

# SCIENCE NEWS - LETTER

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DWIN E. SLOSSON, EDITOR    HOWARD WHEELER, MANAGER  
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## FOOD DETERMINES SEX BEFORE BIRTH

Lincoln, Neb.                      Predetermination and regulation of sex before birth has been accomplished. Although sex determination has not yet been attained in the human species or the higher animals, Prof. David D. Whitney of the University of Nebraska has been able to make a female rotifer, a tiny water animal, produce all males or females by simply varying her food. By isolating the female, Dr. Whitney has also found that reproduction could be carried on for 546 generations or approximately three years without the assistance of the male rotifer.

His experiments show that when the female rotifer is fed upon a colorless animal food called polytoma all females are produced in the two following generations. But if the green scum known as chlamydomonas is used for food, the second generation is all females, but the third generation will run as high as 95 percent males.

Under natural conditions there are many more females produced than males and the female has the greater part of the reproduction to carry on. The male is a small creature having no digestive organs at all and can sustain life only for a day or two during which time he is very active. The female is quite large in comparison, about one-third the size of a pin head with many small silken-like filaments about her head which she uses to propel herself through the water. At any time she may attach herself to some stationary object and become apparently lifeless. The pond may dry up or freeze over but this does not kill her; when conditions are again favorable she continues her activity. Her body is like transparent jelly. The digestive processes carried on there may be watched carefully under a high powered microscope. At times eggs develop within her body; later they are deposited in the water and hatch, producing the young rotifers.

It is definitely known that in the reproduction of swine there are 112 males produced to every 100 of the opposite sex, and in poultry 94 males to every 100 females. This goes to prove the existence of some influencing factor and this Dr. Whitney has succeeded in solving for the rotifer. Scientists believe that to solve this problem for higher animals, it first must be worked out for the lower forms, and with this in view Dr. Whitney began his work with the rotifer when a graduate student at Columbia.

Dr. Whitney's next step will be to analyse the rotifer's foods to determine what mysterious substance contained in them is the cause of sex differences. Whether he will then apply his researches to higher animals, Dr. Whitney refuses to prophesy. He declares his researches are purely scientific.

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SINGLE-CELLED PARASITE IN BONE  
CAUSES JOINT RHEUMATISM

Berkeley, Calif. . . . - A type of rheumatism of the joints or arthritis deformans, recently distinguished by Dr. C. L. Ely of Stanford University as one in which no bacterial infection could be found by him, is due to minute amoebae, single celled animals, in the bone marrow according to the discoveries of Professor Charles A. Kofoid and Dr. Olive Swezy of the University of California.

These amoebae are found as parasites in the human bowel where they cause ulcers and from there they get into the blood and lodge in the bone marrow. Local destruction of the bone marrow and abnormal enlargement of the bone at the joints follow. The one-cell parasites resemble white blood corpuscles of man in size and appearance, but have been distinguished by these investigators from these human cells by the number of chromosomes in the nucleus when the amoebae divide. By long-continued search with the highest powered microscopes these investigators have found the amoebae in the bone marrow of an excised head of a human femur or thigh-bone from a case of arthritis deformans, and have confirmed their discovery by finding both amoebae and human cells dividing. They have counted the chromosomes in both the amoebae and the human cells. The amoebae have six chromosomes and the human leucocytes about forty-eight.

A second mysterious malady of man, always fatal, but fortunately relatively rare, known as Hodgkin's disease, attacks the lymphatic glands. This disease has been studied by Professor Kofoid, Dr. L. M. Boyers and Dr. Swezy. In persons suffering from this disease these same amoebae have been found both in the intestine and in the enlarging lymphatic glands in which the disease was spreading. Amoebae from the intestinal ulcers get into the lymph and are filtered out by the lymphatic glands and are often found dead in the glands which enlarge abnormally. Parasitic amoebae in these diseased glands have been found dividing and their chromosomes and those in dividing human cells in the same glands have been counted as in the case of the amoebae of the bone marrow. Many cases of infection by amoebae in the bowel have been found during and since the war in England and in France and also in



our own soldiers returning from overseas. This infection is also frequently found in persons who have travelled in the tropics and is to some extent endemic in the United States. Only a small number of cases of amoebic infection of the bowel are followed by arthritis deformans and a still smaller number by Hodgkin's disease.

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SCIENCE OF GROWING THINGS

Agricultural News of the Week

HENS EGG-LAYING  
 ABILITY INHERITED

Corvallis, Ore. . . . - That the champion egg-laying hen inherits her superior fecundity is conclusively proved by the annual trap-nest records of the selected fowls of the Oregon Agricultural College Experiment Station covering a period of twelve years, claims James Dryden, of the Department of Poultry Husbandry, here.

"A sure way to increase egg production is by selective breeding based on annual trap-nest records," says Mr. Dryden. "Breed the best to the best; mate high record hens to males from high record hens to produce high record progeny. Of twenty hens with a record of over 1000 eggs each, the ancestry of all can be traced to 1000 egg hens.

The best results can be obtained by not only breeding the best layers to males of the best layers, but by breeding the best breeders to the best breeders judging from the egg records of their progeny. While the annual records are certain criteria, the best two months production is a fairly accurate basis on which to select hens of best laying capacity, and may prove more valuable in selecting breeders; as a large number of eggs over a short period indicates inherited ability to lay while environmental factors may interfere with the necessary vigor for long continued production.

"Breeding from the highest egg producers decreases the number of poor producers but does not obviate the necessity for continued selection, as the amount of variation in the number of eggs laid by the different fowls is not decreased by the selective breeding. An accurate culling practice is to discard or market all hens who do not lay more than 35 eggs in the best two months."

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PSYCHOANALYSIS AND AIRPLANE  
CAN SCARE AWAY SPEECHLESSNESS

Washington. All the genuine cures of speech defects which have been made by sending patients on sky rides in airplanes could probably have been brought about through psycho-analysis, scientists here claim.

Dr. Charles H. McEnerney, executive officer of the United States Public Health Service and the first physician to successfully treat speech disorders by regularly prescribed airplane flights, says that the cases he has treated in this way are those which he had previously definitely diagnosed as hysteria and was practically certain that what was required was to make the patient forget himself. The object of the air trip was to scare him so as to overcome the inhibition which prevented his talking.

Dr. C. E. Seashore, head of the division of psychology of the National Research Council, says that this matter of shocking the nervous system into a normal condition is entirely possible, but that the psychologist could do the same thing on the ground by the use of hypnotism or merely through ordinary suggestion.

"No mere riding tamely along in a passenger plane on an even keel is likely to cause a person to regain his talking powers," Dr. McEnerney says. "When the patient feels himself being taken up 12,000 or 14,000 feet or more and then suddenly the machine does a nose dive or a loop-the-loop, the sufferer from hysteria is likely to forget his other troubles in the presence of danger.

"I selected the airplane for my work because it was the most convenient means at hand. The same thing might have been accomplished by tying the patient to the railroad track. The novelty, surprise, or scare are the main features of the cure. Aviators could not be helped because they would be used to the air thrills.

"There may also be some beneficial effect from the high altitude. It is generally recognized in the treatment of throat trouble that high, dry atmosphere is advantageous. The upper air is rare; germless, and pure, and aviators claim that they feel much better when they are aloft."

"When I take a patient airplaning, I accent the possibility of the rare gases of



of the upper atmosphere helping him. They may, you know."

"As far as we know definitely, however, the airplane flight makes a man talk by scaring him and it might also render a talking man speechless in the same way."

Scaring a man to speech is the doctor's application of mother's home remedy of curing hiccups by frightening her child.

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#### WILL AN AMERICAN BE ONE OF THE TWELVE?

Geneva. Eleven of the twelve members of the Committee of the League of Nations on International Cooperation in Intellectual Work have been selected and there is much speculation as to whether an American scholar will be called to the remaining vacant chair, and if so, whom. The Committee will exert an important influence on the promotion of research throughout the world and will facilitate the interchange of scientific information and the development of higher education in the countries participating.

The committee so far chosen consists of Henri Bergson, the French philosopher and author of "Creative Evolution", Madame Curie, the Polish discoverer of radium, Albert Einstein, the German mathematician who propounded the theory of relativity, and Gilbert Murray, professor of Greek at Oxford, Miss Bonnevie, professor of Zoology at Christiania, D. B. Banerjee, professor of Political Economy at Calcutta, A. De Castro, of the medical faculty of the University of Rio de Janeiro, J. Destree, former minister of science and art in the Belgian cabinet, G. De Reynold, professor of French literature at Berne University, F. Ruffini, professor of ecclesiastical law at the University of Turin, and L. De Torres Quevedo, director of the electro-medical laboratory of Madrid; representing eleven different countries but none from the United States.

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#### NON-STOP AIR EXPRESS TO DROP LOCAL PASSENGERS

Non-stop air express liners which a German-Russian combine plans to operate in the upper air lanes over the 5000 miles between Moscow and Vladivostok will be equipped with a small motorless gliding plane which will permit the landing of passengers at intermediate points not on the schedule of the big machine. The little glider will be lowered on tackle below the express hull, and released for its individual glide to its destination.

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## (A Ten Minute Chat on Science)

WANTED: A PHOTO\*PHONOGRAPH

By Dr. Edwin E. Slosson,  
Science Service.

I am not satisfied with my phonograph. It cost enough and I get a lot of fun out of it but it has its faults. It scratches like a woolen sheet. It has a nasal tone like a New England old-maid speaking French with a cold in her head. Some things it does well, as well as the original, the ringing of a bell, certain violin strings, the shrill notes of the piccolo, the clearcut tones of the xylophone and Galli-Curci. But my favorite musical instruments, the pipe-organ and the bass-drum, come out mere ghosts of themselves. A choir sounds like a quarrel. Lastly I dislike having every piece of music cut off at the end of three and a half minutes regardless of its natural length.

Now all these faults might be remedied. The scratching and other extraneous noises come from the friction of the needle which has to drag up and down a sort of scenic railway route in the hill-and-dale machines or to rub along the sides of a crooked trough in the lateral-cut machines. The heavy arm presses down the point and has to be swung around by it. The recording needle that draws a wavy line in the wax, corresponding to the sound waves, meets with greater resistance the deeper the curve it has to dig. This must distort the tones in proportion to the swing of the vibration.

To get a perfect phonograph we must have (1) a frictionless point for recording and reproducing, (2) A weightless lever to carry the tone-box, (3) non-resisting substance to take the impression, and (4) and an unlimited record.

These sound like impossible requirements. But they are not. The means of accomplishing them are already known. Light will draw a line upon a sensitive film instantaneously and without friction or resistance. A two-by-four beam of light ten feet long weighs exactly nothing. It can be swung around through space without the slightest effort or retardation.

I fancy that the phonograph of the future will record its music by a ray of light reflected from a minute mirror stuck on the back of the diaphragm of the



mouthpiece and cast upon a roll of sensitized celluloid like a motion picture film. The most economical way of using this would be to run the wavy trail back and forth across the strip; "oxen-wise", as the ancient Greeks used to call it when they wrote that way. In this way a great deal of sound could be recorded on a very short strip. Such a message could be sent by mail for slight postage and would not break the way disk records do. Duplicate records could be printed from the original negative quickly, perfectly and cheaply so the records would cost us less than they do now or the phonograph dealers would make more money, one or the other.

To reproduce the music or the message all that would be necessary would be a bright light, an electric battery, a selenium cell or some other means of transforming the alternations of light and shade into a varying current which would set the diaphragm of the receiver to vibrating as in the ordinary telephone. The reel of film could be as long as we liked so we could have the vocal books and papers that were promised us twenty years ago but which have never been delivered.

In fact it seems to me that the phonograph makers have been so absorbed in manufacturing machines and putting out records of opera and jazz that they have not paid attention to the improvement of the invention. They put the same old mechanism into fine period furniture when they might better be devising better ways of recording and reproducing sound.

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MILK DIET POOR MEANS  
OF PREVENTING SCURVY

Washington. After an exhaustive study of the effects of various kinds of milk on guinea pigs, the United States Public Health Service has found that the scurvy-preventing vitamin is not very prevalent in fresh milk and that it should not be depended upon alone to head off the disease.

Orange juice, which is a stronger foe to scurvy, should be added to the certified milk if the best results are to be obtained. A drying process injures this vitamin, although one particular brand of dried milk powder was found to retain much of the original anti-scurvy substance.

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NEWS OF THE STARSAre the Planets Inhabited?

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

On the question of the habitability of five of the eight planets of the solar system all astronomers appear to be in perfect agreement.

Mercury, though possessed of a surface crust, is excluded from the list of suitable abodes in our particular corner of the universe on any one of three counts. It is in the first place too uncomfortably hot, receiving as it does twelve times the amount of heat that is given to our own little world. It lacks, moreover, an atmosphere which is a most essential requirement. Then in addition, it intensifies its too torrid temperature and adds to its general undesirability as an abode of life by keeping the same face always turned toward the sun. That the opposite side of the surface is continually in the shade does not help matters for its temperature probably lies close to the absolute zero of space.

Jupiter, Saturn, Uranus and Neptune are fully as undesirable as Mercury, though for entirely different reasons. Literally one would never attain a foothold on any one of these planets for they have no surface crusts. They are chiefly if not entirely gaseous throughout. The density of Saturn is about three-fourths that of water. The densities of the other three planets slightly exceed the density of water and closely approach that of the sun which is generally regarded as entirely gaseous, though highly compressed toward the center. To make matters worse these four, huge, outer planets have the discouraging temperatures of minus 270 degrees, minus 330 degrees, minus 380 degrees, and minus 400 degrees Fahr., respectively, in the order of their distances outward from the sun. These are the values given by Dr. C. G. Abbot, assistant secretary of the Smithsonian Institution, in an article on the Habitabilities of Other Worlds which appears in the annual report of the Smithsonian Institution just issued. Dr. Abbot finds also for Mercury a surface temperature of plus 450 degrees Fahr., for Venus a temperature of 68 degrees, and for Mars minus 60 degrees. These are obtained from a consideration of the relative



powers and distances of these planets as compared to the known values for the earth, and moon. The temperature given for the earth is plus 59 degrees Fahr. and for the moon plus 50 degrees Fahr.

As regards the question of the possibilities of the planet Mars as an abode of life we no longer find an harmonious agreement among astronomers but a difference of opinion that becomes occasionally acrimonious.

In his discussion of the question of life on Mars Dr. Abbot shares the conservative views of Dr. W. W. Campbell of Lick, Dr. G. E. Hale of Mt. Wilson and Prof. E. E. Barnard of Yerkes. The quantity of water vapor detected by Dr. W. W. Campbell in the spectrum of Mars, he maintains, is far too small to satisfy the requirements of organic life. Dr. Abbot also doubts the correctness of the interpretation of the far-famed "canals of Mars" as water-ways bordered by strips of vegetational growth and considers them to be rather "irregularities in the planet's contour and soil composition". He also favors the opinion that the polar caps are thin deposits of hoar frost or carbonic acid gas, rather than ice or snow, and considers that telescopic observations reveal no clouds on Mars. This view is not held by Dr. E. C. Slipher, and other observers, of the Lowell Observatory. Here the canals have been photographed and clouds over the Martian surface have been frequently observed. Prof. W. H. Pickering and a number of assiduous observers of the ruddy planet also favor the interpretation that the canals are due to the growth of vegetation.

Venus, beyond a question, has a dense atmosphere but astronomers are again divided in opinion on the possibilities of this planet as an abode of life. Dr. Abbot favors the view that Venus is more likely to be inhabited than Mars. The high reflective power of this planet, he maintains, demands the existence of clouds and is unfavorable to the theory that Venus always keeps the same face toward the sun. The recent discovery of the absence of water vapor in the spectrum of Venus introduces a most puzzling phase of the problem, however.

There is a possibility that the atmosphere of Venus is permeated with a finely-divided dust, a possible product of intense volcanic activity, which would act as an excellent reflector of the sun's rays and would at the same time effectually conceal the surface.

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## DO YOU KNOW THAT -

Some of the malaria carrying mosquitoes themselves die of malaria.

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An "ideal section" of road will be built on the Lincoln Highway and lighted electrically at night. Current will be supplied from underground wires.

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Radishes, carrots, beets, spring onions and turnips remain marketable longer when topped in the field, as the growing plants give up moisture to the air from the leaves by evaporation and this increases the wilting of the roots.

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Swiss cheese made in America is now competing with the home made product in Switzerland.

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## DO YOU KNOW THAT -

Expert agriculturists claim that southern Australia is capable of producing enough cotton to supply the world's needs twice over, without colored labor.

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Mail and passenger airship service between London and Australia on a 11 1/3 days schedule for the trip has been proposed.

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The Kentucky legislature has passed a resolution requesting that the names of all town and cities be painted on top of some building as a guide to aviators passing over.

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At the present time it takes 20 million Polish marks to buy an expensive American automobile.

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## DO YOU KNOW THAT -

The monetary losses due to accidents and contagious diseases in the coal mining industry of the single state of Utah average close to a million dollars a year.

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Twenty years ago about 158 babies died for every 1000 born in New York State. Last year only 75 died out of every 1000 born.

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The Bhatghar irrigation dam near Poona, India, containing 21,500,000 cubic feet of masonry, has the largest volume of any dam in the world.

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According to the U. S. Department of Agriculture, all the chestnut trees east of the Mississippi will be wiped out by 1940 by the chestnut blight which was brought to this country in a small shipment of Oriental chestnut trees.

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## DO YOU KNOW THAT -

A Swedish inventor has invented a knockdown packing case which cannot be opened and put together again without detection.

There are over 2,000,000 different kinds of insects known to be now living on the earth.

Although the United States was probably the first country to start construction of armored ships, France put the first vessels of this type into commission, silencing the Russian forts at Kinburn with an ironclad squadron on October 17, 1855.

Christian Hughens was the first to conceive the idea of applying a pendulum as a regulator to a clock in 1656.

## DO YOU KNOW THAT -

A method has been discovered by which pineapple juices formerly wasted can be converted into a very satisfactory vinegar by sterilizing and introducing proper bacteria.

A tree which stood 300 feet high and from which seven 32-foot logs were cut below the branches was recently felled at Kapowsin, Washington.

A 36-inch water main was recently repaired under water in New York Harbor by means of a submarine oxy-acetylene torch.

The principle of the vacuum cleaner is being applied to unload coal, handle grain and other products in large quantities.

## DO YOU KNOW THAT -

Safety matches are used in remote localities around the Red Sea which have never been visited by a white man.

Many people have to their sorrow mistaken wood alcohol for grain alcohol but grain alcohol may actually be made from wood waste by converting it first to sugar and then fermenting.

Kafir natives in Portugese East Africa have orchestras composed entirely of xylophones and drums.

The volume of gasoline that is lost by evaporation in one stage in the handling of crude oil is equal to one-thirtieth of the country's annual gasoline production.



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NEW PAGE SIZE

The page size of the Science News-Letter has been changed to letter-size so that its articles will be easier to handle. The new size will also facilitate filing in standard equipment. The amount of reading matter will not be decreased as the number of pages will be increased.

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