

# THE SCIENCE NEWS-LETTER

A Weekly Summary of Current Science

EDITED BY WATSON DAVIS

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## AMERICAN GEOLOGIST TO HUNT CHILEAN EARTHQUAKE

With the avowed purpose of capturing and embalming the recent Chilean earthquake, Dr. Bailey Willis, professor of geology at Stanford University, sailed for South America on January 11 as the representative of the Carnegie Institution of Washington.

For four or more months, Dr. Willis plans to search for and study the great slipping of the earth that has left its mark on the landscape and rocks of Chile. Traveling in the old fashioned way on horseback and with pack mules in a country with few roads and inhabitants, Dr. Willis will work under conditions similar to those that existed in the American Far West before the Ford became omnipresent. It will be necessary to survey along a stretch of coast extending about 1,000 miles north of Valparaiso, he believes, although the details of cooperation with Chilean scientists have not yet been fully worked out. For four years, Dr. Willis has been consulting geologist to the Argentine government and he is acquainted with South American conditions.

The similarity between the earthquake conditions in Chile and California is one of the reasons for American interest in the earth movements along the Pacific coast of South America. Since the California earthquake of 1906, scientists have been studying the causes of that disaster and other quakes in that region. The investigations of Dr. Willis in Chile are expected to throw light on California conditions, and the work done in America will aid him in interpreting Chilean conditions.

Chile possesses a seismological bureau at the head of which is Dr. Montessus de Ballore, one of the most eminent earthquake specialists in the world. The Chilean scientists will cooperate with Dr. Willis in his investigations. Senor Don Baltram Mathieu, the ambassador from Chile, is greatly interested in this cooperation between the geologists of America and Chile.

### EARTHQUAKES

By Dr. Bailey Willis, professor of geology, Stanford University,  
who will study the recent Chilean earthquake.

Earthquakes are a natural occurrence in certain regions of the world where the mountains are alive. There are districts, like the Atlantic Coast, where they are dead, but around the Pacific and in a great belt which reaches across Asia and the Mediterranean the mountains are growing. In their growth large masses comprising many thousand cubic miles of rock are pressed against each other but are held by friction until the strain becomes too great. They then slip and an earthquake oc-

cure.

This is the modern theory of earthquakes. It was developed through the studies of the great earthquake of 1906 which caused the fire that destroyed San Francisco, and it has been demonstrated since by observation of many minor earthquakes and by a study of the lines along which they occur.

We often speak of an earthquake plane as a fracture, but it is not really a break. It is the surface between two great masses which never have been united, but which for ages have been slipping past each other; and where this plane comes out to the surface of the earth we have a line which is sometimes called an earthquake rift. The greatest of these rifts, so far as it is known, in the United States extends through the Coast Ranges of California for a distance of six hundred miles. It passes just west of San Francisco, to the east of Los Angeles, and disappears in the Gulf of California. Along the San Andreas rift, as it is called, earthquakes have occurred at different times in different sections, the most recent was the quake of 1906, which covered a stretch of 150 miles with San Francisco near the center. South of that stretch for some 300 miles there has been no movement since 1857 when there was a severe shock, the mark of which may be traced across the desert plains like an irrigation ditch. Still further south there have been several recent shocks, but none of great violence, although there is evidence of considerable activity in the section east and south of Los Angeles.

In view of the fact that we can thus locate certain lines along which earthquakes have occurred, we are able to speak of live earthquake rifts as we speak of live volcanoes. We know by the form of the volcano or by the occurrence of eruptions within historical time that it is potentially or actually active, and much the same may be said of earthquake rifts. They are lines of special danger on which no dam or schoolhouse or skyscraper should be located. They should also be avoided, as far as possible, by railroad lines, bridges, aqueducts, and other public works, and yet it happens that they often run through valleys where such work is suggested by the conditions of the ground. As long as we remain ignorant of their position, we run the risk of inviting destruction, but it is not difficult by proper studies to locate the lines of danger on a map and to make the information public for the benefit of engineers and others.

Thus it happens that a map of California, showing the lines of active earthquake rifts and also of faults that are believed to be inactive, is about to be published by the Seismological Society of America as a result of work carried out in cooperation with the Advisory Committee in Seismology of the Carnegie Institution of Washington. It is, however, but one item in the program of that Committee, which embraces plans for the investigations of earthquakes in many relations.

It may perhaps be asked of what use is it to study a phenomenon which is as sure and as inevitable as an eclipse of the sun. Since we can not stop it and probably can not predict it with certainty, what practical benefit can we hope to derive from an investigation of it? There is, of course, the answer that we wish to know; we wish to understand our earth and all its manifestations; but apart from that, as has already been pointed out, the lines along which earthquakes are likely to occur and are most dangerous may be determined and it seems not impossible that if we can perfect our knowledge we may be able to devise methods of forestalling their disastrous effects by the selection of safer locations or by appropriate methods of construction. It is clearly recognized, for instance, that the destruction of San Francisco was in large measure due to the fact that its principal aqueduct followed the earthquake rift for many miles, whereas now it has been located along a mountain range which, if it moves, will move as a block and will not dislocate the pipe line.

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## FISH YIELDS EXTRACT TO COMBAT DIABETES

A compound has been produced from certain cells of the skate and tissues of some clams and found to reduce the symptoms of diabetes, the department of physiology of the University of Toronto has revealed.

Although the identity and composition of the substance is still unknown, it is similar in properties to insulin, which was prepared from the pancreas of animals and which has been found by experiments on men and animals to be a specific in the treatment of sugar diabetes.

Another step forward toward the every day use of the new diabetes treatment has been taken through the practical achievement of the removal of extraneous and poisonous compounds from insulin. Steps are being taken to standardize the preparation and purification of the extract and to devise better methods of production in quantity according to the methods devised by Dr. J. B. Collip of the University of Alberta.

At the recent meeting of the Federation of American Societies for Experimental Biology, Dr. F. G. Banting, discoverer of insulin and one of those now investigating its application to clinical medicine, received an ovation. Many phases of the work being done by Dr. J. J. R. MacLeod, Dr. C. H. Best, Drs. Banting and Collip, impressed the scientists.

Those working with insulin or iletin, as it is also called, declare that the past year of work is only a beginning in the treatment of human beings.

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READING REFERENCE - Allen, Frederick M. and others. Total dietary regulation in the treatment of diabetes. N.Y. Rockefeller Institute, 1919. Horowitz, Philip. Diabetes, a handbook for physicians and their patients. N.Y. P. B. Hoeber, 1920.

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## SCIENTISTS EXPRESS VIEWS ON PUBLIC QUESTIONS

What 11,000 scientists think about various questions was expressed in resolutions adopted by the Council of the American Association for the Advancement of Science, it was learned at its headquarters in Washington.

Combating the attempts made in several states to prohibit in tax-supported institutions the teaching of man's evolution, the Council declared that they were united in believing "that the theory of evolution is one of the most potent of the great influences for good that have thus far entered into human experience." They said further that "there is no ground whatever for the assertion that evidences of evolution constitute a 'mere guess'." On the contrary, "no scientific generalization is more strongly supported by thoroughly tested evidence."

Steps toward the conservation of marine mammals and further study of their life histories was recommended to both the American and Canadian governments and the Association went on record as favoring complete conservation of certain areas that contain peculiarly interesting plants and animals or natural features of educational importance.

All scientific men should use the metric system of weights and measures in all

their publications, either exclusively or else with the customary non-metric units in parentheses, the Association resolved.

It recommended that American men of science cooperate in all possible ways with Austrian men of science in restoring the University of Vienna to its former high rank and in promoting their scientific work.

The Association went on record as opposing provisions of the copyright bill now in Congress that would allow American publishing houses to control the importation and price of foreign books.

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#### REDUCING RUBBER TO THE ORIGINAL MILK

The old problem of how to restore coagulated rubber to the fluid form as drawn from the tree is announced to have been satisfactorily solved by William Beach Pratt. The fresh milk or latex obtained by tapping the trunk goes over easily into a gummy mass by heating, shaking or the addition of acid and it has been supposed to be as difficult to decoagulate rubber as it is to "deboil" an egg. The coagulated rubber could be worked up with water in the form of dispersed and suspended particles, but this was not so good as the original latex, especially for impregnating paper according to the process recently invented by Frederick Kaye.

The decoagulated rubber produced by the Pratt process is said to be capable of storage for months unchanged. Possibly this may permit the shipping of the juice directly from the plantation to the factory where it can be coagulated and vulcanized as desired. No details of the process are revealed in the "India Rubber World" which prints the preliminary announcement in the January issue just out.

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READING REFERENCE- Geer, William C. The reign of rubber. N.Y. The Century Co., 1922. Simmons, H. E. Rubber manufacture; the cultivation, chemistry, testing and manufacture of rubber, with sections on reclamation of rubber. N.Y. D. Van Nostrand Co., 1921.

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#### NUMBERS WILL SIMPLIFY BUYING OF STEELS

"Send me steel no. 50", will be the way in which manufacturers will order the particular kind of metal that they need if plans inaugurated by the American Engineering Standards Committee cooperating with other engineering organizations and steel producers and users are carried out. Much confusion due to the necessity of long and detailed specifications is experienced now and the number and standardization of common specifications will save much waste and time, it is declared. The Navy Department has a million pounds of unidentified steel which must all be analyzed and tested before use. A number system in general use would have prevented this situation. Switzerland, Germany, and other European countries have taken steps toward numbering systems for steel.

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Refuse piles of waste coal are being reclaimed in the State of Washington as a result of field and laboratory studies of coal washing methods.

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## NEWS OF THE STARS

## Astronomical Events in 1923

By Isabel M. Lewis,  
of U. S. Naval Observatory.

Two astronomical events of exceptional interest that will take place in 1923 are the occultation of the planet Venus by the moon on January 13 and a total eclipse of the sun visible in California and Mexico on September 10.

There will be in all four eclipses in 1923, two of the sun and two of the moon. A small partial eclipse of the moon will take place on March 2 which will be visible in Europe, Africa, the Atlantic Ocean, South America and North America, except in the extreme northwestern part. At greatest eclipse thirty-eight per cent of the moon's diameter will be covered by the earth's shadow.

On March 17 there will be an annular eclipse of the sun visible in the extreme southern part of South America, the South Atlantic Ocean and South Africa. The path of the annulus will cross Patagonia, the Falkland Islands, South Africa and Madagascar and the maximum duration of the annular phase of the eclipse on the central line will be nearly eight minutes. The partial phase will be visible over all of the southern part of South America, the South Atlantic Ocean and Africa.

Another small partial eclipse of the moon will occur on August 26, visible in the Pacific Ocean, Australia, western South America and in all of North America except the extreme northeastern part. At greatest eclipse only seventeen per cent of the moon's diameter will be covered.

The total eclipse of the sun that will occur on September 10 will be visible in its partial phase over all of North America, Central America and the northwestern part of South America. The path of total eclipse starts a little to the south of Kamchatka at sunrise, crosses the Pacific to San Clemente Island off the coast of California, touches California in the vicinity of San Diego and the Mexican border, passes over Mexico and Yucatan and leaves the earth at sunset a little to the south of the West Indies. The circumstances should be particularly favorable for the observation of this eclipse both in Mexico, where the path will pass over many excellent points at high altitudes, and in southern California, where astronomers on the Pacific coast are now planning to observe it.

The planet Venus, which will present an interesting and beautiful spectacle on the morning of January 13, when it will be occulted by the moon in the crescent phase, will be a resplendent object in the eastern sky before sunrise for some time to come. It will reach its greatest distance west of the sun on February 4, when it will rise about three hours before sunrise. After that date its angular distance from the sun will decrease but it will continue to be visible in the east before sunrise until shortly before it comes into conjunction with the sun on September 10. From that time on to the end of the year it will be in the western sky after sunset.

Jupiter is now near the meridian at sunrise and Saturn is some distance to the west of Jupiter in Virgo. Saturn will remain in the constellation Virgo throughout the year and Jupiter will be in Libra until December when it will pass into Scorpio. Both planets will be seen at their best in the spring when they come into

opposition with the sun and will then be visible all night. Saturn will be in opposition on April 7 and Jupiter on May 5. They will be visible after sunset throughout the summer and into the fall until within a few weeks of their conjunction with the sun which occurs for Saturn on October 17 and for Jupiter on November 22. Several weeks after conjunction with the sun they will be seen in the east just before sunrise.

Mars will not be seen to advantage in 1923. It is now receding from the earth and is on the far side of its orbit. It will come into conjunction with the sun on August 8. It may be seen low in the western sky during the winter and spring, but will be too close to the sun to be seen in the summer and early fall. By November it will be visible in the east before sunrise.

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READING REFERENCE- Hale, George E. New Heavens; N.Y. Scribner, 1922.  
Mallik, D. N. Elements of astronomy. N.Y. Macmillan, 1922.

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(A Chat on Science)

Electricity From Sputter Work

By Edwin E. Slosson.

Power, more power is the cry of the age. With a coal shortage upon us in mid-winter and with a permanent petroleum famine impending, the eyes of the thoughtful are turned toward the development of new sources of heat and mechanical energy. There are two sources known that would satisfy all our wants if we could make efficient use of them. One is the heat of the sun and the other is the internal energy of the atom. The sun's heat we do use indirectly by the combustion of wood and coal. But the plant is a shockingly inefficient solar engine. No up-to-date factory would use such a wasteful machine, although we should not complain of it so long as we cannot beat it. But some day we may be able to transform heat directly to electric current without going through the roundabout way of growing plant and steam engine and dynamo.

A new way of generating electricity directly from heat was pointed out by Dr. R. M. Holmes of Cornell before the American Association for the Advancement of Science at the Boston meeting, Christmas week. His apparatus might be called "the sputter transformer" since it uses a film made by what physicists call "sputtering", that is, the driving off of extremely minute particles of a metal by electricity in a gas of low pressure and catching them on a glass plate. A film so made contains some atoms of gas entangled in the metal. Anyhow it acts like a different metal. Now it has long been known that when two wires of different metals are soldered together in a ring and one junction heated while the other is cooled an electric current will start up and flow around the circuit. When the two wires are of the same metal no current is produced. Now Dr. Holmes finds that his sputtered film, when connected up with an ordinary piece of the same metal will produce a current when the two junctions are heated unequally. To see if the absorbed gas was the cause of the difference in the sputtered metal he tried the metal palladium which has the remarkable ability of absorbing a thousand times its own volume of hydrogen gas. The gas-filled palladium connected up with the ordinary gas-free palladium was found to work in the same way, that is, a current passed from the

former to the latter at the cold junction.

Where did the current come from? According to modern theory an electrical current is a stream of loose electrons, that is, of atoms of negative electricity. All metals are supposed to contain such electrons wandering about freely like the particles of air in a room. But different metals have different numbers of them in the same size piece of metal and when a metal densely filled with them is brought into contact with a metal wherein they are comparatively scarce, they pass over into the emptier room. If this junction is kept cold and the other junction is heated the current is continuous. Dr. Holmes suggests that in his gas-filled metals the gas molecules may have crowded the electrons into smaller space and so increased their pressure, or else that the extra electrons may come from the hydrogen atoms.

To avoid raising false hopes Dr. Holmes adds that "there seems to be no possibility of applying the method for the generation of electricity upon a commercial basis because of the smallness of the effects produced and because of certain losses which seem inevitable with any arrangement for this direct transformation of heat into electrical energy." So if the reader is approached by an agent with an agate-bearing tongue to take stock in a sputter engine he should investigate before investing. Still it is interesting to know of a new way of solving this vital problem, even if it does not seem of practical value. Here is a most enticing field of research for it offers both fame and fortune. An efficient transformer of the radiant energy of the sun into mechanical work would put a power plant in any vacant lot and make a desert as valuable as a coal field.

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READING REFERENCE- Willoughby, George A. Practical electricity for beginners. Peoria Ill. Manual Arts Press, 1921. Fleming, John A. Fifty years of electricity. N.Y. Wireless press, 1921.

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#### INDIAN PAPOOSES HAD TOYS, TOO

Toys of the American Indian tribes never before exhibited have just been placed on exhibition in the division of ethnology of the U. S. National Museum here. These playthings of the papooses from Alaska to Mexico reveal that the red-men were efficient toy-makers and that their children found delight in the same imitation of their elders taken consideration by the manufacturers of our modern Christmas amusement devices.

While little Indian girls, the exhibit shows, could not hug the talking, walking, and sleeping dolls of our mechanical age, they did have plenty of dolls, with miniature teepees instead of doll houses, and little cradles to carry on their backs like the ones their mother carried them in when they were babies. Among these dolls is one of the tiny Eskimo which is a real stuffed wild duck for baby to play with.

Animal dolls were evidently very popular among the Indians. An ingenious beaver with a tail of leather marked in imitation of the big flat tail of the real beaver was made by an Appapaho papa for his papoose. Cute little woolly buffaloes made out of different colored beads are shown. Miniature elk and targets cut in the shape of buffaloes for little Indian boys to shoot at are also shown.

There are horse dolls and one doll is a tiny horse believed to have been made

from the skin of an unborn colt on account of the lack of seams in the delicate hairy coat covering the little wooden image. These presents were sometimes exchanged when the families went visiting. The exhibit included material from Appapahos, Shoshones, Hopi, Utes, Apaches, Choyennes, and other Indians.

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READING REFERENCE: Grinnell, George Bird. When buffalo ran. New Haven, Yale University press, 1920. Eastman, Charles Alexander. Indian child life. Boston, Little, Brown & Co., 1913.

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#### PLAN TWO-WAY AMATEUR INTERNATIONAL RADIOGRAMS

American amateur trans-Atlantic radio tests recently completed were so successful that within a few days specially selected stations will attempt to hold a two-way conversation in dots and dashes between America and England.

The first attempt at back and forth communication will be made in a few days, officials of the American Radio Relay League announced.

Out of the 318 amateurs who competed in this year's trans-Atlantics, only two failed. Amateur officials are highly elated over this result as last year only thirty-three stations forced their signals across the ocean. Many complete messages were sent across the ocean from America to England, and one amateur in Marion, Mass. succeeded in getting fourteen across. A British amateur station succeeded in extending "Christmas greetings to all American amateurs" and this showing makes the accomplishment of two-way communication probable, the officials said.

The best transmitting stations on both sides of the Atlantic will be assisted by the best receiving stations and they will team together to accomplish the communication.

During the tests last month American stations were heard in Japan as well as in many countries of Europe. One west coast amateur succeeded in making his signals span both the American continent and the Atlantic. English amateurs succeeded in hearing a regular radio concert broadcasted from the New York station of the Western Electric Company. Such success marks the beginning of a new era of international amateur communication, radio amateurs believe.

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#### INSECT LOCKS FOOD BEHIND SILK DOORS

A provident caterpillar which sews-up its food supply in a silk sheet was described to the Entomological Society of America meeting at Boston by Dr. Annette F. Braun of Cincinnati. It feeds on the seeds of the great chicken-weed by reaching into the seed capsule from a small silken case which it attaches to the outside of the capsule. When the seed capsule bursts open, the caterpillar spins a silk sheet across the opening to keep the seeds inside and so assures a food supply. The caterpillar which displays this remarkable adaptation is of a very small moth scientifically called by the pet name of *Coleophora coenesipennella*.

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## PRODUCE WORLD'S SHORTEST ELECTRIC WAVES

Electric or radio waves only one-fiftieth inch in length, identical to the longest of heat waves, have been produced at the Nela Research Laboratories, Cleveland, by the aid of instruments more sensitive than heretofore available, Drs. E.F. Nichols and J. D. Tear told the American Physical Society meeting in Boston recently.

The achievement marks the joining of the electric wave and heat wave spectra. In this latest proof of the identical character of light, heat and electric waves, these physicists were successful in using two different types of electric wave receivers to detect and remeasure the long heat waves, about one-third of a millimeter, that were obtained by Rubens and Von Baeyer in 1911 from a quartz mercury arc.

Drs. Nichols and Tear have produced the shortest radio waves in the world. Ordinary radio transmission is by electric waves from 200 meters, about 300 feet, to 15,000 meters, about ten miles, in length, as compared with half a millimeter or one fiftieth of an inch for their very short waves.

## URGES AMERICAN TOWNS TO RAISE OWN TIMBER

"The United States needs town forests," declared Prof. Ralph S. Hosmer, of Cornell University, in an address to the New England Forestry Congress in session at Boston recently.

After describing European community forestry, noting the differences here and abroad, and stating the necessity of America developing its own methods, he said:

"Our supply of standing timber is rapidly diminishing. Already Pacific Coast species are setting the price in eastern lumber markets. The consumer is the one who pays for the long haul across the continent, or the voyage through the Panama Canal. The need of wood of all kinds for every sort of purpose is steadily increasing. Local supplies are imperatively demanded. It cannot be long before a shortage will be upon us in good earnest.

"We can only prevent a timber famine in years to come," he warned, "by the concerted and combined action of both public and private agencies, working to put large areas of the non-agricultural land of this country at work growing productive forests. It takes time to grow forests of economic value. We cannot start too soon."

Prof. Hosmer emphasized that in such a program the town forest has a unique part. No other class of public forest comes so close to the people. The appeal of the town forest is positive and direct. Every citizen can justly feel that he is a part owner. Helping to establish a town forest offers a tangible outlet for the desire to do something to relieve the national timber situation.

From ten to twenty per cent. of the value of the annual apple crop of the United States is destroyed by the ravages of insects.

The Siamese Government is soon to purchase nine new aeroplanes for use in its postal service.

One out of every 12,000 persons in the United States is murdered annually.

## TABLOID BOOK REVIEW

THE GOLDEN BOUGH by Sir J. G. Frazer. Macmillan. (One volume edition.)

Although appearing as but a new, condensed edition of a work already familiar to students of folklore, this book will be new to many. Its appeal is as wide as the human race. The immense volume of legend compressed within this scholarly work runs back to the very childhood of mankind, before priests sacrificed in their temples, before the gods began their individual careers, before men had formulated ideas of right and wrong. Starting with the most primitive magic, there unfolds in its pages the development of man's perception of the forces of nature which mold his life. From the simple animism which endowed every object with feelings like his own, man came gradually to the conception of spirits of the trees and the grain, and not until long afterward to the idea of gods and goddesses with distinct personalities and complicated histories.

While the book is not a study of comparative religion, but only of the origin and meaning of certain religious practices, the reader sees, through its limpid exposition, the confusion of ancient mythologies in their true order as various cults worshipping the ancient, world-wide deities of the earth, the sky, and the life-sustaining grain under different guises, and with rites that varied from the plaintive sentiment of the Adonis worship to the crude indecencies of the rites to bloody Attis.

Since science is a study of the things around us, it began in mythology and magic. After all, the workings of the primitive human mind as revealed in past customs are not so different from the methods of present thought and for this reason the Golden Bough will interest those interested in science.

## BLAMES GLANDS FOR SHAPES WHICH WORRY OWNERS

Why some families are fleshy and others slender was explained to the American Anthropological Society in session at Boston by Dr. C. B. Davenport, director of the Department of Genetics of the Carnegie Institution of Washington. Secretions of the ductless glands, he said, were responsible in many cases for bodily build. It is not the build, but the peculiarity in the functioning of these glands which is inherited. There are usually two and probably more factors involved in the inheritance of the tendency toward obesity.

The Ayu fish of Japan feasts on invisible food; as the organisms which form its favorite diet are too small to be seen by the naked eye.

In Haiti the wholesale and retail prices of kerosene are generally the same, and dealers make their profit from the sale of the empty cans.

The per capita consumption of meat in the United States has been increasing since 1915, with the exception of 1917, and it is estimated that the 1922 consumption will slightly exceed 150 pounds per person.

The new Poland is more than half as large as Texas and its population is about a fourth as large as that of the United States.