

THE SCIENCE NEWS-LETTER

A Weekly Summary of Current Science

EDITED BY WATSON DAVIS

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ABOUT THE SCIENCE NEWS-LETTER

With this issue the Science News-Letter becomes a more compact and better summary of science.

Two changes are made. The reading references will now be found directly following the articles to which they refer. A department in which new or recent books are listed or reviewed in tabloid has been added.

----- BALD HEADS AS SIGNS OF PROGRESS

Shedding the hair of the head is part of the present evolution of civilized humanity, claims Dr. Ales Hrdlicka, of the Smithsonian Institution, who has made an extensive anthropological study of Americans whose ancestors have lived at least three generations on this continent. It would be wrong to blame the reduced vitality shown by the hair on any particular habits of civilized man or on disease conditions.

These may play a part, he says, but the real cause is hereditary. The hair tends towards an earlier senility and loss because it has become of less use to man living under modern conditions than it was in the past. Nature does not tolerate for long what has become useless or weakened.

It is the men who are getting bald, he finds. Women lose hair, too, he says, but not nearly so rapidly as the males. He is sure the women do not mislead him, as all of them were examined with their hair undone and freely hanging down. Although Dr. Hrdlicka explains the predisposition to baldness among males to inheritance, he adds words of woe to the flapper by explaining that the reason women have longer-clinging hair is that "possibly the weight of the female hair acts as a tonic."

READING REFERENCE - Hausman, L. A. Determining racial relationship by hair. Illustrated World 36:887-8 Feb. 1922. Hubbard, S. D. Ways to keep the 160,000 hairs in your head. American mag. 93:50-1 March, 1922. Hrdlicka, Ales. Physical Anthropology of the Old Americans. American Jr. of Physical Anthropology. Vol. V 2:97-142 April-June, 1922.

EINSTEIN'S FATEFUL DAY IS COME

By Dr. Edwin E. Slosson

On September 21 the theory of relativity will be put to the proof. After that day we may perhaps know whether Einstein is to be ranked with Copernicus and Newton among those who have revolutionized man's conception of the universe or whether he will be regarded merely as the author of an ingenious mathematical theory of limited applicability to reality.

For the last three years the theory of relativity has been the topic of lively discussion extending far beyond the scientific circle for the public realized that some interesting issues were somehow involved in its incomprehensible mathematics. More than a thousand books and uncountable articles have been published on Einstein; all sorts, pro and con, physical and metaphysical, experimental and speculative, serious and frivolous. Prizes have been offered to anyone who could explain it in ordinary language. Personal, political, religious and racial passions and prejudices have been aroused. Einstein was the first German scientist to be welcomed since the war in England, France and the United States, but in his own country he has to go into hiding to escape assassination by the junkers.

It is a remarkable example of how the progress of science may continue in spite of political conflict that during the world war Einstein should have sat quietly in his study in Berlin thinking out his theory and that during the world war English astronomers should have been quietly studying his work and preparing to put it to the test at the earliest opportunity.

This opportunity came on May 29, 1919, when there was a total eclipse of the sun. For Einstein had predicted that when the stars about the darkened disk of the sun were photographed they would appear as though pushed out of their positions. Just as when a dirty and malodorous man gets on a street car, the other passengers move away from him, those nearest naturally moving most. This is one of the consequences of Einstein's theory of relativity, which is designed to supplant, or at least to supplement, Newton's theory of gravitation.

According to Einstein a ray of light from a star passing close by a heavy body like the sun is drawn out of its straight course a little, somewhat as though it were a stream of material particles but to a greater extent than Newton's law would allow for. To an astronomer looking up at the star along this crooked path and not making allowance for the bend it would seem that the star had been moved away from the sun a minute distance, (1.74 seconds of arc). Of course this effect is the same at all times but it can only be observed when the sun's disk is completely shadowed from us by the moon's coming between.

So the British Astronomer Royal, Professor Eddington of Cambridge, sent out two eclipse expeditions in 1919 to points where the eclipse could be observed, one to the west coast of Africa and the other to the east coast of Brazil. When he came to develop and measure up his photographs he found that the stars about the darkened sun were displaced in the direction and close to the amount predicted by Einstein.

This was good evidence in Einstein's favor but scientists are cautious creatures and not all of them were ready to accept so startling a theory as this without further confirmation. The weather was very cloudy in Africa and the only good photograph obtained at the South American Station was one taken with a four inch lens and showing seven stars around the sun to compare with the photograph of the same stars taken when the sun was in their midst.

But there has been no other total eclipse observable till this year and this is not so good a one. There are no bright stars near to the sun, in fact only one visible to the naked eye among those close enough to the sun so their displacement can be measured. But there are four or five faint stars that may be caught on a sensitive plate with a good telescope if the weather permits.

Unfortunately, too, the eclipse occurs in a highly inconvenient part of the earth. Its track is along the Indian Ocean and through the heart of Australia where there are no observatories and few people. The best point is on Christmas Island lying west of Australia and south of Java. This island only measures eight by twelve miles and has a population of about 250 according to the latest census. But its population must be increased now by at least ten per cent. For the British, German and Dutch expeditions are stationed there. Christmas Island is a favored site for it is in the middle of the track of the eclipse. The darkness here lasts five minutes and astronomers can do much in five minutes. An expedition from the Lick Observatory, California, is stationed on the west coast of Australia and the Observatory of Adelaide has sent a party into the arid interior of Australia which involves five weeks of travel by camel train but which is pretty certain to get cloudless weather.

If the eight astronomical expeditions now in the field bring home confirmation of the results of the eclipse of 1919 then we may have to get used to all sorts of queer ideas, besides crooked beams of light in empty space. We may have to give up the force of gravitation and the ether and the constancy of mass and the distinction between matter and energy. We may get to talking about the curvature of time, the weight of heat, kinks in space, atoms of energy, four dimensions, world-lines, and a finite universe. We may be called upon to come to conceive of arrows that shrink and bullets that get heavier the faster they travel; of clocks that go slower the faster they travel; and of a future that turns back and tangles itself up in the present.

But we better not bother about these things till we have to. Perhaps September 21 will be cloudy in the Indian Ocean. Or so sunny that the plates will be fogged. Or the stars may be found in their accustomed places just as if they had never heard of Einstein. In that case we will not have to learn the non-Euclidian geometry but be content with the kind we know - or, to speak more exactly, the kind we got grades in at school.

****NEWS OF THE STARS****

Expeditions Tested Einstein Theory At Sun's Eclipse

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

When Old Sol hid his face behind the moon for a few brief moments on September 21 there were many scientists on hand to record the fact with elaborate telescopic and photographic devices that had been transported in some cases half way around the world months in advance.

Some of the points at which eclipse expeditions were located are the Maldive Islands in the Indian Ocean, Christmas Island about 250 miles south of the west end of Java, Wallal on the western coast of Australia, Cordillo Downs in central Australia, to which instruments and supplies were transported by camel trains from Adelaide, South Australia, and Goondiwindi in the southern part of Queensland. The longest

duration of totality was five minutes and nineteen seconds at Wallal.

The Kodiakanal Observatory expedition from South India in charge of Director Evershed located in the Maldivé Islands. On Christmas Island the eclipse was observed by expeditions from the Royal Observatory of Greenwich and the combined expedition from Holland and Germany which was joined by observers from Java.

The British expedition has been on the island since the last of March making extensive preparations for testing the Einstein theory of relativity. It is essential for this purpose to photograph the field of stars in which the sun is found at the time of eclipse, several months before or after the eclipse date. If, as the Einstein theory requires, the rays of light from stars near the sun are deflected from their course at the time of eclipse owing to the attraction of the sun's mass a comparison of photographs taken when the sun is in this field of stars at eclipse with photographs taken several months previous when the sun was not in the field will show the displacement of the star images required by the theory.

An number of eclipse expeditions located at Wallal, West Australia, owing to the generosity of the Australian government in placing at the disposal of the eclipse expeditions a transport of the Australian Navy.

Some of the expeditions that accepted this offer of the Australian Government are the Crocker eclipse expedition of the Lick observatory, California, in charge of Prof. W. W. Campbell, an expedition from the University of Toronto which also included Dr. R. K. Young of the Dominion Astrophysical Observatory, Victoria B. C., and an expedition from the Observatory of Perth, West Australia. The transport left Fremantle, the port of Perth, the last of August and will bring members of the expeditions back to that port after the eclipse.

The chief object of all expeditions was the test of the Einstein theory which requires that stars near the sun that are visible when the sun's rays are temporarily blotted out shall be displaced from their normal positions by amounts depending upon their angular distances from the rim of the sun. It will be recalled that the deflections both in direction and amount required by theory were obtained by the British observers at Principe, Africa, and Sobral, Brazil, at the time of the total solar eclipse of May, 1919. This is the first opportunity that has been afforded since that date to obtain an additional test of this prediction of the relativity theory.

All expeditions are equipped with the astrographic telescopes needed to test this theory and the results will be awaited with the greatest interest by the scientific world.

READING REFERENCE- Bird, J. Malcolm. Einstein's theories of relativity and gravitation. N.Y. Munn & Co., 1921. Moszkowski, Alexander. Einstein, the searcher his work explained from dialogues with Einstein. London, Methuen & Co., 1921. Slosson, Edwin E. Easy Lessons in Einstein. Harcourt, Brace & Co., 1921.

PREHISTORIC OBSERVATORY UNEARTHED BY ARCHEOLOGIST

A seat of science among prehistoric Americans has been discovered. Dr. J. Walter Fewkes, chief of the Bureau of American Ethnology of the Smithsonian Institution, just returned from three months of archaeological field work at Mesa Verde National Park, Colorado, reports the finding of an astronomical observatory used by the ancient cliff dwellers in calculating time for their farming operations.

A round tower, 15 feet in diameter and 10 feet high, was probably used for observations of the sun on the horizon at sunrise and sunset, and the information gained was used in determining the time for planting and performing other agricultural operations. In front of "Far View Tower", as this observatory has been named, there are the ruins of three underground rooms that Dr. Fewkes believes were used for the worship of the sun and other sky gods.

A large mound was also opened and investigated by the expedition. When work began no walls were visible. The site was covered with fallen stones and earth capped by sagebrush, identical with many other elevations found in the immediate vicinity. The removal of vegetation and debris, and an excavation of the rooms revealed a rectangular building 70 feet square with walls averaging one story high. It had indications of a lofty tower in the middle of the western side, which must have imparted to the building somewhat the appearance of a church steeple, or minaret of a mosque. The large room was subterranean, situated in the center of the ruin, its floor being about 25 feet below that of the other rooms. This subterranean room is a kiva but differs from others of like type on the Park in that it has no fireplace in the center of the floor, no ventilator or deflector and has eight mural pilasters instead of six to support its roof.

The fallen walls within showed indications of a great fire, the stones and adobe being turned brick color and the walls bright red by the great heat. On the floor of the kiva 25 feet deep was an enclosure set off by a semi-circular wall where the action of fire was particularly evident. In the enclosure was found many votive offerings, the most numerous of which were a dozen clay tobacco pipes of various shapes and sizes, one or two decorated on their exteriors. These pipes which are the first ever found on the Mesa Verde, had evidently been smoked by the priests and then thrown into the shrine. With the pipes the shrine also contained several fine stone knives, small decorated clay platters various fetishes and other objects. Pipe Shrine House was entered on the south by two doorways midway between which a large pictograph of a coiled serpent was incised on a large stone set in the wall.

To the south of the building there was a plaza surrounded by a retaining wall and directly opposite one of the entrances there are aboriginal steps which lead to a rectangular shrine four feet in size, in which were found a number of water-worn stones and a meteorite surrounding a large stone image of the mountain lion. The contents of this shrine were replaced, the mountain lion left in his original position and the enclosure covered with a netting to prevent the possible removing of the objects from their places. Other shrines and several stone idols of size were found in the neighborhood. The idols found at Pipe Shrine House represent the snake, mountain lion, mountain sheep, and bird, an important discovery as previously only one stone animal idol had been found at the Mesa Verde Park.

Dr. Fewkes declares that one of the most instructive experiences of the archaeologist is to see a skeleton centuries old as it lies in the grave. One of the ancient people of Pipe Shrine House was left in a prepared chamber for tourists to inspect. The cemetery lies on the southeast corner of this ruin and in it were found

several human burials from one of which a good skeleton was chosen to illustrate the manner of burial and the mortuary offerings. This skeleton was not removed from the grave but was surrounded by a stone wall, forming a room rectangular in shape protected by a grating and a waterproof roof. Visitors may now see one of the skeletons of the race of cliff dwellers as he was placed in his grave more than 500 years ago; Not a single bone has been moved from position. This is the first time in North American archaeology that an effort has been made to protect an indian skeleton and leave it just as it laid for centuries.

READING REFERENCE - Fewkes, J. Walter. A prehistoric Mesa Verde pueblo and its people. In Smithsonian Institution Annual Report 1916. p. 461-88.
Shelsh, R. C. Mesa Verde cliff dwellers. Mentor 10:3-12 June, 1922.

IS EUROPEAN CIVILIZATION BREAKING UP?

A warning that Europe was in danger of dissolution and of sinking again into Dark Ages was uttered by H. J. E. Peake, in his presidential address before the anthropology section of the British Association for the Advancement of Science meeting at Hull, England. The concluding passage of the address is as follows.

"It is needless for me to remind you that the world is in a state of very unstable equilibrium - that the crust is, so to speak, cracked in many places, and that the fissures are becoming wider and deeper, and that fresh fissures are constantly appearing, not only in distant lands but nearer home. Again, this crust, if I may continue the geological metaphor, is stratified, and there are horizontal as well as vertical cleavages, which are daily becoming more marked. It is to the interest of humanity that these breaches should be healed and the cracks stopped, or we may find the civilization of the world, which has grown up through long millennia at the cost of enormous struggles, break up into a thousand fragments. Such a break in the culture of the European Region followed the dissolution of the Roman Empire, and more than a thousand years were needed to heal it; nay, some of the cracks then made have never yet been closed. Anything that may help to avert such a disaster is important to the human race, and there is no greater danger at present than the alienation of the peoples of Asia and the Near East!"

In order to prevent this disaster Mr. Peake urged that anthropologists should devote themselves to the study of the differences between civilized peoples instead of confining their investigations to savages who, he said, "represent not so much our ancestors as our poor relations."

READING REFERENCE- Bogardus, Emory S. A history of social thought. Los Angeles Univ. of Southern California Press, 1922. Finney, Ross L. Causes and cures for the social unrest an appeal to the middle classes. N.Y. Macmillan Co. 1922.

CARRYING COAL TO NEWCASTLE

That Great Britain has become an extensive importer of coal, oil and iron was shown by the report of the Committee on Fuel Economy to the British Association for the Advancement of Science meeting at Hull, England. The miners' strike so reduced the supply of fuel that in 1921 it was necessary to bring in some 3,433,000 tons of coal and 136,424 tons of coke and manufactured fuel, mostly between May and July.

The crisis in the coal trade led to a severe depression in iron and steel. The Belgian and French works, by lowering the cost of production and taking advantage of exchange, were able to deliver pig iron in Scotland at thirty shillings per ton less than the British cost of production. The output of pig iron in Great Britain fell from 8,034,700 tons in 1920 to 2,611,400 tons in 1921 and the output of steel fell from 9,067,300 tons in 1920 to 3,625,800 tons in 1921. The cost of house fuel is still so high that the Committee sees "little hope of further reduction in the present prices of pig iron and steel."

In the matter of oil fuel the situation is worse for Great Britain is almost altogether dependent upon foreign supplies since the home production of shale oil is now very small. The imports of fuel oil rose from 1,425,000 tons in 1920 to 2,225,000 tons in 1921. Crude oil imports which were insignificant in 1920 (only 17,417 tons) increased to 426,151 tons in 1921.

MAPPING AIR AVENUE ACROSS CONTINENT

The C-2, the big Army dirigible now making the first trans-continental trip ever undertaken by a lighter than air machine, is training airship personnel and mapping a route which will be followed much more swiftly by the larger aircraft now building.

The C-2 is not trying to make any record flight. Its work will provide experience for the men who may man the giant ZR-2 or other dirigibles now building and to chart the way and locate landing fields.

The surveying party locating the new sky road planned to make stops at various points along the way. The principal way points are Scott Field, Belleville, Illinois; Brooks Field near San Antonio, and Camp Burnitt, El Paso, Texas, with Ross Field, California, as the western terminus. The route chosen takes in Langley Field, Washington; Akron; Dayton; St. Louis; Little Rock; Dallas, San Antonio, and Marfa, Texas; Nogales and Yuma, Arizona; and Ross Field, California.

The C-2 is 192 feet long, 54 feet wide, and 57 feet high and has a capacity of 172,000 cubic feet of hydrogen. It is equipped with two 15 horsepower Wright motors and can ascend to an altitude of 8,500 feet. The present round trip, it is estimated, will take about forty days, but airships following the route laid down can probably cross the continent on a regular two-stop schedule in two and one-half days. The cruising radius of the C-2 is about 700 miles, but an Army ship now building at the Goodyear plant will have an 1800 mile radius.

AIR PLANES AS AGRICULTURAL IMPLEMENT

Airplanes, so effective in human battles, may be used to turn the tide in the losing fight being waged by the southern planter against the boll-weevil. Experiments now in progress at the Delta Laboratory of the U. S. Bureau of Entomology at Tullulah, Louisiana, have shown that dusting plants with calcium arsenate from a flying machine is an effective means of control of the cotton-leaf worm. It is believed that the boll-weevil may be handled in the same way.

Experiments will probably be continued next year along these lines before any definite recommendations are made, officials stated today. This method of spreading the poison has, however, proved much more effective than expected and a much more even distribution of the chemicals was obtained than at first thought possible. The dust delivered from the plane can be controlled to poison effectively a strip of any desired width from 20 to 400 feet with about 2 pounds of calcium arsenate to the acre insuring a very thorough distribution. The air current created by the propellers is used to force the dust downward. About 250 acres of cotton an hour can be treated in this way.

By community dusting, the airplane method will prove cheaper than the present cost of mules and labor required to do the same work. The necessity of quick work in case of severe infestations is another great advantage, as the air method can do in a few hours what it would take the mule team weeks to accomplish.

Last year the ravages of the boll weevil were the worst yet and cost the farmers 109.1 pounds per acre in reduced production.

BLOOD TESTS CANNOT TELL CHILD'S PARENTAGE

Blood tests to determine the legitimacy of a child are declared dangerous. Dr. J. Arthur Buchanan of Pueblo, Colo. points out that such tests are by no means a sure index to parentage.

Fixing the paternity of a child by comparing its blood with that of its alleged parents, rests on the fact that all human beings regardless of race or sex may be divided into four groups according to the characteristics of their blood.

Advocates of the admission of blood tests as legal evidence say that if a child's blood shows the same characteristic as the supposed parents, then the child could be their offspring although it may not be. They do claim, however, that if the child's blood shows the wrong group for the asserted parents, the child does not belong to the supposed parents. That is, if both parents belong to Group No. 1, their children would also have Group No. 1 blood, and children showing other blood groups could not belong to them.

Dr. Buchanan says that this does not follow, and that in some cases the child might inherit the blood group of a grandparent, although that group did not appear in either of the parents. The only instance, he says, in which it appears that the blood group could be held as direct evidence would be in a family of four or more children of whom one was of a different group than that represented by both parents and all four grandparents.

EXPERTS EXPLAIN SOFT COAL BURNING

Proper firing will save money for the former anthracite users who have been made amateur soft coal handlers by the coal shortage. The U. S. Bureau of Mines tells how to use bituminous coal so as to effect a saving of these black diamonds.

Don't pile soft coal all over the furnace fuel bed. If you do, you will send good money flying up the chimney in the form of tarry, greenish-yellow smoke. The smoke will cover the flue surfaces with a large amount of soot and tar, which will reduce the transfer of heat and choke down the draft.

Fresh coal should be added on one side of the grate only, so that there will be enough heat to burn the gases driven off. If the fire-box is rectangular in shape and large enough, the fresh coal should be applied only at the front of the fire. Then the gases driven off pass over the remaining red-hot coal and are burned in the back portion. Later the coked coal at the front may be pushed back and fresh coal applied at the front.

In the case of round heaters, upon opening the door, it will generally be seen that one side of the fire is burned down lower than the other. The fresh coal should be spread on this low side only. The heat from the high side will ignite the gases given off.

When the coal contains much slack, particular care should be taken not to cover the whole fire for when the fire finally works through the fresh fuel layer, the gases and smoke with which the furnace and flues have become filled may unite with an explosion violent enough to blow down the pipes, and fill the house with smoke.

More frequent firing is required with soft coal than with anthracite and less coal should be fired at a time. By careful attention to firing, however, heat losses from incomplete combustion and the necessity of flue-cleaning may be reduced to a minimum.

GYRO TOP AIDS AIRPLANES IN FOG

A gyroscopic top is the latest device applied to saving the airman from the dangers of flying through fog. The U. S. Air Service has received word from London that the English air expresses are being provided with a stability gauge on the principle of the scientific toys which when spinning retain their balance even on a needle point.

The small gyroscope is fitted on the pilot's dashboard and controls a series of tiny colored electric lights, each shining through a small hole an inch in diameter. When the air express is flying at its normal position a white light is shining, but the moment the machine departs from the horizontal this white light goes out and one of the tiny colored lights appears. These lights are so arranged that they not only tell the pilot when his machine is leaning but how much. He is therefore able instantly to bring the plane level, the white light showing the moment this is accomplished.

The gyroscope itself is kept spinning continuously from the moment the air express leaves the ground by the suction caused as the machine rushes through the air.

READING REFERENCE- Chalmers T. W. The gyroscopic compass a non-mathematical treatment. London, Constable & Co., 1920. Cordeiro, F. J. B. The gyroscope. N.Y. Spohn & Chamberlain, 1923.

TABLOID BOOK REVIEWS

"A Half Century of Public Health". Jubilee Historical Volume of the American Public Health Association. Mazyck P. Ravenel, Editor-in-chief. pp 461 & XI. New York. American Public Health Association, 370 Seventh Avenue. Cloth, \$5.25; Stiff paper cover, \$3.75.

An interesting summary of progress of sanitation in America, written by those who have played important parts. It is a history of the first stage of the cleaning-up of America which is still in progress.

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"Science and Human Affairs". From the viewpoint of biology. By Winterton G. Curtis, professor of zoology, University of Missouri. Harcourt, Brace and Company. 330 p. \$4.

A good statement of modern views on evolution, a compact survey of the history of science from the earliest times and an argument for the reorganization of society on scientific principles.

CONTROL MALARIA BY QUININE ALONE

Malaria can be controlled by quinine treatment alone in any area of the world if there is sufficient quinine available and the people are sincerely desirous of being rid of the disease. This declaration is made by Dr. C. C. Bass, professor of experimental medicine in Tulane University as a result of malaria control work in the Mississippi delta under the supervision of the Mississippi Board of Health and the International Health Board of the Rockefeller Foundation.

The dose recommended for adults is ten grains of quinine sulphate taken at bedtime each night during the mosquito season. Where geographical conditions make the elimination of the Anopheles mosquitoes impracticable by the usual methods of draining breeding ponds and ditches and stocking waters with larvae-consuming top minnows, it is expected that the sterilization of malaria carriers by quinine treatment will be effectively used.

SMALL-POX MAKES STARTLING ROUND

Small-pox is on the increase. Scotland, Germany, France, Spain, Australia, Burma, the Phillipines, Brazil, Argentina, Chile, Costa Rico, Santo Domingo, Canada, and part of the United States have had epidemics of this disease in the last five years in a more severe form than it has appeared here, officials of the U.S. Public Health Service say.

Recent reports on the epidemic of 1920 in Glasgow, Scotland, show that small-pox which before vaccination was mainly a disease of childhood has switched to the grown-ups. No vaccinated person under 15 years of age died.

In this country small-pox showed an increase over previous years of 138 per cent. last year but a decrease of 71.9 per cent. occurred in the first six months of this year.
