doubt the validity of the CPT theorem now? Why? 12. What do you know about the Soviet scientists working in this field?

XI. Translate the following questions into English and answer them.


XI. Translate the following into English and comment on the picture.

Число теоретических работ, появляющихся в последнее время после открытия новых веществ, резко возрастает, что дает повод для шуток, таких, например, как этот рисунок, опубликованный в журнале «Курьер ЦЕРН».

XIII. Render the text in English.

К сожалению, теоретическое понимание данной проблемы не может возрасти в связи с получением новых результатов, имеющих определенный перспективный характер. Упорно ищется положительное подтверждение наличия подобных нарушений. С этой точки зрения необходимо провести исследование всех взаимодействий более чувствительными методами, и эта работа уже ведется.

Таким образом, сейчас продолжаются исследования, с помощью которых физики пытаются понять, это представляет собой эффект нарушения CP-симметрии, наблюдаемой в распадах нейтральных K-мезонов. Нарушается ли CP-симметрия вообще? Нарушается ли T-инвариантность? Справедлива ли CPT-теорема? Только эксперимент может дать ответ на эти вопросы. Можно предположить, что те нарушения, которые мы видим, очень малы. Поэтому эксперименты, необходимые для их обнаружения, должны быть очень точны. Не исключено и такая вполне реальная

возможность: эти нарушения столь малы, что при существующем уровне экспериментальной техники их вообще нельзя обнаружить.

Нарушение инвариантности относительно обращения времени в одном из фундаментальных взаимодействий не является столь уж необоротным. Очень важно сейчас, чтобы все сколь-нибудь подозрительные случаи были бы исследованы. Мы совершенно не можем понять механизмы проявления основных сил природы, если не будем знать их свойства по отношению к фундаментальным симметриям. Более того, все наши концепции окружающей нас Вселенной, наши фундаментальные представления о пространстве и времени находятся в сильной зависимости от того, какие из установленных нами законов сохранения и принципов симметрии соответствуют природе. Одно несомненно: только будущее покажет, существуют ли различия между временем, идущим вперед, и временем, идущим назад.

XIV. Look through the article (paragraphs 1-14) and say what part serves as introduction, main part, conclusion. Write a summary of the article. It should not exceed 300 words. Translate the summary into Russian.

Topics for discussion: 1. Particles and antiparticles. 2. The importance of CPT symmetry. 3. CPT theorem and its sequels. 4. Discoveries in time reversal. 5. Theory and experiment — which is more important in physics.

LESSON TWENTY-THREE

Text: Superconductivity at High Pressure (part I)
Grammer: The Complex Object

ACTIVE VOCABULARY EXERCISES


2. Read the following sentences and try to guess the meaning of the words in bold type. Study the use of these words.

compress v.: The electrons must get closer to one another when matter is compressed. Experiments designed to measure the effects of compression on the superconducting properties of certain metals may lead to the creation of new, higher-temperature superconductors.
hope n., v.: While there is life there is hope. Don't raise his hopes too much. He was the hope of his school. My hopes were destroyed. Let's hope for the best. I hope so (not). I hope to have his support.

abrupt adj.: The road is full of abrupt turns. The discovery of superconductivity gave birth to hopes that this phenomenon——the abrupt disappearance of all resistance to electric current in some metals at very low temperature——might eventually be put to many practical uses.

transmit v.: Iron transmits heat. Parents transmit some of their characteristics to their children. They have just transmitted the message by radio. Most of the sun's radiation reaching the earth's atmosphere is transmitted by it to the earth's surface.

alloy n., v.: Brass is an alloy of copper and zinc. Steel is an alloy of iron and carbon. So far efforts to produce materials with a still higher transition temperature by alloying superconductors with one another and doping them with impurities have not been successful.

propose v.: The concept of an atomic nucleus was first proposed by Ernest Rutherford in 1911. They proposed that the meeting should be continued the next day. His proposition was not accepted.

clarify v.: Already at an early date it was stated that the main goal of space research should be to clarify how the solar system was formed. Clarify your meaning. Clarity of style is clarity of thought. Theoretical physics develops not only by the creation of new theories but also by elaboration and clarification of the existing ones.

insight n.: The model provides some physical insight into the processes involved. New insight into covalent bonding in crystals has followed from studies of energy-band spectroscopy. His extraordinary insight into the complexity of the situation helped us to avoid danger.

possess v.: He possesses several languages besides his native tongue. Physicists hope to synthesize some new superconductors which will remain superconducting at temperatures well above the present region and may possess (have) unusual properties.

inhibit v.: The motions of the atoms of a liquid are inhibited by strong interatomic forces. Physicists don't know what mechanism inhibits superconductivity in nontransition metals.

exhibit v.: A body that exhibits magnetism is called a magnet. In 1924 De Broglie suggested that moving particles, e.g. electrons, should exhibit properties of waves. The soldiers exhibited great bravery in the battle. The exhibition has little attraction for me.

latter adj.: Of the two methods suggested the latter would be preferable in practice. The scientists have given two possible solutions to that dilemma, and the latter was quite an elegant one. They used two methods, the latter appeared to be more effective.

former adj.: Recent discovery challenged our former notions of such phenomena. Of the two articles which were given to me the former is more interesting. Of these two evils the former is the less.

convert v.: A television camera converts the variable light intensity of an image into a modulated electrical signal: the video signal. It was shown long ago that heat can be converted into mechanical work, that is, that heat is convertible into mechanical work.

serve v.: A good citizen is always ready to serve his country. Let this case serve as a lesson to him. I wish I could serve you in this matter. The new device (scheme) serves the (no) purpose. The telephone service is out of order.

3. Give the English for the following: сжимать; надеяться; внезапный; сообщать; передавать; сплав; предлагать; разъяснять; проницательность; способность проникновения в сущность; сдерживать; подавлять; показывать, прибегать; последний (из двух названных); врежный, бывший, первый (из двух названных); превратить; служить, быть полезным.

SUPERCONDUCTIVITY AT HIGH PRESSURE

Experiments designed to measure the effects of compression on the superconducting properties of certain metals may lead to the creation of new, higher-temperature superconductors.

by N. B. Brandt and N. I. Ginzburg

1. The discovery of superconductivity by Heike Kamerlingh Onnes 1 60 years ago gave birth to hopes that this phenomenon——the abrupt disappearance of all resistance to electric current in certain metals at very low temperature——might eventually be put to many practical uses involving the transmission of electricity. Unfortunately, although a great number of materials have been tried, superconductivity still is observed only at temperatures not very far from absolute zero, or zero degrees Kelvin. Twenty-four elements in the periodic table have been found to be superconductive, but the highest temperature at which any of them passes into that state is 9.3 degrees K.; this is the transition temperature for niobium. Alloys with a somewhat higher critical temperature have been synthesized, and the record-holder 2 is an alloy of niobium with aluminum and germanium that becomes a superconductor at about 21 degrees K. So far efforts to produce materials with a still higher transition temperature by alloying superconductors with one another and doping them with impurities have not been successful. Another line of investigation has now been opened, ho-
ever, by recent results achieved with the application of high
pressure.

2. The high-pressure studies throw light on the theory of su-
perconductivity as well as on the possibilities for the creation of
new superconductors. The theory, proposed in 1957 by John Bar-
deen, Leon N. Cooper and J. Robert Schrieffer and now known as
the BCS theory, has led to models that relate the experimentally
measured parameters of metals in the superconducting state to
their characteristics in the normal state. By observing how high
pressure changes the parameters of the crystal lattice in the nor-
mal state and in the superconducting state, and comparing the
measurements with the predictions of the theoretical formula, one
can now test the validity of some theoretical models. The com-
parison of experimental results with theory also promises to clarify
the mechanism by which a change in the lattice parameters brings
about a change in a metal's superconducting properties. In addi-
tion, the measurement of the characteristics of a superconducting
metal under high pressure gives us an insight into certain basic
properties of the metal, such as the energy spectra of its electrons
and its phonons (the quanta of the thermal vibrations of the crys-
tal lattice). In some cases the relevant data under high pressure
are considerably easier to obtain in the superconducting state than
they are in the normal state of the metal.

3. The experiments with high pressure give us hope that, just
as the application of pressure made possible the production of arti-
ficial diamonds and other superhard substances, so it will beco-
me a useful means of synthesizing new superconductors, some of
which will be superconducting at temperatures well above the pre-
sent region and may possess unusual properties. It seems possible
that some materials may be designed to be superconducting by a
mechanism different from the one due to electron-phonon interac-
tion that characterizes present superconductors.

4. It is already known that in the case of some transition me-
tals (elements with an unfilled inner shell of electrons) and some
of their alloys the critical temperature at which they become su-
perconducting is raised when pressure is applied, whereas for su-
perconductors in the nontransition category the application of
pressure lowers the critical temperature. What is the mechanism
that inhibits superconductivity in the latter case? Can high pres-
sure alone completely suppress this property in nontransition metals?
How does the application of pressure enable transition metals to
become superconducting at elevated temperatures? What is the up-
per limit to the range of temperatures at which any substance
could be superconductive? For several years we have been inves-
tigating these questions in our laboratory in the department of low-
temperature physics at Moscow State University.

5. Kamerlingh Onnes and his co-workers at the University of
Leiden attempted to investigate the behavior of superconductors
under pressure as early as 1925. The problem of conducting useful
experiments at high pressure and low temperature turned out to
be exceedingly difficult, however. In order to obtain answers to in-
teresting questions such as we have just listed, the sample of su-
perconducting material must be examined over a range of temper-
atures sometimes down to a few hundredths of a degree K. under
very high pressure, and the pressure must be reasonably uniform
throughout the sample. Uniform application of pressure can be ob-
tained only by using a liquid or some other highly plastic medium
to transmit the pressure from a press to the sample. Kamerlingh
Onnes and his associates used liquefied helium—the only ele-
ment that remains liquid at temperatures as low as one degree
K. They found, however, that under a pressure of 140 bars (about
138 times the atmospheric pressure at sea level) helium froze solid
at 4.2 degrees K., and at lower temperatures it was converted to
the solid state by even smaller pressures. Consequently studies of
superconductors placed under very high pressure at ultra-low tem-
peratures were out of the question. Subsequent attempts to solve this
problem with similar head-on attacks met with little success. It took
40 years and new ideas to develop an effective technique for the
extensive investigation of superconductivity under high pressure.

6. The basis of the new approach was the stratagem of ap-
plying the pressure before the sample is cooled to the supercon-
ducting state instead of afterward. In the initial stage, usually at
room temperature, water or some other substance that is liquid or
highly plastic at ordinary temperatures can serve as the medium
for transmitting pressure to the sample in a press; thus the pres-
sure can be applied with a high degree of uniformity to the entire
sample. The compression is then "frozen in" as the system is cool-
ed to the temperature of the experiment. Assuming that the sample
and the medium are both isotropic (that their properties do
not change with direction), we can expect the pressure in the
sample to remain homogeneous throughout, although the magni-
tude of the pressure may have been changed by the system's ther-
mal contraction.

(to be continued)

Notes on the text

1. Pronounce the following proper names correctly: Heike Ka-
merlingh Onnes [hiik 'kamerliŋ 'onnes], John Bardeen [dʒərn 'ba:də:n], Leon Cooper [ˈleɪən 'kʊpər], Robert Schrieffer [ˈrɔbərt 'sriəfər].
2. the record-holder — спорт. обладатель рекорда, рекордсмен
3. This is out of the question. — Об этом не может быть и ре-
чи, это исключено.
4. a head-on attack — фронтальный удар; лобовая атака
5. a stratagem [ˈstrætədʒəm] — (военная) хитрость, уловка
Active words and word combinations

- to compress
- to propose
- to exhibit
- hope n., v.
- to clarify
- latter adj.
- abrupt adj.
- an insight
- former adj.
- to transmit
- to possess
- to convert
- alloy n., v.
- to inhibit
- to serve
- to raise smb.'s hopes; to hope for the best; to transmit smth. by radio; to clarify one's meaning; to serve a lesson to smb.

**EXERCISES**

I. State the part of speech of the following words pointing out the word-building elements. Give their Russian equivalents.

To compress — compressive — compressible — compressibility; hope — hopeful — hopeless; abrupt — abruptly — abruptness; to clarify — clarity — clarification; to exhibit — exhibition — exhibitive; former — formerly; to convert — convertible — convertibility; to serve — service.

II. Arrange the words given in a) and b) in pairs of synonyms.

a) abrupt, to transmit, to compress, hope, hopeful, hopeless, clear, to clarify, insight, to possess, to inhibit, to exhibit, exhibition, latter, former, to convert, to serve, service;

b) to contract, faith, unexpected, desperate, promising, to transfer, transform, earlier, recent, to purify, understanding, to reveal, clean, to have, to restrain, display, to aid, duty.

III. Arrange the words given in a) and b) in pairs of antonyms.

a) latter, to compress, compressible, hope, hopeful, abrupt, to transmit, clear, to clarify, to possess, to inhibit, to exhibit;

b) former, contaminated, to expand, to hide, gradual, to encourage, incompressible, despair, to pollute, to receive, hopeless, to lose.

IV. Combine the words in bold type with those in brackets.

Translate the combinations into Russian.

- hope (good, great, strong, vague, lost, vain, last)
- service (good, bad, hard, long, normal, information, telegraph, telephone, communication, medical, diplomatic)
- to transmit (information, electric current, radiation, heat, message, power, sound, light, infection, disease)
- to propose (a scheme, a resolution, a plan, a change, a new model, a new concept, a topic for debate, new applications)
- to possess (good qualities, bad health, some property, great patience, the respect of one's friends, a foreign language)

V. Say it in English. If you are in difficulty, consult ex. 2.

1. Они только что передали это сообщение по радио. 2. Он предложил продолжить собранье на следующий день. 3. Его предложение не было принято. 4. Понимайте свою мысль. 5. Ясность слова — это ясность мысли. 6. Эта выставка меня не интересует. 7. Жаль, что я не могу помочь вам. 8. Новый прибор соответствует своему назначению. 9. План нигде не годится. 10. Телефонная связь нарушенна.

VI. Find the complex object in paragraph 6.

VII. Translate into Russian paying special attention to the complex object.

1. They consider the plan to be realizable. 2. He predicted all these molecules to have very similar properties. 3. Physicists consider regularity to be the most characteristic feature of crystalline solids. 4. One expects phonons to be strongly scattered at the boundaries, as indeed they are. 5. Since photons pass undiminished through so much nuclear space, one might naively expect them to illuminate all the nucleons in a particular nucleus. 6. When the substance is in the solid phase, the forces which exist between atoms and molecules cause them to form definite geometrical patterns; these show up as the crystalline structure. 7. According to this argument we would expect the deformation to be roughly equal to the number of nucleons in unfilled shells divided by the total number of nucleons. 8. This scientist could show the penetration depth to be essentially the same regardless of the strength of the magnetic field. 9. By 1933 scientists knew 17 pure elements and over 53 alloys and compounds to be superconducting. They also knew the electrical and magnetic properties of alloys and compounds to be quite different from those of the pure elements. 10. Until the early 1960's the superconducting elements were a minority among all metallic elements. Consequently, scientists considered superconductivity to be an anomalous property. 11. We know A. V. Shubnikov to have made the first systematic measurements of the properties of Type II superconductors. 12. We expect all the students without exception to take an examination in English at the end of the term.
Active words and word combinations

- to compress
- hope [n., v.]
- abrupt [adj.]
- alloy [n., v.]

- to propose
- to clarify
- an insight
- to possess
- to inhibit

- to exhibit
- latter [adj.]
- former [adj.]
- to convert

- to raise smb.'s hopes; to hope for the best; to transmit smth. by radio; to clarify one's meaning; to serve a lesson to smb.

EXERCISES

I. State the part of speech of the following words pointing out the word-building elements. Give their Russian equivalents.

To compress — compressive — compressible — compressibility; hope — hopeful — hopeless; abrupt — abruptly — abruptness; to clarify — clarity — clarification; to exhibit — exhibition — exhibitive; former — formerly; to convert — convertible — convertibility; to serve — service.

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a) latter, to compress, compressible, hope, hopeful, abrupt, to transmit, clear, to clarify, to possess, to inhibit, to exhibit;

b) former, contaminated, to expand, to hide, gradual, to encourage, incompressible, despairs, to pollute, to receive, hopeless, to lose.

IV. Combine the words in bold type with those in brackets. Translate the combinations into Russian.

- hope (good, great, strong, vague, lost, vain, last)
- service (good, bad, hard, long, normal, information, telegraph, telephone, communication, medical, diplomatic)
- to transmit (information, electric current, radiation, heat, message, power, sound, light, infection, disease)
- to propose (a scheme, a resolution, a plan, a change, a new model, a new concept, a topic for debate, new applications)
- to possess (good qualities, bad health, some property, great patience, the respect of one's friends, a foreign language)

- to exhibit (magnetism, some properties, ingenuity, pictures)
- to convert (water into steam, electric energy into thermal motion, heat into mechanical work, ideas into deeds)
- hopeful (sign, prospect, pupil, student, future, prognosis)
- hopeless (cause, case, struggle, task, illness, situation)
- abrupt (change, action, decision, curve, turn, discharge, interval, manner, departure, disappearance)
- clear (day, sky, water, statement, conclusion, idea, head, intellect, style, thought, reflection, photograph, voice, meaning)
- former (times, days, life, president, members of the club)

V. Say it in English. If you are in difficulty, consult ex. 2.

1. Они только что передали это сообщение по радио. 2. Он предложил продолжить сборение на следующий день. 3. Его предложение не было принято. 4. Понялите свою мысль. 5. Ясность слога — это ясность мысли. 6. Эта выставка меня не интересует. 7. Жаль, что я не могу помочь вам. 8. Новый прибор соответствует своему назначению. 9. План никогда не годится. 10. Телефонная связь нарушена.

VI. Find the complex object in paragraph 6.

VII. Translate into Russian paying special attention to the complex object.

1. They consider the plan to be realizable. 2. He predicted all these molecules to have very similar properties. 3. Physicists consider regularity to be the most characteristic feature of crystalline solids. 4. One expects phonons to be strongly scattered at the boundaries, as indeed they are. 5. Since photons pass undiminished through so much nuclear space, one might naively expect them to illuminate all the nucleons in a particular nucleus. 6. When the substance is in the solid phase, the forces which exist between atoms and molecules cause them to form definite geometrical patterns; these show up as the crystalline structure. 7. According to this argument, we would expect the deformation to be roughly equal to the number of nucleons in unfilled shells divided by the total number of nucleons. 8. This scientist could show the penetration depth to be essentially the same regardless of the strength of the magnetic field. 9. By 1933 scientists knew 17 pure elements and over 53 alloys and compounds to be superconducting. They also knew the electrical and magnetic properties of alloys and compounds to be quite different from those of the pure elements. 10. Until the early 1960's the superconducting elements were a minority among all metallic elements. Consequently, scientists considered superconductivity to be an anomalous property. 11. We know A. V. Shubnikov to have made the first systematic measurements of the properties of Type II superconductors. 12. We expect all the students without exception to take an examination in English at the end of the term.
VIII. Translate into English using the active vocabulary.

1. При температурах ниже определенной (свойственной данному металлу) критической температуры некоторые металлы в силах перейти в так называемое сверхпроводящее состояние. 2. Сверхпроводящее состояние вещества характеризуется двумя основными свойствами. Одно из них --- резкое исчезновение электрического сопротивления в некоторых металлах при температурах, близких к абсолютному нулю, было открыто голландским физиком К. Оннесом в 1911 году. 3. С другой стороны, в действительности кристалл металла в обычном проводящем состоянии всегда проявляет электрическое сопротивление. 4. Физик не могли дать удовлетворительного объяснения поведению электронов в сверхпроводящем состоянии до 1957 года, когда Джон Бардин и другие ученые выдвинули первую (суб)микроскопическую теорию проводимости. 5. Сейчас мы располагаем огромным количеством данных о системах силов. 6. Ученые надеются получить исчерпывающую информацию, которая в дальнейшем позволит создать высокотемпературные проводники, остающиеся сверхпроводящими при температурах порядка 100°К, а еще лучше — и при комнатной температуре. 7. Необходимо установить, насколько свойства жидкостей, такие как вязкость и сжимаемость, могут быть связаны со взаимодействием между отдельными молекулами. 8. Атомы жидкостей не двигаются независимо от своих соседей; их движения сопровождаются сильными межатомными силами и любое движение каждого атома оказывается соседними атомами. 9. Чтобы внести ясность в этот вопрос, давайте попробуем изучить этот макроскопический квантовый эффект при помощи нового метода. 10. Новый прибор уже доказал свои огромные возможности в экспериментах, осуществить которые при очень низких температурах прежде не удавалось.

IX. Translate the text at sight.

The first investigators to employ this idea in low-temperature studies were B. G. Lazarev and L. S. Kan of the Ukrainian Physico-Technical Institute. In 1944 they built a pressure-producing apparatus based on the fact that water increases in volume on freezing. With this device, called the "ice bomb" apparatus, they were able to produce pressures of about two kilobars in a chamber of constant volume at liquid-helium temperatures. In 1955 N. E. Alekseevski and Y. P. Gaydukov applied the ice bomb method to investigate the superconducting properties of cadmium under a pressure of about 1.6 kilobars at ultralow temperatures. By the end of the 1950's a number of investigators in various countries were using prepressurizing devices to explore the superconductivity of certain metals under pressures as high as 10 kilobars at liquid-helium temperatures and 1.6 kilobars at temperatures below one degree K.

We began our own studies at that time, with a resolve to obtain higher effective pressures and investigate superconductors over a wide range of temperatures. We set out to find a method of compression that would generate very high and homogeneous pressures and would operate automatically without the use of an external compressor.

X. Give extensive answers to the following questions.

1. What experiments may lead to the creation of new, higher-temperature superconductors? 2. In what range of temperatures is superconductivity observed? 3. An alloy of niobium with aluminum and germanium becomes a superconductor at about 21 degrees K., doesn't it? Is it still the record-holder? 4. Is there any hope to synthesize alloys with a somewhat higher critical temperature? 5. When was the first submicroscopic theory of superconductivity proposed? Who proposed it? 6. What is a transition metal? What is interesting about the transition metals? 7. What questions have the authors of the article been trying to answer for several years? 8. What are the ways of obtaining uniform application of pressure? 9. Why were studies of superconductors placed under very high pressure at ultralow temperatures out of the question? 10. What was the basis of the new approach?

XI. Develop further the following statements.

1. The discovery of superconductivity gave birth to hopes that... 2. Although a great number of materials have been tried, superconductivity is still observed only... 3. Twenty-four elements in the periodic table have been found to be superconducting, but... 4. The first submicroscopic theory of superconductivity has led to models that... 5. Comparing experimental results with theory also promises to...

XII. Discuss the following statements.

1. Another line of investigation has now been opened by recent results achieved with the application of high pressure. 2. In some cases the relevant data under high pressure are easier to obtain in the superconducting state than they are in the normal state of the metal. 3. The problem of conducting useful experiments at high pressure and low temperature turned out to be exceedingly difficult. 4. It took forty years and new ideas to develop an effective technique for the extensive investigation of superconductivity under high pressure.

XIII. Render the text in English.

Сверхпроводящие кристаллы

Явление сверхпроводимости было открыто голландским физиком К. Оннесом в 1911 году. Однако, подобная жидкость, была обнаружена при 4,2 кельвина (то есть на 4,2 градуса выше абсолютного нуля — 273,16 градуса Цельсия) ртутью, сжатой в ячееке, при электрическом сопротивлении. Было бы край-
speculate v.: It's interesting to speculate (to think) about future developments in this field of physics. The earliest recorded speculations on the nature of matter are those of the Greek philosophers.

vanish v.: For an ordinary particle with nonzero rest mass the total energy can never vanish. Under this condition scattering processes are rare and the electrical resistance of a superconductor vanishes.

cancel v.: He cancelled his order for the goods (= said that he no longer wanted the goods he had ordered). Most of the large positive charge of a neighbouring nucleus is cancelled by the negative charge of the electrons in orbit around it.

repulse v.: He offered to help, but was repulsed. Although the nuclear force acts between nucleons, whether they are protons or neutrons, it must overcome the disruptive influence of the electrical repulsion between the positive charges of the protons in the nucleus.

pursue v.: The USSR steadfastly pursues a Leninist policy of peace and stands for strengthening of the security of nations and broad international cooperation. Our state pursues a steady policy of raising people's pay levels and real incomes through increase in productivity.

decline v.: The critical temperature for a particular element may decline under pressure and then be suddenly raised. The sun was declining. Her strength slowly declined. His courage began to decline.

obvious adj.: His theory may seem of little value because there was no obvious way to test it. It is now obvious that we have to start a second approach from widely different starting points.

survive v.: The four-element theory of Empedocles survived in one form or another for about 2,000 years. I never thought I could survive it. The fact survived in my memory. The custom still survives.

evidence n.: Is there any evidence that matter of such density exists? The hypothesis was abandoned because of the complete lack of evidence. Have you any evidence for this statement? It must be evident to everybody that he was right.

undergo v.: When a system is subjected to external forces, it generally undergoes a change in size or shape or both. The concept of heat has undergone several changes during the development of physics.

retain v.: Molecule is the smallest particle of a substance which retains its chemical properties. Though the model was replaced by more precise theories, some descriptive terms were retained.

treat v.: They treated his words as a joke. Please treat this information as strictly private. He treated the subject thoroughly. This essay treats of the progress of medical research. This machine does not allow of rough treatment.

presume v.: The proton and the electron are presumed to be