

# THE SCIENCE NEWS LETTER

A Weekly Summary of Current Science

EDITED BY WATSON DAVIS

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## COAL CRISIS NOW SHIFTS TO HOMES

(By Science Service)

Washington, - While Government officials, miners, operators, rail men, and road heads are trying to get coal production and distribution back to normalcy, it is becoming increasingly evident here that the home consumer will have to use more brains in feeding and firing his stoves and furnaces if the nip of cold and the pinch of pocketbook is not acutely felt.

The private individual may have little to say as to whether great industrial consumers get the necessary fuel, but he can do much to preserve his own winter comfort of body and check the drain on his finances.

In some sections it may be a question of how to "keep the home fires burning" while in others it may mean more careful tending of the fires to eliminate waste.

The crisis may be met in three ways, according to conditions faced by the individual consumer. First, less heat may be used; second, substitute fuels may be employed; and third, greater care may be taken to get the maximum of heat from the fuel burned.

It has been estimated that on the average ten to twenty per cent. of the heating value of coal burned is wasted by inattention to the furnace. Health experts also claim that probably a large percentage of the apartments and houses are kept from 2 to 10 degrees too hot. While in the hard coal regions many people have become so accustomed to anthracite that they may actually suffer rather than turn to other fuels to which use their stoves and furnaces may be easily adapted, there are substitutes that can be used in a crisis.

SUBSTITUTE FUELS  
EASILY AVAILABLE

Washington. Shortage of coal this winter will make it necessary for many domestic consumers to use some substitute for the particular kind of fuel to which they have become accustomed. This will be especially true of anthracite users.

The best substitute available is coke. With the bituminous coal production getting back to normal, U. S. Bureau of Mines officials say, there should be plenty of this cleanest of fuels. Coke eliminates smoke, reduces the necessity of cleaning the furnace and flues, requires less attention than soft coal, and gives a uniform temperature in the house. But it does take up more room in the cellar and requires more attention than anthracite.

Some anthracite householders may find it necessary, however, to burn soft coal. Only small quantities should be fired at one time. Care should be taken not to cover the entire surface of the burning coal with fresh coal. If the entire surface is covered at one time, the gases are driven off from the fresh coal but there is not enough heat to burn them and they are lost up the smoke pipe.

In some sections, especially in rural regions, there is plenty of wood which can be used to advantage and can be burned in coal stoves and furnaces with a few minor changes which are easily made. The simplest way to use wood in a coal furnace, however, and the most effective in producing heat is to combine it with coal. One-quarter to half of the coal ordinarily used can be saved by substitution of wood in this way. Any kind or size of wood can be used that will go into the fire pot, and will burn with good efficiency when surrounded with coal. With enormous supplies of wood widely distributed over much of the United States, especially the eastern half, there is no excuse for suffering because of inability to get coal. And the widespread use of wood for fuel, if only such wood as is best fitted for this purpose be taken, will be of great benefit to our forests. Wood is especially good for the mild weather of early fall and spring.

Oil is an emergency fuel only and useful only when it is possible to install the special equipment necessary to burn the liquid.

CHEMISTRY SEEN AS  
AGENT OF DEMOCRACY

Pittsburgh. Sept. 5- "The democracy that the politician talks about the chemist is actually accomplishing," said Dr. Edwin E. Slosson of Science Service, Washington, in the opening address to the American Chemical Society meeting here this morning. "Chemistry is the most effectual agent for democracy since it actually achieves in regard to many material things that equality which legislation aims to bring about in the political sphere," said Dr. Slosson. "Luxuries, formerly the monopoly of the privileged classes become through chemistry the common property of the masses. The 'royal purple' of the ancients and dyes far more beautiful are now to be had on the bargain counter and Solomon in all his glory was not arrayed like the modern American maiden. Even though her purse be scant she need not lack jewels and perfumes and fine raiment, such as once were worth a slave's life. Fruits exotic and out of season are upon our dinner table, and the china we eat them from is not brought from China but made from a clay bank at home.

"In early ages the man who owned a piece of steel shaped it into a sword and made himself master of his fellows. Now we make buildings out of steel and he who lives in the garret of one of them could look down on the tower of Babel. The Feudal Age vanished at the first whiff of gunpowder for that device of the Black Art levelled the natural and the artificial inequalities of humanity in warfare, for with a gun in his hand the churl could meet the knight on equal footing and the dwarf was match for the giant - more than a match for he had the larger target.

"Medicines such as a prince could not have procured, though his physicians surveyed the earth from China to Peru, are now at hand to cure the pauper. The new chemical motive powers have given man in the automobile a very fair substitute for the seven-league boots of the fairytale; they enable him to go down into the sea in ships on more or less lawful occasions, and they have endowed him with the wings that he has always longed for but never expected to get until he reached Heaven. Books are

no longer chained up in treasuries but, manifolded by the magic of ink, are to be bought on the street corner like peanuts. Pictures from the private gallery of prince or plutocrat are multiplied by the same mechanism and scattered throughout the land. We do not have to pay ten dollars to hear a song by Galli-Curci since we can hear her at home with as many encores as we want. Caruso, though dead, yet speaketh. His voice has been embalmed by carbolic acid. Events that few could witness are brought to all of us on the celluloid film. The drama is brought to every village.

"So whether it be the satisfaction of our material wants or the gratification of our aspiration for art and literature, the chemist acts as the agent of applied democracy. Democracy was engaged in a struggle for life lasting five years and emerged triumphant - thanks to the chemist. For war has now become essentially a branch of applied chemistry, carried on almost entirely by chemical weapons and chemical defenses. Germany, regarding herself as the heaven-born leader of mankind in this science attempted to use it to establish her political supremacy in the world, but in spite of her advantage on the start she was foiled in the end by the democratic nations. She had freed herself in advance from dependence upon the nitrate beds of Chile for her explosives by developing methods of making nitrates from the air.

"The war is over and Germany has been relieved by the Allies of the burden of armament that still weighs upon the victorious nations. But Germany, unlike the United States, finds it profitable to proceed with the Haber process even in time of peace. We have no fear in America of such a catastrophe as the explosion of Oppau. We have no such works to lose. If the Muscle Shoals plant should blow up now the loss of life would be considerably less. It is curious to recall that the Allied aviators were never able to blow up the Oppau works despite their gallant and persistent attempts, yet now the Germans, without outside aid, have removed the entire establishment from the earth with the greatest ease. The moral of this is the old maxim, 'If you want a thing done do it yourself!'"

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GET INSIDE STORY  
ON MAMA'S COOKIES

Pittsburgh. Sept. 6.- Micro-chemical analysis of a sugar cookie was made today by Washington Platt and R. S. Fleming of the Herrell-Soule Company Laboratories of Syracuse, New York, before the American Chemical Society in an explanation of why shortening shortens.

While sugar cookies and other baked products using fats and fixed oils as shortening have been made in kitchens since the memory of man runneth not to the contrary, no explanation has previously been put forward to account for their action or the difference between the power of different fats.

Describing this delicious morsel, these chemists say: "A cookie is seen to be essentially a mass of gluten and starch, soaked in a concentrated sugar solution. Shortening is the only material in dough not soluble in water or wetted by it. Shortening brings about its effects by extending throughout this dough or cake in layers which separate the particles from one another and prevent the formation of a continuous solid mass."

The fat may be seen microscopically in the dough or cake, extending in films around the starch grains.

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CORN'S USEFULNESS  
INCREASED BY OIL

Pittsburgh. Sept. 6.- "The corn oil industry has greatly increased the usefulness of corn," A. F. Sievers of the U. S. Department of Agriculture declared at the American Chemical Society meeting today.

From 80,000,000 to 100,000,000 pounds of corn oil are produced in this country annually as a by-product of the hominy and cornstarch industries. About three-fourths of this is refined for food purposes, he said.

As an edible oil it has made great progress. It is now utilized for all purposes for which cottonseed and peanut oils are being used and is a raw material for the manufacture of soap and the making of rubber substitutes. Since it is a by-product the amount produced will depend on the amount of hominy, starches, and glucose manufactured.

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(A Chat on Science)

PICTURE TELEGRAPHY

By Dr. Edwin E. Slosson

Whenever an author writes a romance of Utopian life some centuries in the future he introduces as one of the marvelous inventions of that period an instrument for seeing what is going on at a distance. Usually it is modeled after the telephone with a disk in which one can see mirrored the scene at the other end of the wire. I do not remember that any of these novelists of the twenty-first century and after have dared to discard the wire, which shows how difficult it is nowadays for the imagination to get ahead of the facts. Already we hear that wireless pictures and wireless movies will be added to the wireless telephone.

But even though long distance photography is slow to enter into broadcasting, it will be a great thing for illustrated journalism. News comes now by wire and the pictures follow by slow freight, arriving usually a week or so after people have lost interest in the event. This delay places too much of a strain on the editor's conscience. He is sometimes unable to resist the temptation to put a stock cut to a new use or to touch up a photograph.

When Father Gapon led his procession to their death in St. Petersburg on Bloody Sunday in the first Russian revolution the American papers came out with half a dozen different portraits of him, all typical Russian revolutionists; any one of them might have looked like him, but unfortunately none of them did. When San Francisco was burning, the most enterprising of the New York papers published a photograph of the city in flames with very natural looking smoke rolling up from it. Unfortunately the staff artist who adapted it neglected to erase the date of the copyright, which was several years before the catastrophe. During the Great War the press photographers were able to produce from their stock rooms the portrait of any general whose name was cabled over. We saw pictures of the tanks and Fokkers as soon as we heard of them, though these did not look much like those that appeared later. Doubt-

less the early designs were abandoned.

Such accidents have a tendency to impair the implicit confidence which the dear reader should have in his favorite periodical. Besides, the moral character and future prospects of an editor deserve consideration. But perhaps this new machine like all the others, will bring with it more powerful and insidious temptations. "God made man upright, but they have sought out many inventions."

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#### EXHAUST GAS TEST SAVES MOTOR FUEL

Pittsburgh. - Guess-work has been taken out of carbureter adjustment. The leanest adjustment which can be made without reduction of power may be accurately determined by means of an analysis of the exhaust gas with an easily operated carbon dioxide indicator, Drs. G. W. Jones and A. G. Fieldner of the Bureau of Mines laboratory here explained to the American Chemical Society meeting.

Fifteen trucks, varying from 2½ to 7½ ton capacity were tested in this way and all but one found to be too richly adjusted for maximum power and economy. The adjustments made gave an increase of over 20 per cent. in mileage for the first month after testing and 16 per cent. for the second month.

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#### SCIENTIST NEEDS RESEARCH INDICES

Pittsburgh, Sept. 5.- A person can store only a limited amount of information in his head so it is preeminently desirable that a part of that information consist of a thorough knowledge of where and how to locate additional information when needed, said Prof. E. J. Crane of Ohio State University before the American Chemical Society meeting this afternoon, in an address on the importance of properly indexing chemical journal literature.

"Human progress is made by cooperation," he said. "The great factor for science and industry is research. Cooperation in research is effected chiefly by means of journal literature. The existing indexes are weak in showing a tendency to list words instead of subjects. Better English and better chemical nomenclature is most desirable."

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COD FISH FURNISH  
GROWTH VITAMINES

Pittsburgh, Sept. 6.- The hopes of the rising generation that somebody would discover that cod liver oil is not such a fine thing for young stomachs were dashed to earth here today by a paper which Arthur D. Holmes presented before the American Chemical Society. His experiments show that even the oils obtained from emaciated fish in the springtime was full of the growth vitamine.

To be sure of knowing where his oils came from, Mr. Holmes caught his own cod fish, obtained their livers, and rendered the oils under laboratory conditions. He tested out the vitamine content by feeding the oil to rats.

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SUNFLOWER GIVES  
OIL OF MANY USES

Pittsburgh, Sept. 6.- Soap, varnish, enamel, and butter substitutes are some of the things they are making out of sunflower seed oil in foreign countries, George S. Jamieson and Walter F. Baughman told their fellow test-tube tinkers of the American Chemical Society, here today. Several million pounds of the seed from the Kansas state flower are produced in the United States every year and are used for poultry feed. The whole seed contains twenty-seven to thirty per cent. oil.

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CHEMISTS APPROVE  
ICY EGGS

Pittsburgh, Sept. 7.- Frozen eggs are good eggs. So concludes S. K. Robinson of Chicago after finding that microscopic examination, freezing test, incubation, shaking test, and effect of air and light tests were met as well by the solidified as by the fresh egg. He spoke to the American Chemical Society here today and advised them that fine mayonnaise dressing which held well in a warm room for thirty days had been made from the refrigerated product.

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PEACOCK'S BRILLIANT TAIL  
CONTAINS ONLY BROWN COLORING

Pittsburgh, Sept. 5.- An expert can distinguish the iridescent tail feathers of the peacock in the dark simply by the feel, Dr. Wilder D. Bancroft of Cornell University, told the American Chemical Society here this afternoon. The feather fringes are only flattened plates colored brown. The colors, he said, are not due to pigments but to the flatness of the feather parts which produces an interference of light from the two sides. The same colors are seen in a film of auto oil spilled on the street.

As the colors produced on the practically colorless oil depend on the thickness of the film, which averages about one fifty-thousandth of an inch, so the patterns on a peacock's tail and the apparently self-luminous reds in the throat feathers of the humming bird are due to variations in thickness.

When you look through a peacock's feather you see only a brown due to the so-called melanin pigment which is equivalent to the asphalt pavement on which oil is spilled. In all the iridescent feathers the barbules are flattened plates of brown which therefore give the colors of thin films.

"It is possible to duplicate the color effects of the peacock and the humming bird," claimed Dr. Bancroft, "by putting a very thin coat of varnish over the dark feathers but we cannot regulate the thickness with such accuracy as to produce the patterns of the peacock. When one considers that variations in thickness of a hundred thousandth of an inch may change the color completely, it seems marvelous that all the tail feathers of all the peacocks can be so near alike."

"The neck feathers of the white pigeon show practically no iridescence because the dark background is lacking. If they are dyed brown, the iridescence appears in full force. On the other hand the white peacock is not an albino in the sense of merely having no dark pigment. The whole structure of the feathers has changed. The barbules are not flat plates and consequently no brilliant colors can be developed by dyeing the feather brown or painting the back with India ink."

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## DAMAGING LUMBER STAINS DUE TO SMALL PLANTS IN WOOD

Madison, Wis.                      Stains which annually do millions of dollars worth of damage to lumber are due to a minute plant which enters the cells in the wood and feeds upon it, says Ernest E. Hubert, Assistant Pathologist, of the Bureau of Plant Industry, U. S. Department of Agriculture, stationed here, who has been devising methods of combating this waste.

These stains appear in the lumber sometimes as soon as 48 hours after it is cut and begin their penetration into the cells of the wood by means of tiny threads. The threads get the nourishment to continue further destructive work by feeding upon the wood through which they grow.

Tiny black specs appearing on the surface of the lumber, when examined under the microscope, look like little hairs swollen at the end. From these bulb like ends the seed or spores are ejected which may be carried by the wind to spread the stain in other lumber.

These fungus plants have been known to lie dormant in the wood for seven years and then when conditions became more favorable to their growth to revive and send out more of the little threads which spread through the wood, staining it yellow, blue, green or red.

The way to fight wood stains is by air seasoning, kiln drying, or treating the lumber with an antiseptic solution.

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NEWS OF THE STARSThe Moon Will Eclipse Aldebaran

By Isabel M. Lewis  
U. S. Naval Observatory

The bright, red, first-magnitude star Aldebaran in the V-shaped group of the Hyades in Taurus will be temporarily eclipsed or occulted by the moon in the early morning of September 13.

This occultation will be seen to the best advantage west of the Mississippi particularly on the Pacific coast and in the farwestern states. It will not be visible at all in the Gulf states while in the eastern and central states both the disappearance and reappearance of the star will take place after sunrise and so cannot be observed without the aid of a telescope. In the west-central states the disappearance of the star will be visible but its reappearance will take place after sunrise.

An occultation of a first-magnitude star or planet by the moon for any one point on the earth's surface is a comparatively rare occurrence. The last occultation of this sort that was seen to advantage in the United States was that of Saturn in 1916. The brilliant star Spica was occulted several times in 1920 but these occultations either occurred below the horizon in the United States or else in broad daylight.

The time that elapses from the disappearance of a star at the eastern limb of the moon to its reappearance at the western limb may be anywhere from a few brief moments to more than an hour depending on the position of the observer. At the time of the occultation of Aldebaran the moon will be nearly at the last quarter. The disappearance of the star will take place at the eastern limb which will be the illuminated limb and the reappearance will be at the dark limb.

Occultations are considered to be of considerable importance astronomically and they are carefully observed with the aid of the telescope at most observatories whenever visible since they give the position of the moon to a high degree of accuracy at the time of the occultation. Both occultations and eclipses furnish the data for improving the tables of the moon's motion which are needed to predict its position

from day to day and from year to year.

Observations of occultations also tell the astronomer something of the condition of the moon's atmosphere. The suddenness with which the star disappears and reappears is taken as an excellent proof of the extreme rarity of the moon's atmosphere. Were there a gradual dimming of the star image it would be an indication that the moon possesses an appreciable atmosphere.

Since the observations of occultations are considered to be of considerable importance it is customary for the various almanacs of different countries to publish the elements needed for the prediction of occultations visible in the course of a year. As the moon makes a complete circuit of the heavens every month it is continually occulting a number of stars of the sixth magnitude or brighter for which the elements are given. The number occulted in a single year usually lies between eighteen hundred and two thousand and to compute the elements of all these occultations usually occupies all of the time of several computers for a number of weeks.

Though the moon passes over about two thousand stars in the course of a year not more than about one hundred of these occultations may be seen at any one point on the earth's surface. All of the remaining occultations take place with the moon below the horizon. Moreover, of the number observable, many are faint fifth or sixth magnitude stars or are observable only in the day-time, with the aid of a telescope. It is for this reason that the occultation of a bright star or planet by the moon is such a comparatively rare occurrence.

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#### WORLD WAR HELPED HOME BY TEACHING FOOD VALUE

Urbana, Ill.

"The public learned more about food and nutrition and the relation of food to health in one year of the World War than in any ten years preceding," says Professor Isabel Bevier of the University of Illinois here.

"In these days it is quite the habit to blame all the ills of life upon the war," she continues, "but in home economics it was a great benefactor. The vital relation of food to health and efficiency was demonstrated on a great scale by the army and the ill-nourished children of other lands. In this country, the vocabulary of food was acquired by the layman rapidly. Calories were removed from the funny column of the newspaper and became the measuring unit of the food resources of the Allies."

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## MOTHER'S MILK PROTECTS FROM GERM FOES

New Haven, Conn.

Mother's milk acts as an antitoxin and vaccine to protect the chemically helpless new-born baby from disease germs according to Arthur H. Smith of the Sheffield Laboratory of Physiological Chemistry of Yale University.

"The new born infant is defenseless," he says, "not only physically but also chemically. His blood lacks that part known as euglobulin to which are attached those antibodies or chemical substances which oppose the constant attack of disease germs. Until provided with some source of euglobulin, the baby is at the mercy of the agencies of disease and destruction.

"The chemical laboratories of the milk glands of the mother are wonderfully efficient, however. They either manufacture entirely, or appropriate for use from the mother's blood, the euglobulin so urgently needed by the child. For the first two or three days after birth, the milk is so rich in this and other proteins that it is often slimy in consistency."

Just as vaccine and antitoxin are used to introduce into the blood antibodies to fight certain diseases, Mr. Smith points out, so the mother's milk furnishes the substances which give the child some degree of immunity directly. Furthermore, it also provides the mechanism for the acquisition of the child's future protection.

## MUST BRING OWN RABBIT FOR RABIES TREATMENT

Washington.

Scientists of the Pasteur Institute of

the Breslau University in Germany are demanding that patients desiring treatment for rabies shall bring a whole rabbit. They would prefer two rabbits and they must be alive. The treatment consists in a progressive inoculation with an attenuated virus. To secure the proper strength virus the rabbits are first inoculated and then a virus obtained from them for use on the human being. On account of the scarcity of rabbits, requisition has been made on the back-yard warrens of the patients to supply the necessary animals.

DO YOU KNOW THAT -

Application of searchlights of the type used at sea on battleships to the marking of landing fields for night-flying airplanes was demonstrated at Dayton, Ohio, recently.

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The humming bird, smallest of all birds, crosses the Gulf of Mexico, flying over 500 miles in a single night.

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Although canned fish from Portuguese waters are exported all over the world by ship-loads, the people of Portugal like cod-fish and send fishing fleets to Newfoundland to get them.

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Milk is the most efficient of all foods in insuring an all-round adequacy of the diet. It is important as a source of energy, protein, mineral elements and vitamins.

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DO YOU KNOW THAT -

Bees do not like peppermint, but they will eat candy with potassium ferrocyanide in it and it does not seem to hurt them.

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In the bones and their arrangement, there is a close resemblance between the flipper of the whale and the human hand.

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The school marm is trying to keep up with Willie. Radio instruction was given to a number of school teachers taking courses at the University of Washington this summer.

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During the first half of the present year 149,124,520 pounds of explosives were sold for use in the United States. 45.8 per cent of this was for coal mining.

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DO YOU KNOW THAT -

Crows and the "flying foxes" or fruit-eating bats of Ceylon live in the same trees; the crows being at home at night and the bats in the daytime.

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Russia will have 5,000,000 to 12,000,000 long tons more of bread grains this year than last, it is estimated, and should be able to feed herself.

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There are approximately 10,000,000,000 pins produced in this country every year or about 100 pins per person.

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Stone idols were used in the religious ceremonials of the prehistoric cliff-dwellers of Colorado it has recently been discovered.

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DO YOU KNOW THAT -

Nineteen species of shorebirds breed north of the Arctic Circle, every one of which visits South America in winter.

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Insects are capable of classifying and analyzing odors many of which are unknown to human beings.

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The American idea of foodstuffs in packages - sealed, airtight, and bug proof - is gradually being adopted in Chile where packaged goods were formerly practically unknown.

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The deepest well in the world is at Fairmont, West Virginia, and is 7,570 feet deep.

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DO YOU KNOW THAT -

Snakes have been known to live for more than a year without taking a particle of nourishment.

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There are only thirty stars known to be within a hundred billion miles of the earth.

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Helium is found in very minute quantities in sea and river water.

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One hundred and fifty thousand comparative strength tests made by the U. S. Forest Service show that kiln drying and air drying have the same effect upon wood.

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DO YOU KNOW THAT -

There is a marked resemblance between the dwarf chameleon, the little eight inch long reptile which lives in the Kamerun of Africa, and that gigantic prehistoric reptile called Triceratops which was 20 feet long and 8 feet high.

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Wild rice, used as a feed for wild ducks and other water fowl, is sown and harvested from rowboats and canoes.

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Astronomers claim that there are no sounds, no floating dust, and no twilight on the moon.

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Because spring in Manitoba, Canada, is too late to permit successful hatchings in large quantities, chicks, a few days old are shipped in by hundreds of thousands from Ohio, Indiana, and Iowa in heated cars.

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FRAGMENTS OF SCIENCE  
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It does not seem to be biologically necessary that a race should decline  
 and die out. On the animal genealogical tree there are many branches that have been  
 dead for millions of years. The fossil-bearing rocks - the great graveyards of the  
 buried past - are full, not only of ancestors, but of lost races. Yet there are  
 many very ancient races of animals that are going strong today; and there seems no  
 reason why this should not hold true for human races also - provided that the sur-  
 vival value of health and vigor of body and mind is practically recognized.-  
 The Outline of Science.

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