SCIENCE NEWS - LETTER

EDITED BY WATSON DAVIS

SCIENCE SERVICE

WASHINGTON, D. C.

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DISCOVER INVISIBLE SPOTS ON SUN

Pasadena, Calif. Invisible sun-spots have been discovered. Dr. George Ellery Hale, director of the Mount Wilson Observatory has announced that through their magnetic effects he and his associates have detected solar storms that can not be photographed or seen through the telescope.

Ten of these invisible spots have been found in the last few months by Drs. Hale, Ellerman and Nicholson working with the 150 foot tower telescope and the 75 foot spectroscope.

"It is expected that the further study of these objects will help explain the origin and nature of sun-spots", Dr. Hale declares.

In 1908 Dr. Hale discovered that a sun-spot is a great whirling storm, similar to a terrestrial tornado, but on a gigantic scale, often vastly larger than the earth. The expansion of the hot solar gases, caused by the centrifugal action of the whirl, cools them sufficiently to produce the appearance of a dark cloud, which we call a sun-spot. If this cooling is not great enough to produce a visible darkening of the surface, the whirling storm may still be present, though invisible to the eye. Such invisible whirls have now been detected by their magnetic effect on the light emitted by the luminous vapors within them.

Magnetic fields in visible sun-spots were first found by Dr. Hale in 1908. They are due to the whirl of electrified particles in the spot vortex just as the magnetic field of an electromagnet is produced by the whirl of electrons through its wire coils. The magnetic field in a sun-spot is recognized by the effect it produces on the lines in the spot spectrum. A line due to iron vapor, for example, is split into three parts by the powerful magnetic field in a large spot. In a very small spot, where the magnetic field is much weaker, the line is not split up but merely widened. Invisible spots were discovered by exploring promising regions of the sum, where signs of disturbance, such as faculae or clouds of calcium vapor, are present. A special polarizing apparatus moves back and forth across the slit while the iron line is watched through a very powerful spectroscope. The presence of a weak magnetic field, showing the existence of an invisible spot, is betrayed by a slight oscillation of the corresponding part of the line, caused by its widening successively to right and left as the polarizing apparatus oscillates over the slit.

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Some invisible spots foreshadow the birth of a visible spot, which finally appears to the eye several days after the first indications of the whirl have been found. Others correspond to the period of decay, and permit a spot to be traced for some time after it ceases to be visible. In other cases the invisible spot never reaches maturity, which means that the cooling produced by expansion never becomes great enough to produce perceptible darkening of the sun's disk.

CHEMICALLY PURE ICE SOON TO BE DEMANDED

Charleston, S.C. Ice closely approaching chemical purity will soon be necessary to supply the commercial demand, says R. H. Hemphill, who has been conducting experiments to this end in his plant here for years.

"I found that nature freezes out the impurities", he says. "There is no question in the world but that the crystals of pure ice will freeze out of a solution unless it is tremendously embarassed. Certain portions of the Hudson River, for instance, which have sewage and all sorts of contamination in it will produce chemically pure ice.

"I have made chemically pure ice in cans. I have produced it out of sewers. I have produced it out of sea water. I have mixed up 25 or 30 packages of purple dyes and poured into the can, forming as perfect a solution as possible with coloring matter, and have frozen it out until I have produced what our chemists say is chemically pure ice, but the process has not yet been reduced to practice on a commercial scale."

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HELICOPTER EMERGES FROM WAR'S ECLIPSE

Washington. - Helicopter propellers are stirring interest as well as air. Demonstrations by Henry A. Berliner, of this city, of his new design and the reports and denial of the sensational flight by Louis Brennan in England have caught scientific attention and aroused the popular imagination in regard to the development of this type of heavier-than-air machine which was eclipsed when the war concentrated engineering efforts upon the perfection of the further advanced airplane.

Aircraft that are sustained by propellers turning on vertical axes are still in the experimental stage. Theoretically they can go straight up, fly horizontally, hover in the air, and then come down safely. There are several difficulties to be met when an attempt is made to put this theory into practice. The chief of these problems are: first, getting the machine into the air; second, flying it horizontally; and third, getting it down out of the air.

Bringing it down safely is the big problem for the helicopter designer. As the chiddren say, "All that goes up is bound to come down." This is particularly true of this kind of heavier-than-air device. Stop the motor and it comes down with a rock-like fall. With an engine of extreme nicety of adjustment and absolute certainty of action descent might be made by simply throttling down the propeller speed gradually. As there is no engine of such dependability, other means must be devised for getting down safely. Parachutes of the necessary size would add too much weight. Ochmichen and Peugeot in France tried helping out the heavy machine with a balloon. Another method proposed is that in coming down the propellers be so built that they can be disconnected from the engine and the angle of the blades changed so that they would spin around like a windmill offering greater resistance than when held stationary. Every inventor tries to solve this problem but as yet nothing effective has been done.

More progress has been made on the problem of securing horizontal flight. The latest Berliner helicopter shows griat promise in this respect. The machine resembles an airplane without wings. The fuselage and rudder are the same and a Le Rhone 110

horse power rotary motor is mounted forward as in the aeroplane. On either side of the fuse mage there is an upright carrying a fourteen foot propeller. These two propellers revolve in opposite directions and force the air downward, lifting the 1300 pounds of the machine with pilot straight off the ground.

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Near the tail there is a small propeller which is also geared to the motor and which titts the entire helicopter by slightly lifting its tail. This tilt causes the forward motion of the machine, at the expense of lifting power. The inventor claims, however, that with a 1000 pound load but three per cent of the lift is lost in a tilt of 15 degrees and that this loss is transferred into horizontal pull of about 25 per cent of lifting power. This is a somewhat greater tilt than has been used in most of the experiments, but he thinks that a 25 degree tilt may possibly be reached safely. Closed flights, it is claimed, have been made over a rough field, but the machine has never been higher than twelve feet alove the ground.

Aviators, however, claim that getting a helicopter into the air is comparatively an easy matter. When near the ground the air which is forced downward forms a cushion which helps to sustain the machine, but when the machine gets some distance above the ground it lacks this cushion and there is a gyroscopic action created by the big rotating propellers which frequently causes such devices to turn turtle. Lisut. Stefan von Petroczy of the Austrian Balloor service was able to rise 170 feet in a helicopter which was later wrecked. It is claimed that Louis Brennan, the English inventor, has been up 40 feet inside the hangar. Henry Berliner says that he could go higher, but that 10 feet is enough for experimental purposes.

While great progress is being made, the helicopter problem has not yet been solved. Few machines have gotten their own weight off the ground and experts say that it is too early to make any prediction as to what load thesenew air craft will be able to carry or just how valuable they will prove.

The outstanding advantage of the helicopter will be the ability to rise vertically from a standing start and to land in a similar fashion. This will be important in landing on and taking off from a battleship at sea. It is also claimed that the ability of the new machine to hover aver a particular spot will prove of value in military operations, but air men claim that the plane flying at 100 miles an hour can drop bombs, for instance, as effectively, as could a hovering machine and that a balloon for observation purposes would be hardly more vulnerable from anti-aircraft guns.

The idea of the helicopter being a practical means of popular transportation from home to office or as offering any near relief for the long suffering strap-hanger is a figment of the fiction-fed imagination and is not justified by the long hard fight which the scientist must carry on to produce a man-made bird which will compete with the heron in directly ascending flight.

CORN COBS TO RUN TRACTORS AND PROVIDE NEW CHEMICAL

Washington. - The tractor that plows the corn can be run by a chemical obtained from corn cobs at low cost. This colorless aromatic liquid, called furfural, also runs automobiles, and is a substitute at a cheaper price for formaldehyde in making the hard rubber and synthetic resins from which phonograph records, varnishes, pipe stems, cigarette holders, buttons, and many other articlespare made.

Success in perfecting the process of cheaply obtaining this promising chemical from waste corn cobs has been announced by Dr. W. W. Skinner, assistant director of the Bureau of Chemistry, Department of Agriculture, in a report to the American Chemical Society. For six years Dr. Frederick B. La Forge and Gerald H. Mains of the Bureau of Chemistry have been developing the commercial process of matrix furfural and they now declare that this product selling at present for about 50 cents a pound can be made for six cents.

Through the development of by-products obtained during manufacture of furfural from corn cobs, it is believed that furfural can be made even more cheaply. Among the available by-products are acetic acid and a gummy material which has a field of usefulness in the manufacture of coal briquettes. Tests show the undisputed superiority of the briquettes made with this gum over those made with other binders. The new briquettes are characterized by a total absence of smoke and superior waterresisting qualities.

Although furfural is a successful motor fuel, the type of carburetor suited to gasoline can not be used. It is not now as cheap as gasoline but in the future it may be important as four cent per pound furfural would mean furfural motor fuel at about thirty-two cents a gallon.

As a substitute for formaldehyde, furfural will preserve the hardwood forests of America as well as utilize a waste product of the farm. Formaldehyde which when combined with phenol, otherwise known as carbolic acid, makes synthetic resins, comes from wood alcohol or methanol. Methanol is chiefly produced by the destruc-

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tive distillation of hard woods, such as birch, beach, oak, maple and elm.

Furfural production is simple, Dr. La Forge declares in explaining the process used at the large scale experimental plant near Washington that was erected for this work.

The corn cobs, with some water, are placed in a large steel cylinder or pressure cooker. Steam at about 135 pounds pressure is turned in. After cooking for about two hours the furfural is blown off with steam, passed through a condenser and collected as a solution in water. This solution is then distilled in a special apparatus for the separation of the furfural from the water. The old method of production consists in heating vegetable materials with strong mineral acids. Then the acid is neutralized and furfural separated.

INSECT POWDER IS VIOLENT EXPLOSIVE

Kansas City, "We must regard dust even the kind used to kill insects as an explosive material quite as dangerous as dynamite, powder, or gasoline. We must take the necessary steps for protection of life, food stuffs and property". This is the opinion of David J. Price, engineer in charge of the dust explosion investigations in the United States Department of Agriculture, speaking before the Millers' National Federation. During recent years 242 dust explosions in industrial plants have been reported and fifty-two of these caused the loss of 379 lives and more than \$30,000,000.

It is possible to get an explosion with any sort of combustible material when it is finely divided, forming a dust or powder suspended in the air. In a factory making a lime-sulphur insect powder, the fine sulphur, which burns readily when mixed with air, was the cause of at least seven explosions. Explosions have also occurred with aluminum dust, hard rubber dust, wood and similar industrial material, for anything which will burn may also explode when in finely powdered form.

The proper mechanical removal of the dust and prevention of its accumulation on ledges, beams and girders throughout plants will prevent catastrophes, Mr. Price explains.

RADIO NEWS OF THE WEEK

BEST ALL AROUND HOME-MADE AMATEUR RADIO .THA NET METICO

Hartford, Conn. Louis Falconi, builder and operator of station 5ZA at Roswell, New Mexico has the best American amateur radio station, the largest part of which is home-made. He has just been awarded the Herbert Hoover cup for 1921 by the board of direction of the American Radio Relay League.

Secretary of Commerce Hoover, who is in charge of governmental radio regulation, last fall offered a cup to be presented each year during his administration through the American Radio Relay League to America's best all-around emateur station, the major portion of which is home made, as determined by a consideration of the extent to which the apparatus was home made, ingenuity displayed, electrical efficiency, transmitting range, receiving performance, observance of radio law, ability of the operator, amount of amateur traffic handled, and completeness of the station log.

Falconi, the operator of 5ZA, who receives the first award of the cup so completely overtopped every other station and operator in the contest that he received the unanimous vote of the judges.

For several years Falconi's station has been the chief connecting link between the Mississippi Valley and the west coast. He has had a splendid station located in a territory where amateurs are very rare, and so has been strategically located for the establishment of amateur records. His station has been heard in every state in

the union except Maine, by ships off the Atlantic coast, and in the Pacific, and he is consistently heard in the Hawaiian Islands. His station equipment not only includes a spark transmitter, but a continuous wave transmitter, I.C.W. telegraph, and a radiophone. The phone has been heard as far east as Indiana and almost every place inside that range. The equipment is entirely home made, and Mr. Falconi's accomplishment is all the more remarkable when it is considered that he is located in a small town in an out-of-the-way place where encounters with other mnateurs are infrequent, and where difficultires are encountered in securing parts for the construction of apparatus.

Mr. Falconi was born in Italy and is twenty-seven years old. He came to this country as a baby. Up to ten years ago he resided at Portsmouth, Virginia, when he moved west for his health. His interest in radio dates from 1911. He is at present local agent for the Exide Storage Battery at Roswell.

Signals from his station are familiar to amateurs everywhere almost. A great

deal of relay traffic is handled through his station, and under big difficultiqe, as the distances worked are always much greater than those that the average amateur accomplishes. It was Falconi's station which connected Chicago with Los Angeles on the occasion of the last amateur transcontinental relay test, when a message was relayed from Hartford, Connecticut, to Los Angeles and the reply returned to Hartford in a total elapsed time of 62 minutes.

MORE RADIO BEACONS TO PROTECT SHIPPING

Washington. . Radio beacons, that send out warning signals to ships in times of fog and heavy weather, will be installed at Boston, Nantucket, Cape Charles, Columbia River, Puget Sound, the Department of Commerce has announced. When these installations are completed there will be ten Lighthouse stations broadcasting radio signals from which any ship equipped with the radio direction finder can determine its exact position. If funds permit, radio beacons will also be installed at Delaware Bay, Los Angeles, and Blunts Reef. Radio beacons are now in operation at Ambrose, Fire Island and Sea Girt near New York harbor, and on the light ships off Cape Hatteras and San Francisco. Many foreign vessels are now installing radio direction finders that will enable them to take advantage of the radio warnings, and these as well as American ships are interested in improved service.

METEOROLOGISTS TO MEET HIGH IN THE AIR

Meteorologists evidently think that it is all right for them to get "up in the air" about the weather, as plans are under consideration by the Austrian Society of Meteorology and the Somblick Absociation to hold a meeting October 10-14 at Sonnblick Observatory over 10,000 feet above sea level. The only hitch intthe plans is due to the fact that there is some doubt whether enough of the scientists will be willing to take the necessary eight hour rocky climb to the mountain summit upon which the big observatory is perched.

(1: 3 en Minute Chat on Science)

MAN AFRAID OF NOTHING

By Dr. Edwin E. Slosson, Science Service, Washington,

Nothing frightens man so much as nothing. The idea of empty space is horrible to him. He abhors a vacuum. If he can't find anything else to fill it with he fills it with his imagination. Primitive man filled the space about him with fairies, ghosts, spirits, demons, invisible beings of all sorts, some of them grotesque or malignant, but anyhow company to him.

Man early fixed up a snug little universe according to his fancy, a bowl inverted on a plate, as mushrooms are served. Above the bowl were the gods who were pleasant to look up to, although their conduct was not always what it should be. Below the plate were demons, terrifying of course but better than nothing for they were much like folks after all.

But when Galileo's telescope knocked to pieces this neat boxed-in cosmos man was scared out of his wits. At first he refused to believe it and he does not like it yet. For he cannot bear to think of being stuck on the surface of a ball that is whirling around at the rate of a thousand miles an hour and traveling through empty space at the rate of a thousand miles a minute.

Chesterton expresses his aversion to the scientific view in these lines:

The dear sun dwarfed of dreadful suns, Like fiercer flowers on stalk, Earth lost and like a little pea, . In high heaven's towering forestry.

Man feels as lonely as Robinson Crusoe, thus cast away on a desert planet. There are no neighbors within call, perhaps none anywhere in the universe. The nearest habitation is over two hundred thousand miles away and nobody lives there, not even lunatics. The next is Venus 25,700,000 miles off on the read to the sun while in the other direction the nearest planet is Mars 48,600,000 miles away. The four

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big planets farther out are too cold for comfort, three or four hundred degrees below zero Fahrenheit, and besides they are gaseous or at least so soft in substance that a man would sink into them like water. The only other planet, Mercury, is so close to the sun that it has a temperature of 450 degrees which would melt the Tin Man.

All of the planets, therefore, seem out of the question as the abode of life with the possible exception of the two nearest to ours in space and nearest to ours in size and state. But there is no evidence that either Mars or Venus have water or oxygen enough to support animal life of any sort. Some astronomers have reported a complicated system of irrigation ditches on Mars but others with equally good eyes and bigger telescopes can see nothing of the sort. The mean temperature on Mars is probably some sixty degrees below zero so most likely Mars has long ago lost the higher forms of life if it ever had any.

Human life requires such a close adjustment of chemical and physical conditions that there is small chance of its finding suitable means of support anywhere else than upon the earth and even here the favorable environment will not last forever. Even if the climate of another planet should at some time have been like ours it would be highly improbable that the course of evolution should have produced beings in the least like ourselves.

But man hates to be alone in the dark so he seeks for a friendly face in every conceivable quarter of the universe.

HORSES DO NOT CATCH DIPTHERIA FROM MAN

Washington Wild horses running on the open range and never in contact with human beings have been found to be infected with the diptheria germ, according to Dr. H. W. Schoening of the Pathological Division of the Bureau of Plant Industry. This fact, he claims, indicates that the diptheria organism is wide spread in the soil and is not carried to the horse by some human attendant, as has been held

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ALL EARS HEAR DIFFERENTLY; E IS EASIEST TO HEAR

New York. What you hear when you listen to talk or music is not the same thing that anyone else hears. All human ears hear the same thing differently.

This is one of the discoveries made in the Research Laboratories of the Western Electric and the American Telephone and Telegraph companies according to Dr. Harvey Fletcher.

The normal human voice can be reduced to one-millionth of its volume and still be heard, says Dr. Fletcher, but if the voice is reduced to one ten-millionth it becomes inaudible. The ear will receive a human voice amplified to one hundred times its normal volume without distress but if increased a thousand-fold the sound is painful to the ear. At this volume of sound also the words are indistinguishable. Thus the range of good hearing is from one-millionth the volume of the normal voice to 100 times its volume.

By a series of filters which eliminate any desired group of vibrations from the slowest to the most rapid Dr. Fletcher has discovered that E is the hardest sound in the English language to kill. Next to it is I.

Th is the black sheep of the family. This sound, together with V and F, account for more than half of the errors in understanding what is said.

Ou was found to be the easiest sound for all ears to recognize and TH the most difficult.

Dr. Fletcher has a perfect telephone apparatus which carried the voice without distortion. This is still a laboratory product, too expensive and fragile for commercial use. The results of 8,000 tests which are still being studied, will, he says, eventually be of great value in improving the commercial telephone and revealing to actors, singers, teachers and public speakers what sounds must be stressed in order to be heard perfectly by the greatest number of hearers.

You may think a whisper does not start a sound wave but Dr. Fletcher's perfect phone shows there is no fference in clearness in the reproduction of whispered sounds. Radio telephone orators take notice. Dr. Fletcher has compiled a list of sounds giving the following order in which they are easy to recognize: OU,L,NG, long O,ER,Y,longA,I,D,O,W,T,long U,M,long E, Sh,B,H,A,U,A,J,Z,N.CH;K,S,G,P,E,V,F,TH.

NEWS OF THE STARS

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Mars Now Closest to Earth.

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

Mars, the planet of mystery, with its polar caps of white, and its dusky, greygreen markings against a reddish-ochre background crossed, so many astronomers say, by elusive canals, may now be seen in all its fiery brilliancy in the southeastern part of the heavens in the evening shortly after the resplendent Venus has disappeared beneath the western horizon.

On June 18 Mars will make its nearest approach to the earth at a distance of 42,360,000 miles. This is the nearest that Mars has been to us since the close opposition of 1909 when it came within a distance of 36,500,000 miles. The closest possible approach of Mars to the earth is, in round numbers, 35,000,000 miles. On August 23, 1924, this limit will be attained, for Mars will approach to within 34,600,000 miles of the earth.

The Martian canals were discovered only forty-five years ago by the Italian astronomer, Schiaparelli. With a modest 8 3/4 inch telescope, he observed the planet through the clear Italian skies at the time of the close opposition of 1877, when Mars was 35,000,000 miles from the earth. The reddish-ochre regions he found were covered with a network of straight dark lines intersecting in dark spots and ending in the dusky regions and these newly-discovered markings he called "canali". Unfortunately this was translated in English as "canals"; whatever these markings are they certainly are not canals in the sense in which we use the term. Their least width must be about twenty miles. The explanation generally accepted by those who believe in the existence of the canals is that they are strips of vegetation bordering on water-ways, but they disagree as to whether the water-ways are artificial.

Today the discussion raised by Schiaparelli's discovery is still unsettled though the canals have been photographed at the Lowell Observatory and elsewhere and have been systematically observed by many observers in the United States and Europe.

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The number of those who believe in the canals has considerably increased, and some astronomers who at one time doubted their existence now express a belief in their reality but interprete them as irregularities or streaks in the barren surface of the planet.

There are, however, a few significant facts about the planet Mars on which practically all astronomers are in agreement.

The existence of the polar caps and their dependence upon the seasonal changes is not disputed though certain astronomers still hold to the opinion that they consist of carbonic acid gas or hoar frost rather than ice. All believe that the polar caps are shallow and that there are no extensive oceans or seas on Mars. That seasonal changes take place in the color and general appearance of the dark markings on Mars, is not seriously disputed. Astronomers also believe that there is some water vapor on Mars but how much is an question. There is also no doubt that the atmosphere of Mars is much rarer than the atmosphere of the earth and that the average yearly temperature is considerably below zero, probably between minus 39 degrees Fahrenheit and minus 60 degrees Fahrenheit.

The chief source of controversy over the markings on Mars seems to be the fact that systematic observers of the planet with small telescopes between four inches and ten inches in aperture see fine markings that observers using the 36 inch Lick Observatory refractor, the 40 inch Yerkes Observatory refractor and the 60 inch Mt. Wilson Observatory reflector cannot see. One exception to this is that the canals have been continually observed and even photographed at the Lowell Observatory at Flagstaff, Arizona, with a 24 inch telescope.

The observers with the smaller telescopes maintain that large telescopes are not suitable for planetary observations since they magnify atmospheric disturbances and make the detection of fine planetary detail impossible. Those who use small telescopes emphasize the fact that it is of chief importance to choose an observatory site where atmospheric conditions are particularly good if one wishes to observe planetary detail.

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EDITORIAL

FINDING INVISIBLE SUN-SPOTS

The announcement from the Mount Wilson Solar Observatory that it has been found possible to discover and map spots on the sun before they become visible and after they disappear is not only an amazing achievement in astronomy but may lead to knowledge of great practical importance.

For the sun is the central power-house of the solar system. All earthly life is dependent upon the regular daily supply of the energy that reaches us by radio and the minute and irregular variations in this radiant energy must affect our climate and prosperity though we do not yet know how or how much. It has long been known that a

flare-up on the sun finds its reflex in the northern lights.

Sun-spots are solar tonnadoes, deep whirlpools in the sun's atmosphere, so large that the earth might be dropped into one and so hot that iron and line are gassous. The revolving streams of electrons create a magnetic field in their core and it is by these magnetic effects that such electric storms can be found thile yet too small to be discernible as dark patches on the sun's disk. It has recently been discovered that the sun as a whole is a magnet. When a flock of spots appear it means an outburst of solar activity but curiously enough this causes cloudiness in the earth's atmosphere so the weather is apt to be cooler instead of warmer.

Many fantastic ideas of the relations between sunspot cycles and earthly crises have been advanced. Rash attempts have been made to connect brain-storms as well as rain-storms with solar cyclones, and to predict wars and financial failure as well as crops. But measurements of solar radiation are now being used in forecasting the weather in several countries and the new method of tracing disturbances on the sun may contribute to this.

RIVALLING THE HUMMINGBIRD

Man is not satisfied with marely conquering the air. He must use all the means that his imagination can create. In a city today the hum of an airplane motor hardly bends afneck. Airplane trips, mail via aero, aerial photographs, and stories of the use of airplanes in war are more commonplaces. Now inventors are at work on helicopters, trying to build a craft that, like the hummingbird, can mount straight upward, hower, fly horizontally, and them drop safely to earth straight downwards.

It is not an easy task. Getting into the air is simple, but coming down from the heights is difficult, just as it is in many other events in life. The helicopter's development at the present time corresponds to the pre-Wright days of the air plane. We may expect prizes of 50,000 pounds sterling and the urge of the inventor's dreams, combined with mechanical facility and greater scientific knowledge, to eventually produce a man-made machine that will rival any bird in its power of vertical flight and stationary hovering.

DO YOU KNOW THAT -

The driver-ants found in the Gold Coast Colony of Africa constitute the standing army of the insect world. They march in close formation, twelve abreast, forming a line two inches wide. The soldiers are half an inch long and the officers seveneighths of an inch.

The quantity of explosives used in the United States during the calendar year of 1921 was lower by more than 30 per cent than the amount consumed in 1920.

The Einstein theory of relativity has been put in the movies. Six European professors have written the script for a 5,000 foot film consisting of drawings and trick pictures by which the theory is explained.

In the South Pacific, west of Patagonia, there is a sea-desert which contains so few forms of marine life that, it is claimed, whales and sharks frequently die of hunger before they find their way out.

DO YOU KNOW THAT -

The first farm tractor ever seen in Central China recently arrived at Hankow to be used with other American machinery in the cultivation of peanuts.

Speaking movies on a new principle said to be not unlike the transmission of photographs over telegraph lines are being produced in Germany. Light waves are converted into sound waves and amplified.

What was believed to be water from a fossil ocean imprisoned since mid-Paleozoic time was found at a depth of 6,260 feet in the Geary deep well 20 miles southwest of Pittsburgh.

Timber lands in Canada are being mapped with the help of aeroplanes at a less cost than ground work of similar accuracy.

DO YOU KNOW THAT -

Magnesium alloyed with aluminum and other non-ferrous metals, produces a series of metals whose extreme lightness and high strength are inestimably valuable to the builder of airplanes and ships. Properly alloyed, these metals are not flammable.

A University of Washington student claims to have found in a fungus a new fadeless green dye which withstands some chemical tests that no other known dyes can meet.

Roads built so as to interfere with proper drainage create breeding places for malaria carrying mosquitos, says U. S. Public Health Service.

The Bureau of Mines is testing the efficacy of dust from Alabama flake graphite for preventing the formation of scale in boilers.

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FRAGMENTS OF SCIENCE

Those who have gone deeply into natural history say that foxes approve of large families among rabbits .- By Prof. J. A. Thomson.

Thinking takes its departure from specific conflicts that occasion perplexity and trouble. - By Prof. John Dewey.

Life, in its main aspects, is essentially a rhythmic phenomenon. The essence of rhythm being order, it seems, indeed, inevitable that, with the progress of time, all biological phenomena of importance, whether concerned with the inner functioning of the organism or with its behavior in relation to the outside world, should tend to become increasingly rhythmic in character. - By F. W. Flattely.