; <i>при обозначении времени:</i> в; <i>при обозначении занятия:</i> за
at last	наконец
at least	по крайней мере
before	<i>при обозначении места:</i> перед; <i>при обозначении времени:</i> до, перед; раньше (<i>наречие</i>); прежде чем (<i>союз</i>); до того, как;
behind	перед тем, как позади, за
below	ниже, внизу
beside	рядом с
besides	помимо, кроме
between	между
by	<i>эквивалент русск. творит. падежа имени существ.;</i> посредством, путем; мимо; к (<i>о времени</i>)
by the way	кстати, между прочим
by means (of)	посредством
by no means	никоим образом
down	вниз по; вниз (<i>наречие</i>)
(to) write down	записать
for	за, ради; для; в течение (<i>указывает длительность</i>); ибо, так как (<i>союз</i>)
from	из, с, у; от
in	в, через (<i>для обозначения времени</i>)
in this way	таким образом
in spite of (despite)	несмотря на
into	в (<i>на вопрос «куда?»</i>)
of	<i>эквивалент русск. родит. падежа имени существит.;</i> из; о, про
of course	конечно

on = upon	на; по; о; для обозначения времени: с днями и числами; наречие со значением: вперед, дальше
over	через (над); свыше
since	с, с момента; с тех пор, как; поскольку; так как
through	через (внутри, по)
throughout	по всему, во всем
till = until	до; (до тех пор) пока...не
to	эквивалент русск. дат. падежа имени существит.; к, в, на (движение в направлении к чему-то)
toward (towards)	к; по направлению к
under	под; при; по, согласно
until	см. till
up	вверх по; вверх (наречие)
up to	вплоть до
upon	см. on
with	эквивалент русск. творит. падежа имени существит.; с, со
within	в пределах; через (о времени)
without	без

ПРИЛОЖЕНИЕ 4

Особые случаи образования множественного числа существительных

Единственное число	Множественное число
datum [!deotɤm] данная (величина)	data [!deotɤ]
basis [!beosos] базис, исходный пункт	bases [!beosoz]
phenomenon [fɔ!n]mɔnɤn] явление	phenomena
medium [!mi:dɔɤm] среда	[fɔ!n]mɔnɤ]
radius [!reodɔɤs] радиус	media [!mi:dɔɤ]
analysis [ɤ!nælosos] анализ	radii [!reodɔaɔ]
thesis [i:sos] тезис	analyses [ɤ!nælosi:z]
stimulus [!stɔmjulɤs] стимул	theses [i:sɔz]
curriculum [kɤ!rɔkjulɤm] учебный план	stimuli [!stɔmjulaɔ]
minimum [!mɔnɔmɤm] минимум	curricula [kɤ!rɔkjulɤ]
stratum [!streotɤm] слой	minima [!mɔnɔmɤ]
locus [!loukɤs] траектория	strata [!streotɤ]
criterion [kraɔ!tɔɤɤɤn] критерий	loci [!lousaɔ]
formula [!f]:mjulɤ] формула	criteria [kraɔ!tɔɤɤɤ]
maximum [!mæksɔmɤm] максимум	formulae [!f]:mjuli:]
axis [!æksos] ось	maxima [!mæksɔmɤ]
erratum [!erɔtɤm] опечатка	axes [!æksɔ:z]
index [!ɔndeks] индекс	errata [!erɔtɤ]
crisis [!kraosos] кризис	indices [!ɔndɔsi:z]
terminus [!tɤ:mɔnɤs] конечная станция, цель	crises [!kraosi:z]
apparatus [7æɤɤ!reotɤs] прибор	termini [!tɤ:mɔnaɔ]
	apparatus
	[7æɤɤ!reotɤs]
	or apparatuses
	[7æɤɤ!reotɤsɔz]

ПРИЛОЖЕНИЕ 5

Использование простых и однозначных слов в качестве технических терминов

Вот несколько примеров, когда, казалось бы, самые простые и однозначные слова в качестве технических терминов приобретают совсем неожиданные значения.

Слова повседневной речи	Что эти слова могут означать в технике
snake	светловина
goose	утюг
monkey	баба (для забивки свай)
bug	скоба
collar	подшипник
jacket	стенка цилиндра
skirt	полюй цилиндр
boot	сошник
hat	кровля
leaf	прицельная рамка
nut	гайка
bush	втулка
grass	лента шумов
plum	заполнитель бетона
forehead	забой
brow	мостки
nose	головка домкрата
lip	козырек ковша
beard	зазубрина
ear	зажим
arm	спица
breast	амбразура
leg	катет
chair	рельсовая подушка
bench	верстак
blanket	зона воспроизведения

То же самое наблюдается и в русской технической терминологии:

Слова повседневной речи	Что эти слова могут означать в технике
журавль	рычаг
кошка	захват
жучок	отвод
собачка	стопор
лягушка	пиротехнический снаряд
палец	ось
шейка	соединительная часть
плечо	часть рычага
глазок	отверстие
колени	ответвление
губа	залив
щека	боковая накладка
бородка	часть ключа
ребро	сторона
скула	стрингер
рубашка	полость
юбка	часть поршня
чулок	часть заднего моста
серьга	соединительное звено
гребенка	зубчатая рейка
рукав	шланг
фартук	деталь станка
вилка	рычаг
тарелка	часть клапана
стакан	корпус снаряда
лепесток	контакт
стебель	часть затвора
пенек	выступ
ветка	путь

ПРИЛОЖЕНИЕ 6

Список наиболее часто встречающихся сокращений

- A, a** – ampere - ампер
Å – Angstrom - ангстрем (10^{-8} см, 10^{-10} м)
A.C. (a.c.) – alternating current - переменный ток
a.f. – audio frequency – звуковая частота
A.F.C. – automatic frequency control – автоматическая
подстройка частоты (АПЧ)
a-hr – ampere-hour – ампер / час
C – centigrade – градус Цельсия
Cal – kilogram-calorie – большая калория
cm. p. s. – centimeters per second – см / сек
c.p. – candle power – свеча
c.p.s. – cycles per second – герц
db – decibel – децибел
D.C. (d.c.) – direct current – постоянный ток
dia. – diametre – диаметр
dm. – decimeter – дециметр
e.g. – exempli gratia – например
emf – э.д.с.
etc. – и т.д.
F – farad 1) фарада, 2) градус Фаренгейта
f.s.d. – full size detail – деталь в натуральную величину
g – грамм
g. r. – gear ratio – передаточное число, отношение
h. f. (r. f.) – high frequency (ratio frequency) звуковая частота
hi-fi – high fidelity – высокая точность звуковоспроизведения
h. p. – 1) horsepower – лошадиная сила;
2) high pressure – высокое давление
h. v. – high voltage – высокое напряжение
i.c. – internal combustion – внутреннего сгорания (*о двигателе*)
i.e. – id est = that is – то есть
i. f. – intermediate frequency – промежуточная частота
Kc/ s – kilocycles per second – килогерц
kg – kilogram – килограмм
kgf – kilogram force – килограмм (кГ, ед. силы)

kg/sq. cm – kilogram per square centimetre – атмосфера (ед. давления)
kV/a-hr – kilovolt ampere-hour – киловольтампер / час
kW – kilowatt – киловатт
kW – hr – киловатт / час
j – joule – джоуль
lb. – pound – фунт
lit. – litre – литр
lm – lumen – люмен
l.p. – low pressure – низкое давление
l.v. – low voltage – низкое напряжение
m – metre – метр
m – milli- – милли-
μ – micro- – микро-
mA – milliamperere – миллиампер
μA – microampere – микроампер
Mc/s – megacycles per second – мегагерц
μfd – microfarad – микрофарада
μH – microhenry – микрогенри
mi – mile – миля
min. – minute – минута
mm Hg – миллиметр ртутного столба
No.; Nos – number(s) – номер(а)
pc., pcs – piece(s) – штука (и)
pf – picofarad – пикофарада
ppm – parts per million – частей на миллион
p.s.f. – pounds per square foot – фунтов на кв. фут
p.s.i. – pounds per square inch – фунтов на кв. дюйм
Qty – quantity – количество
r. f. – radio frequency – высокая частота, радиочастота
r.p.m. – revolutions per minute – оборотов в минуту
r.p.s. – revolutions per second – оборотов в секунду
sc. – scale – шкала
sec. – second – секунда
St. Std – State Standard (ГОСТ)
Std – Standard (ОСТ)
s.w. – specific weight – удельный вес
t – ton – тонна

tf – ton force – тонна сила

tm – ton moment – тонна момент

V – вольт

v.f. – video frequency – видеочастота

vs – versus – против

v.v. – variable voltage – переменное (регулируемое) напряжение

W – watt – ватт

w.g. – wire gauge – проволочный калибр

yd. – yard – ярд

ПРИЛОЖЕНИЕ 7

Единицы измерения (Units of Measurement)

Меры длины (Linear Measures)

Дюйм	inch	in.	2.54 cm
Фут	foot	ft(12 in.)	30.48 cm
Ярд	yard	yd(3ft)	91.44 cm
Миля	mile	mi.(1760yd)	1609.33 m
Миля морская	nautical mile (knot)	naut.mi.(6080ft)	1853.18 m

Меры веса (Measures of Weights)

Драхма	dram	dr.	1.77 g
Унция	ounce	oz (16 dr.)	28.35 g
Фунт	pound	lb.(16 oz)	435.59 g
Стон	stone	st. (14 lb.)	6.53 kg
Квартер	quarter	qr (28 lb.)	12.7 kg
Центнер	hundredweight	hwt (112 lb.)	50.8 kg
Тонна большая	ton	t (20 hwt)	1016.048 kg

Меры объема жидких и сыпучих тел (Measures of Volume)

Джилл	gill	—	0.14 l
Пинта	pint	pt (4 gills)	0.57 l
Кварта	quart	qt (2 pt)	1.14 l
Галлон	gallon	gal. (4 qt)	4.55 l
Бушель	bushel	bsh. (8 gal.)	36.37 l
Квортер	quarter	qr (8 bsh.)	290.94 l

Меры площади (Square Measures)

Кв. дюйм	square inch	sq. in.	6.45 cm ²
Кв. фут	square foot	sq. ft (144 sq. yd)	9.29 cm ²
Кв. ярд	square yard	sq. yd (9 sq. ft)	0.836 cm ²
Акр	acre	ac. (4840 sq. yd)	0.4 hectare
Кв. миля	square mile	sq. mi. (640 ac.)	2.59 km ²

Меры объема (Cubic Measures)

Куб. дюйм	cubic inch	c. in.	16.39 cm ³
Куб. фут	cubic foot	c. ft (1728 c. in.)	28.32 cm ³
Куб. ярд	cubic yard	c. yd (27 c. ft)	764.53 dm ³
Тонна регистровая	register ton	reg.t. (100 c. ft)	2.83 m ³

Time

60 seconds = 1 minute

60 minutes = 1 hour

24 hours = 1 day

7 days = 1 week

Angles

60 seconds (60!!) = 1 minute (1!)

60 minutes (60!) = 1 degree (1°)

90 degree (90°) = 1 right angle

360 degree (360°) = 1 circle

4 right angles = 1 circle

Соотношение между единицами измерения температуры (°F, °C, °R), работы (кВтч, ккал) и мощности (кВт, л.с.)

$$t_R = \frac{4t_C}{5} = \frac{4(t_F - 32)}{9}$$

$$t_C = \frac{5(t_F - 32)}{9} = \frac{5t_R}{4}$$

$$t_F = \frac{9t_C}{5} + 32 = \frac{9t_R}{4} + 32$$

1 *квт.* (kW) = 1,36 *л.с.* (h.p.)

1 *л.с.* (h.p.) = 0,736 *квт.* (kW)

1 *квтч.* (kWhr) = 860 *ккал.* (kcal)

1 *ккал.* (kcal) = 0,001163 *квтч.* (kWhr)

ПРИЛОЖЕНИЕ 8

Латинизмы

(латинские слова и выражения,
употребляемые в оригинале без перевода)

IBIDEM (IB., IBID) = in the cited source – там же

IN SITU = at the site – на месте

PER SE = by itself – само по себе

CONDITIO SINE QUA NON = indispensable condition –

непременное условие

VIA = through - путем

IN VITRO = in a test tube – в пробирке

STATUS QUO = initial condition – исходное положение,

в первоначальном виде

SUI GENERIS = in its kind – в своем роде

ERGO = consequently – следовательно

PROVISO = on condition that – при условии

SIC! = important! – важно; подлинник

c. = circa [!sχ:kχ] – примерно, около

i.e. = id est – то есть

etc. = et cetēra – и т.д.

e.g. = example gratiā – например

viz. = videlicet – а именно, то есть

v.v. = vice versa – наоборот

v.s. = vide supra – см. выше

v.i. = vide infra – см. ниже

vid. = vide – смотри

u.i. = ut infra – как указано ниже

p.m. = post meridiem – после полудня

a.m. = ante meridiem – до полудня

p.a. = per annum – в год

n.l. = non licet – недопустимо

c.v. = curriculum vitae – жизнеописание

ПРИЛОЖЕНИЕ 9

Фонетика. Правила чтения

Фонетика

Aa Bb Cc Dd Ee Ff Gg Hh Ii Jj Kk Ll Mm Nn
Oo Pp Qq Rr Ss Tt Uu Vv Ww Xx Yy Zz

Буквы

Гласные: A,a [ei], E,e[i:], I,i[ai], O,o[ou], U,u[ju:], Y,y[wai].

Согласные: B,b[bi:], C,c[si:], D,d[di:], F,f[ef], G,g[dzi:], H,h[eit]
J,j[dzei], K,k[kei], L,l[el], M,m[em], N,n[en], P,p[pi:],
Q,q[kju:], R,r[a:], S,s [es], T,t [ti:], V,v[vi:],
W,w[ˈd bju:], X,x[eks], Z,z [zed].

Звуки

Согласные: [p], [b], [t], [d], [k], [g], [f], [v], [s], [z], [], [z],
[±], [→], [h], [j], [w], [l], [r], [m], [n]

Гласные: краткие: [i], [e], [æ], [ʌ], [u], [ɔ], [χ]

долгие: [i:], [a:], [i:], [u:], [χ:]

дифтонги: [ei], [ai], [au], [i], [ou], [iχ], [εχ], [uχ]

Особенности английской орфографии - 26 букв, 44 звука.

Типы ударного слога

I – открытый - оканчивается в произношении на гласный звук, а в написании на гласную букву, например: me, by.

II – закрытый - оканчивается в произношении на согласный звук, а в написании на согласную букву, например: at, pen.

III – гл. + R - слог, в котором ударная гласная прикрыта буквой «r», например: car, or, her, sir, fur.

IV – гл. + R + гл. - слог, где за буквой «г», которой прикрыта ударная гласная, следует «немая» или другая читаемая гласная, например: care, here, fire, during.

A[ei]	[ei] fable, fate	[æ] fat	[a:] far, farm	[χ] fare, daring
O[ou]	[ou] no, note	[ɔ] not	[ɔ:] nor, north	[ɔ:] more, snoring
I[ai]	[ai] pie, pine	[i] pin	[χ:] fir, firm	[aiχ] fire, firing
Y[wai]	[ai] by, type	[i] gym	[χ:] Byrd	[aiχ] tyre, tyrant
E[i:]	[i:] me, meet	[e] met	[χ:] her, term	[iχ] here, hero
U[ju:]	[ju:] [u:] due, rule	[ʌ] cut	[χ:] cur, turn	[(j)uχ] cure, during

В английском языке имеется также условно-открытый слог, оканчивающийся в произношении на согласный звук, а в написании на гласную букву «е», которая не читается («немая»). Например: Eve [i:v], Kate [keit], spoke [spouk], time [taim], use [ju:z]. Немая «е» указывает, что предшествующий слог открытый и гласная в нем имеет алфавитное чтение.

Сводная таблица чтения согласных букв

Буква	Какие звуки передает	Пример
Bb	[b]	bed, bad
Cc	[s](перед e, i, y) [k](перед o, u, a), согл.	face cat, cup, cry
Dd	[d]	do [du:]
Ff	[f]	friend
Gg	[→] (перед e, i, y) [g] (перед o, u, a), согл.	large gun, go, green <i>Исключения:</i> get, girl, give
Hh	[h]	he
Jj	[→]	jim-jams
Kk	[k]	book
Ll	[l]	lamp
Mm	[m]	my
Nn	[n]	no, nine
Pp	[p]	pen
Qq	[kw]	quick
Rr	[r]	red
Ss	[s]	yes
Tt	[t]	ten
Vv	[v]	five
Ww	[w]	well
Xx	[ks]	box
Zz	[z]	size

Запомните следующие правила:

- ⇒ В конце слов английские звонкие согласные никогда не оглушаются. *Например:* ebb [eb], bag [bæg]
- ⇒ Английские согласные перед любыми гласными произносятся твердо.
- ⇒ Глухие согласные перед звонкими не озвончаются. *Например:* ['ɪŋgli□ 'bʌks], в конце слов они произносятся энергично и четко.

Чтение буквосочетаний согласных

Буквосочетание	Звук	Пример	Буквосочетание	Звук	Пример
sh	[ʃ]	shelf	ck	[k]	block
ch	[tʃ]	french	ng	[ŋ]	long
th	[ð]	this	wh	[w]	what
	[θ]	thin		[h]	who
wh	[w]	what, where	kn	[n]	know

Буквосочетание	Звук	Пример	Буквосочетание	Звук	Пример
wh	[h]	who			
igh	[ai]	high, light	wr	[r]	write
alk	[:k]	talk	ng	[ŋ]	sing

- сходны со звуками русского языка [b, g, f, v, z, m, j];
- похожи по звучанию, но произносятся иначе: [p, k, d, t, l, n]
- нет в русском языке: [w, ð, θ,];
- отличаются по артикуляции: [h, r, θ, ∞, tʃ]

Словесное и фразовое ударение Ритмические группы. Интонация

Словесное - выделение слога в слове.

Фразовое - выделение слов в предложении: имена существительные, прилагательные, числительные, смысловые глаголы, наречия, вопросительные местоимения.

Обычно безударны - артикли, союзы, предлоги, вспомогательные глаголы, личные и притяжательные местоимения.

Например.: I have ‘ come to ‘London to’ enter this ‘institute.

Ритмическая группа:

- ⇒ ударные слоги (слова) произносятся через более или менее разные промежутки времени;
- ⇒ неударные слоги произносятся слитно с предшествующими ударными
- ⇒ начальные неударные слоги примыкают к последующему ударному.

Например.: My 'friend is in' London now.

Смысловая группа:

- ⇒ длинные предложения членятся на отдельные отрезки (по смыслу)

Например.: My English friend / often spends his Sundays / in the British Museum.

Интонация

Интонацию в английском предложении принято обозначать следующим образом:

- ↓ - понижение интонации
- ↑ - повышение интонации

Yes / No questions (вопросы, требующие ответа Да/Нет) ↓

Wh - questions (вопросы, начинающиеся с вопросительных слов) ↓

Polite requests (вежливые просьбы) ↑

Imperatives (приказания) ↓

Alternative questions (альтернативные вопросы) ↑... or ↓...

Tail questions (разделительные вопросы) ..., ↑...

ПРИЛОЖЕНИЕ 10

Список неправильных глаголов

Infinitive	Past Indefinite	Participle II	Перевод
to arise	arose	arisen	возникать, появляться
to become	became	became	становиться
to begin	began	begun	начинать(ся)
to break	broke	broken	ломать
to bring	brought	brought	приносить
to build	built	built	строить
to burn	burnt	burned	гореть, жечь
to cast	cast	cast	<i>техн.</i> : отливать, лить; бросать
to choose	chose	chosen	выбирать
to come	came	come	приходить
to cut	cut	cut	резать
to deal	delt	delt	распределять; отпускать
to draw	drew	drawn	тащить, рисовать
to drive	drove	driven	везти
to dwell	dwelt	dwelt (dwelled)	обитать, жить
to eat	ate	eaten	есть
to fall	fell	fallen	падать
to feed	fed	fed	<i>техн.</i> : питать, снабжать
to feel	felt	felt	чувствовать
to fight	fought	fought	бороться
to find	found	found	находить
to fly	flew	flown	летать
to forget	forgot	forgotten	забывать
to get	got	got	получать, становиться
to give	gave	given	давать
to go	went	gone	идти, ехать
to grow	grew	grown	расти, выращивать
to gnaw [n:]	gnawed	gnawn	разъедать (о кислоте)
to hang	hung	hunged	вешать; <i>техн.</i> : застревать
to have	had	had	иметь

to hear	heard	heard	слышать
to hold	held	held	держать
to keep	kept	kept	держать, хранить
to know	knew	known	знать
to lead	led	led	вести
to learn	learnt, learned	learnt, learned	учить(ся)
to leave	left	left	оставлять
to let	let	let	позволять
to light	lit	lit	зажигать
to lose	lost	lost	терять
to make	made	made	делать; создавать
to mean	meant	meant	значить
to meet	met	met	встречать; удовлетворять, обеспечивать
to put	put	put	класть
to rebound	rebound	rebound	переплетать (снова)
to ring	rang	rung	звонить
to run	ran	run	бежать; работать (о маш.)
to say	said	said	сказать, говорить
to see	saw	seen	видеть; понимать
to sell	sold	sold	продавать
to send	sent	sent	посылать; передавать (радио)
to set	set	set	помещать, класть
to show	showed	shown	показывать
to shut	shut	shut	закрывать; выключать
to sink	sank	sunk	тонуть; угасать
to slink	slunk	slunk	красться
to speak	spoke	spoken	говорить
to speed	sped	speeded	ускорять; спешить
to spin	spun, span	spun	<i>техн.</i> : выдавливать (на станке)
to split	split	split	расщеплять
to take	took	taken	брать; твердеть
to teach	taught	taught	учить; проучить
to tell	told	told	рассказать; заверять
to think	thought	thought	думать; полагать

to throw	threw	thrown	бросать; направлять
to wake	woke, waked	waked, woken	будить; просыпаться
to win	won	won	выигрывать; <i>горн.</i> : добы- вать (руду)
to write	wrote	written	писать; сочинять

Любовь Федоровна Чернявская

АНГЛИЙСКИЙ ЯЗЫК
Термины и терминообразование

Компьютерный набор и верстка: О. Коврова

Подписано в печать 3.08.2007

Формат 60 × 84 ¹/₁₆

Печать трафаретная.

Уч.-изд. л. 6,1. Усл. печ. л. 61.

Тираж 200 экз. Заказ 149

Отпечатано в авторской редакции

в УОП РИО БрГУ

665709, Братск, ул. Макаренко, 40