

SCIENCE NEWS - LETTER

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HUMANIZED SCIENCE URGED TO COUNTERACT ANTI-EVOLUTION

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(By Science Service)

Salt Lake City, June 23.- A new form of education that will cultivate both the scientific and humanistic frame of mind in our young people and prevent such conflicts as that now waging over evolution was advocated by Dr. James Harvey Robinson, founder of the New School of Social Research and author of "The Mind in the Making", at the meeting of the Pacific Division of the American Association for the Advancement of Science here today.

Science Service has secured the most striking parts of Dr. Robinson's address:

THE HUMANIZING OF KNOWLEDGE

By James Harvey Robinson

Modern scientific research in spite of its professed aloofness and disregard of human feelings and motives, has succeeded in unfolding to our gaze so new a world in its origin, development, workings and possibilities of control in the interests of human welfare that practically all of the older poetic and religious ideas have to be fundamentally revised or reinterpreted. Scientific knowledge ingeniously applied and utilized by inventors and engineers has, with the assistance of business men and financiers, metamorphosed our environment and our relations with our fellow men. Our notions of our own nature are being so altered that should we discreetly apply our increasing knowledge of the workings of the mind and the feelings a far more successful technique might finally emerge for the regulation of the emotions than any that has hitherto been suggested. This is at least an exhilarating hope. We are forced to ask whether it is safe when our life has come to be so profoundly affected by and dependent on scientific knowledge to permit the great mass of mankind and their leaders and teachers to continue to operate on the basis of presuppositions and prejudices which owe their respectability and currency to their great age and uncritical character, but which fail to correspond with real things and actual operations as they are coming to be understood.

Much has been written of the conflict of science and religion. The real problem is nothing less than the stupendous task of cultivating an appreciation of the nature and significance of precise thought and exact knowledge in a being by nature and nurture so careless of truth and given to modes of thinking repugnant to scientific intelligence. For even the more magnificent scientific discoveries, especially those of recent years, have not penetrated into our general education and are entirely disregarded in most discussions of social problems. And yet an imposing accumulation of critical information of wide bearing is at our disposal which could become an active factor in the readjustment of the troubled relations of men were it possible to over-

come the obstacles to its general dissemination and acceptance.

A striking illustration of the present ineffective methods of popularizing cardinal scientific discoveries has recently been supplied by the revival of a strong and threatening opposition to the knowledge we now have of man's affinity and obvious relationships with the rest of the organic world. The idea of organic evolution is perhaps the most momentous in its bearings of all the great generalizations which have come with increased knowledge of the globe's history and the history of its inhabitants. Those who will take the trouble to consider even in the most elementary manner the multifold and concurrent evidence of the successive appearance of vegetable and animal species on the earth and the reasons for including man among the primates, cannot fail, unless they be utterly blinded by prejudice, freely to concede the animal hood of man.

Recently a serious misunderstanding has resulted from the report that men of science are giving up "Darwinism", that "Darwinism is dead". This has puzzled those who supposed that evolution was a well substantiated assumption and has filled with a somewhat malicious joy those who have always denounced the notion as wicked and opposed to Scripture. To the public, Darwinism means evolution, man's monkey origin, as the matter is popularly but inexactly phrased. But to the paleontologist and biologist Darwinism does not mean the theory of man's animal descent, which was formulated long before the publication of the "Origin of Species", but is confined to the ingenious theories which Darwin so patiently worked out to account for the facts of evolution. The statement that Darwinism is dead does not mean that the evidence for the evolutionary hypothesis has in any way been weakened or that any really competent man of science doubts our animal derivation. It only means that Darwin's explanations of how one species may have been derived from another have proved, as a result of increasing knowledge, to be mistaken or wholly inadequate. It means that we cannot any longer assign the importance he did to sexual and natural selection and the hereditary transmissibility of acquired characters. But the confessed failure so far of biologists to clear up the process of evolution, or experimentally create a new species from an existing one, does not affect the facts derived from many converging sources which lead to the unavoidable conclusion that man has a genealogical relation to the higher animals.

The chief aim of education for us who really grasp the value of a scientific attitude and appreciate the inherent obstacles which oppose themselves to its successful cultivation in the human species, should be the inculcation of the profoundest of truths, namely that science is one. It is all nothing more or less than the most accurate and best authenticated information that we possess, subject to constant rectification and amplification, of man's nature and history, and of the nature and history of the world in which he finds himself. It is just the most reliable knowledge we have. It is not history, philosophy, psychology, ethics, politics, economics; it is not astronomy, physics, chemistry, geology, botany, biology -- these are merely historical divisions of labor, which are now being profitably transgressed as we learn more of the essential interweaving and mutual dependence of all things. These consecrated divisions may still have a declining significance in research, but I cannot but think that they are one of the chief barriers to the cultivation of a really scientific frame of mind in the young and the public at large. They are aspects of a single supreme theme, Man and his World. Once it was well to dehumanize science; now it must be rehumanized.

Teachers and text book writers cannot proceed directly toward their ideals in education as they conceive it. They must hedge and suppress, compromise and extenuate, lest the authentic things now known which it concerns boys and girls to learn should unluckily start them thinking. For this might rouse the apprehension of some defender of the social and moral order, some professional patriot or some adherent of the Mosaic authorship of the Pentateuch. The politicians in the Kentucky legis-

lature think themselves competent to decide whether the state should grant funds to any institution in which man's animal extraction is taught; the politicians in the New York Legislature have provided that no one shall teach in the schools of the state who is known at any time to have expressed any distrust of our institutions.

Now nothing could be more diametrically opposed to the cultivation of a scientific frame of mind. Education should be largely devoted to the issues upon which the young as they grow up should be in a position to form an opinion. They should understand that scientific advance has greatly altered, and promises still further to alter, our environment and our notions of ourselves and the expediency of existing institutions of moral, social and industrial standards. We should have a dynamic education to fit a dynamic world.

We need some new organized effort to bring together in an imaginative and novel manner the prevailing and sometimes conflicting knowledge of the material world, its fundamental nature as it is coming to be understood in the light of the astonishing new theories of matter itself; the general story of life, with some attention to the great classes of living creatures; the discoveries in regard to man's nature and functioning and the history of his achievements and perplexities.

DR. JORDAN DEFENDS DARWIN;
SCORES GUESSING AT TRUTH.

Salt Lake City, June 23.- David Starr Jordan discussing evolution before the American Society for the Advancement of Science here today denied that in any matter of vital importance scientific opinion has altered the evolutionary theory. In praising Darwin's realization that the facts of nature have a material cause within the range of exploration, he declared that no guesses, however plausible, serve the purpose of truth and that philosophic speculation may be a worse enemy to science than crass ignorance.

"By the current term 'organic evolution' we mean the vast extension of geologic time, bound together by bonds of unity, which show that the life of the present is descended from the life of the past, controlled by the continuous action of existing causes," Dr. Jordan said. "Life changes with time. In the formation of any species two innate factors are always present, variation and heredity. By the former new combinations are constantly brought about. By the latter each individual is in large degree like its ancestry. Like produces not exactly but nearly like, and the creatures of the future spring from the survivors of today.

"On the outside two factors, at least, are present, molding the life of every individual and of every species. These Darwin brought together as 'natural selection', natural survival, as distinguished from the imagined 'supernatural', special creation; but the term as Darwin left it will bear further analysis. One element recognized by Darwin, that is, the inheritance of acquired characters, is still hypothetical and largely discredited, but no one who studies living things in nature can doubt the reality of the great sifting process by which those survive who can, leaving progeny having their general traits and their qualities of adaptability. Adapta-

tion has its rise in selection while fundamental resemblance in structure and development indicates blood relationship.

"A second effect of environment has been often overlooked but is especially potent in molding forms of life, this is isolation or separation which prevents a wide range in breeding through the interposition of barriers. The formation of words in a language is closely akin to the assembling of a fauna or flora. Every animal or plant or word flourishes in every part of the world unless (1) it has never been able to get there, or (2) getting there, it has failed to maintain itself, or (3) maintaining itself it has undergone changes into something else.

"No one having a right to any opinion at all questions the essential facts of descent and divergence, however much they may differ as to unsettled details. There is no contrary hypothesis in biology any more than in astronomy. Darwin's position was that of an explorer mapping an area from a lofty height. Others have furnished multitudes of detail, yet in no matter of vital importance has scientific opinion much altered his sketch map. But even more potent than his conclusions was his method, the realization that each phenomenon has its material cause within the range of exploration and that no guesses, however plausible, serve the purpose of truth. Whatever is true is the truest thing in the world and whatever it is we shall never know until we find out."

EDITORIAL

THE WILL TO DISBELIEVE

American scientists have recently been shocked to discover that a considerable part of their fellow countrymen have a violent antipathy toward an idea that has been universally accepted in the scientific world since the last century, the idea that all living beings, including men, are descended from the forms of life previously existing on earth. To account for this disconcerting discrepancy between scientific and popular opinion the Pacific section of the American Association for the Advancement of Science meeting this week in Salt Lake City called upon Prof. James Harvey Robinson whose latest book, "Mind in the Making", shows him skilled in understanding mass-psychology. His explanation of the popular reluctance to accept the new ideas that are now abundantly produced by scientific research was briefly this:

"Ideas, like kisses, go by favor. In almost all we hear, read, say and come to believe, truth in the scientific sense of the term is a matter of almost complete indifference. We often naively use the word 'feel' for 'believe', and even the word 'believe' means to cling to something dear and precious and good in our sight - to accept what we like to accept. And the wonder grows that there ever appeared in this world of ours a group of men like those here assembled so eccentric as to regard truth as the paramount issue."

This is discouraging to scientists who think that all they have to do is to demonstrate a theory to have it universally accepted. According to Professor Robinson, they will have to sugar-coat their pills, or first dig out the complex in the popular mind that prevents the reception of a particular idea.

COLORADO RIVER THREATENS
TO OVERFLOW IMPERIAL VALLEY

Salt Lake City. June 23.- Immediate action by the United States to protect mannaed lands in this country and Mexico against the flood waters of the Colorado River, was urged by C. E. Grunsky, San Francisco engineer, at the meeting of the Pacific Division of the Association for the Advancement of Science held here today.

This river, he claims, is ready to again change its course, go over and break through the levees, and empty into the Salton Sea in an attempt to bury the rich Imperial and Coachella Valleys under a lake of water in the same way that they were submerged in the recent geological past. It will take millions of dollars to stop the break when once it starts. To prevent this, he urged that the river be placed upon a direct course to the Gulf of California instead of the roundabout bed it has followed since 1905 and that a reservoir be constructed up stream which will control the flow of water.

"For over 500 years the Colorado has been flowing down the south slope of its delta cone, but there is physical evidence that in recent geologic time it has switched over to the northern slope and emptied its waters into the basin of which the present Salton Sea and the Imperial Valley and the Coachella Valley are a part.

This ancient lake formed in this way was 100 miles long and was 20 miles wide, when full. Periodically, from 500 to 1000 years, the Colorado flows into this basin and then for a similar period into the Gulf^{as} at present. Levees now prevent the river from turning back into the Salton Sea, but it is constantly building up its bed and threatening to go over the man-made banks. In 1905 it broke through and at an expense of nearly \$2,000,000 was forced back.

As part of both slopes of the delta cone lie in Mexico much of the work had to be done in that country, which caused embarrassment. This international aspect, as well as the fact that seven states depend upon the water of this river for irrigation, make it necessary that the work of constructing the large proposed dam to impound the water up the river at Boulder Canyon, control its flow in flood season, and conserve

the water for irrigation in the slack season, be undertaken by the Federal government. The fact that diplomatic relations with the Mexican government have been severed since 1913 further complicates the situation, Mr. Grunsky said.

Human activities modifying the natural conditions of well-watered banks with luxuriant vegetation are responsible for the present menace to the 70,000 people and \$100,000,000 to \$2,000,000 worth of property that is threatened by the river, Mr. Grundy declares. In 1905 diversion of the water from the old channel allowed the vegetation to dry up and be destroyed by fire.

BLIND WONDER DECEIVES SELF:
CAN'T SMELL COLORS IN DARK.

Chicago, Willeta Huggins, the 17 year old blind and deaf girl who recently astonished doctors with a demonstration of apparent ability to name colors by the sense of smell and to hear by the sense of touch, really has a remnant of sight and her deafness is probably hysterical, declared Dr. Joseph Jastrow, professor of psychology of the University of Wisconsin, who has examined her and believes that she is deceiving herself and others in her pretense to remarkable powers. He made the investigation for the American Medical Association.

"In every practical sense," he says, "the girl is blind and has no central vision whatsoever. The possibility of a slit-wise vision is, however, by no means excluded. In bringing objects to her nose to smell them she has them near enough to her eyes to see them through this slit of vision.

"When Miss Huggins was tested in a dark-room while an ordinary light was on, she sorted colors correctly but much more slowly than in the fully lighted room. With the light extinguished, she was unable to do anything at all.

"The claim put forward," he continues, "that she is able to understand spoken language provided there is a connection between her fingers and the head or the larynx of the speaker either directly or through a wooden rod is also beyond belief.

"Those acquainted with the phenomena of hysterical deafness will realize how

difficult it is to determine the actual status of this sense. It would take far more careful experiments than have yet been made to decide whether this is a case of hysterical deafness, but the psychologic laboratory possesses a technic sufficient to determine whether the girl deceives herself in the belief that the vibrations conveyed through her finger tips make her hear the sounds which really reach her through auditory channels. When, unknown to Miss Huggins, the rod that is regarded as essential to carry the vibrations was actually not in contact with the speaker's head, she replied to questions quite as well as though the contact had been established.

"The reason Miss Huggins is accredited with these unusual senses is through the conviction that her sight and hearing are useless. My examination does not bear out such a conclusion."

FIND ORIGINAL SPUDS
LEADING WILD LIFE

Washington. . . Thirteen thousand feet above sea level in the mountains of northern Ecuador, the region which is believed by scientists to be the cradle of the potato race, there has been found a true wild species of this plant which is quite different from the cultivated tubers. These discoveries were made by Wilson Popenoe of the Bureau of Plant Industry, Department of Agriculture.

Our own large, developed potatoes would be just about as proud of these mountain murphies as Mr. Bryan is of the anthropoid apes; for the Andean variety from which our own has sprung is too small to be of economic importance. Plant breeders in this country, however, hope that tests may show characteristics which will make it worth while to combine them with our cultivated kinds by crossing. The wild tubers produce seed rather freely, but also are subject to one of the potato diseases of which their cultured brothers are often victims.

DID PRYING EYES REVEAL VENUS
OR WAS IT MERELY HER VEIL?

Salt Lake City. June 22.- Is Venus inhabited? The answer now hangs on the veil with which she conceals her charms. Dr. Charles E. St. John, astronomer of Mt. Wilson Observatory, has declared that spectroscopic analysis shows that neither oxygen nor water vapor, necessary to life as we know it, is present in the atmosphere of our sister planet. Today Alfred Rordame, meteorologist of this city, came to the rescue of the possible Venusians in an address before the American Meteorological Society meeting here in which he claimed that the clouds which surround their sphere reflect the light so that the spectroscope can not tell what is below them.

"When photographs and drawings made by astronomers using the telescope are interpreted in terms of meteorology the apparently contradictory evidence of the lines and shadows is more easily understood," he said. "The only conclusion we can draw must be from analogy. Venus is a rotating planet and the atmosphere is subject to the same laws as that of the earth. Ascending currents at the equator produce dense clouds which deposit snow and ice at the poles, and the only partly clear places on the planet are those zones corresponding to our trade wind regions. Light and heat are of twice the amount received by the earth from the sun, causing clouds to form at an immense height as compared to those of the earth.

"The spectroscope is incapable of penetration below these clouds around Venus, as the light is reflected from the upper surface of them. The bulk of whatever oxygen and water vapor exists must be beneath this veil in the stormy atmosphere nearer the planet."

315 ORGANIZATIONS
INTERNATIONAL IN SCOPE

Washington. - Religions, lawn-tennis, etymology, the weather, medicine, international language, and many other activities, movements and sciences are being furthered by international organizations of some sort. A handbook of international organizations has just been issued by the League of Nations at Geneva. Some 315 associations, bureaus and commissions are included, with a short summary of their objects.

GAME RESOURCES OF COUNTRY
FABULOUS IN VALUE

Salt Lake City, June 22.- The wild game resources of the United States have a value that seems nearly fabulous, Dr. Barton Warren Evermann, president of the Pacific Division of the American Association for the Advancement of Science, declared in his address at the annual meeting here tonight. He estimates the annual kill of game worth: deer, \$3,000,000; rabbits, \$3,000,000; game birds, \$50,000,000; fur-bearing animals, \$10,000,000. To the wild fowl and animal wealth must be added the value of our great coal and oil fields and natural gas, forests of hard and soft woods, our hundreds of species of valuable insectivorous and predacious birds, and the rich fisheries of our Atlantic and Gulf coasts, Great Lakes and interior waters, and of our Pacific Coast and Alaska.

"This very richness of our natural resources has had much to do with making us the most short sighted, the most extravagant, and the most wasteful people in all the world," he said. "Every effort should be made to maintain in profitable condition these valuable assets."

He told how they could be conserved. Forest cover must be maintained. Swamp lands, marshes, ponds and small lakes that can not be converted into more valuable agricultural land must be kept in their natural condition. Stream pollution must be prohibited. Cover must be provided for quail, prairie chickens and pheasants. The migratory-bird treaty act has already resulted in a great increase in our waterfowl and other migratory birds; its rigid enforcement will result in still greater increases. The enactment into law of the "Public Shooting Grounds and Bird Refuge Act", recently introduced in Congress, will make it certain that there will be no more wild fowl shooting for all for many years to come without any serious effect upon the abundance of the various species.

The natural resources of the sea,--the whales, fur seals, sea otters, sea lions, and walrus, are all in danger of serious depletion if not extinction, Dr. Evermann warned. An international treaty similar to that of 1911 for the protection of the northern fur seal and the northern sea otter, is necessary to save the southern fur seal, the southern sea otter, the whales and the other marine mammals from total extermination.

DRY SPELL DISCOURAGES
UTAH TREE PLANTERS

Salt Lake City. June 23.- Drought during the latter part of June and the first part of July has proved the chief hindrance to successful reforestation in Utah, F.S. Baker of the U. S. Forestry Service at Ogden told the Society of American Foresters meeting here. It is largely responsible for the failures which caused the abandonment of the State's tree planting, begun energetically when attention was attracted to the problem by the creation of the National Forests.

"In the large open and bushy country of the mountains of central Utah, a large amount of planting was done with western yellow pine," he said. "Owing to the extent of failures, planting was reduced year by year until it was finally discontinued in 1920. Plantations made on sites having exceptional subterranean water supplies, either on account of their location or lack of heavy vegetation to use up the water rapidly, prove to be the best planting sites, but the usual dry period which occurs in the latter part of June and early July is the chief hindrance to timber raising."

LONG RANGE WEATHER
FORECAST TO COME

Salt Lake City. June 22.- Forecasting the weather far in advance is a possible development of the future, J. S. Ricard, S.J., of the University of Santa Clara, California, declared before the American Meteorological Society here today. Sun-spots and signs on the planets will undoubtedly aid in such predictions.

"Storms and counter-storms are the immediate factors in the weather and we can base our short range prediction largely upon them," he said. "In order to make long range forecasts it is necessary to know the remote factors. This is entirely possible for no realm in nature is lawless and a law controls the weather. It is the business of the meteorologist by observation of phenomena to work out these laws scientifically. He does not have to bother about the why and wherefores; that is for another and higher branch of science."

NEW ELECTRIC CONVERTER
DEMONSTRATED BY DANISH SCIENTIST

New York. June 00.- An ingenious device for converting alternating to direct electric current by means of a jet or stream of mercury is now being demonstrated at Columbia University by Dr. Julius Hartmann of Copenhagen. This invention, experts think, may supplant the mercury arc rectifier for use in battery charging sets. Some experts also ^{see} the possibility of this new apparatus replacing the extensive converter now used in furnishing power to street cars.

In this new method the alternating or pulsating current flows through a jet of mercury which passes between the poles of a permanent or constant electro-magnet. The magnetic force acting on the jet changes its direction with the changing direction of the alternating current and the stream of mercury swings from side to side like a stream of water from a garden hose swung in the hand.

As the jet swings backward and forward, it passes from one to the other of two electrodes separated by an insulating quartz wedge. One of these is connected to the positive side and one to the negative side of the direct current apparatus. By properly adjusting the distance of these electrodes from the magnet, the swinging of the jet is so timed that it strikes the positive electrode only when the current is positive and the negative only when the current is negative, thus rectifying the alternating current.

The spent mercury is continuously pumped back to the reservoir which feeds the jet and is prevented from becoming dirty or fouling as a result of oxidization by passing it through an atmosphere of hydrogen or coal gas.

The inventor claims that he has had one of these machines in operation for over a year without an adjustment and that with the exception of the pump to return the mercury to its reservoir, there are no moving parts to get out of order.

Up to 50 kilowatts, the largest size in which this mercury jet converter has been built, an efficiency of 95 percent has been obtained.

NEWS OF THE STARSStars Differ Greatly in Size but Little in Mass

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

(Science Service)

That the stars differ very little from one another in mass or the quantity of matter that enters into their composition though they may differ enormously from one another in size is one of the most remarkable discoveries of modern astronomy.

It has been found that the most massive of all stars, the bluish-white helium stars, contain at the most no more than about eighteen times the quantity of matter that enters into the composition of our own sun, though some are larger in size than the sun's planetary system. This is approximately the upper limit of the masses of the stars. On the other hand there are, so far as is known, no luminous stars that contain less than about one-tenth of the mass of the sun. In fact it can be shown that there are good reasons why stars of very small mass could not be self-luminous.

Prof. A. S. Eddington, the noted English astronomer and mathematician, has shown in a brilliant mathematical investigation of the effects of radiation-pressure on the evolution of the stars that there are theoretical reasons why the masses of the stars cannot exceed a certain value, and his conclusions are confirmed by the results of observations.

As the giant red stars, representing the first stage in stellar development, contract and become hotter the pressure of light or radiation within their interiors increases with the temperature and acts in opposition to gravity tending to push particles outward from the center of the star toward the surface. As the star passes in its evolution through the stages of yellow, white and bluish-white giant star in turn to the peak of its development as a star of the latter type this radiation pressure becomes more effective as the temperature increases. Under the action of the two opposing forces, gravitation which tends to draw particles toward the center and light or radiation-pressure which tends to force them outward toward the surface, an equilibrium is maintained so long as the mass of the star does not exceed a certain

amount. If the mass does exceed this amount the star becomes unstable and either disintegrates or the excess mass is expelled by the action of radiation-pressure. Possibly for this reason, the most massive and hottest of all the stars are frequently enveloped in luminous nebular gases which conceivably are puffed forth from the stars under the action of radiation-pressure. The upper limit of the masses of the stars is thus controlled by the safety-valve of radiation-pressure. If the mass of a star should greatly exceed a certain amount it would at a certain stage of its evolution practically go to pieces.

The enormous giant stars such as Antares and Betelgeuze for this reason exceed our own sun millions of times in volume but have masses so small that their densities are less than one-thousandth of the density of air. As a result their surface gravities are only a few hundredths that of the earth while the surface gravity of the sun is twenty-seven times that of the earth.

EXPLAINS THE MANNA OF MOSES

Baltimore. - Manna, upon which the Jews fed while wandering in the wilderness with Moses, is explained by Dr. Paul Haupt, instructor in Semitic languages at Johns Hopkins University.

Manna was a nutritive lichen like Iceland moss and the reindeer moss which in times of great drought and famine has served as food for a large number of men in the arid steppes of various countries stretching from Algeria to Tartary, Dr. Haupt declares.

The edible lichens, he said, contained not only starchy substances but in some cases a small quantity of saccharine matter. It was prepared by grinding the lichen-manna in querns or mortars, mixing it with the honey-like drops which exudes from the punctured bark of the tamarisk tree, and baking this mixture.

RADIO NEWS OF THE WEEKRADIO ON TRAINS TO FOLLOW
AUTOMATIC TRAIN CONTROL?

Washington. Will the next step in "safety first" railroading be routine radio communication between train and dispatchers? This is the question that is being asked here by those who see the future significance of the Interstate Commerce Commission's final orders to forty-nine railroads to establish automatic train control devices on their lines before January 1, 1925.

The first trains ran "wild" with no other control than that of the engineer. When two trains used the same track in opposite directions, the first control was through synchronized watches. Watch failure, or an engineer's impatience, often resulted in a head-on collision. Then came the telegraph, and the red light, and its resulting intermittent communication between dispatcher and engineer. As the air brake was perfected and speeds and weights increased, the block signal system, and later the automatic interlocking signal system, came into being and use, extending the intercommunication between dispatcher and train. Now comes the automatic train control, to insure that engineers will do with their trains what the signals say they must do. Yet, with the best of signal systems and the most reliable of automatic control, the fact remains that a fallible human being is propelling a many ton missile at tremendous speed and power across country, with only intermittent communication with those who might warn him of danger or tell him why he should stop.

Radio telephones would keep engineers and conductors in continuous touch with all stations on the right of way. Its installation by legal enactment is believed by many to be as inevitable as was that of the air brake, the block signal and now the automatic train control.

CALIFORNIA'S REDWOODS
GROW MOST WHEN YOUNG

Salt Lake City. June 22. The venerable redwoods of California, like children, grow faster when they are young, Dr. D. T. MacDougal, director of botanical research of the Carnegie Institution of Washington, told the western branch of the Ecological Society meeting here today.

In young trees the cambium layer of the trunk, a surrounding sheet as thin as paper which does the growing, may lay on half an inch of wood in a year, but the rate of growth decreases with age so that five hundred years later the annual increment may not be more than a fifth of that amount. Though the redwoods are large and old they are very delicately responsive to seasonal differences in growth activities. This spring their trunks did not begin to enlarge until five weeks later than last. The enclosing sheet of cambium may be active in patches or on one side of the tree only and thus make incomplete annual rings, Dr. MacDougal said.

If Californians wish to measure the redwoods when they are largest, they must get up early, as Dr. MacDougal explained that "trunks, whether dormant or growing, show a daily variation in diameter by which they are thickest at sunrise and shrink until midafternoon."

PACIFIC COAST SCIENTISTS
MEET AT SALT LAKE

(By Science Service)

Salt Lake City. June 22.- Scientists of the Pacific Coast region will gather here for a three day meeting beginning Thursday, June 22. There will be sessions of the Pacific division of the American Association for the Advancement of Science and thirteen affiliated organizations. The leading addresses will be on evolution and the attacks that are being made upon it. Among the speakers on this subject will be Dr. James Harvey Robinson and Dr. David Starr Jordan. The problems of the Colorado River will be discussed at a symposium.

(A Ten Minute Chat on Science)

THE SUN CURE

By Dr. Edwin E. Slosson

Seasonal are the reports confirming the curative value of sunlight. It seems that what has long been vaguely surmised or cultivated as a fad is at last to be incorporated into the realm of sober science. For many years Dr. Rollier has been treating tuberculous sores and swellings by exposing them to sunshine on his Alpine farm at Leysin, Switzerland, where the boys work and play all day long in the open with no clothing but a breech-clout. Those too weak to stand are exposed in beds on the porches and given ten minutes sunning the first day, twenty minutes the next and so on, being carefully watched to see that the rays do not burn the skin or set up a fever.

The Germans have carried their Nacktkultur as they have their other forms of Kultur beyond the limits allowable in other countries. The British have taken it up the sun cure although they have not much of any sunshine to work with.

In our own country Dr. A. F. Hess of New York reports the prevention and cure of rickets in infants by exposure to the sun's rays for half an hour a day. There is nothing magical about the sun. He gets the same results by exposure to the rays from a carbon arc lamp such as is employed in taking motion pictures. But the light must be received direct for even window glass shuts off those rays which effect the cure. The babies in the hospital behind glass windows developed rickets while those set outside in the sun did not, although both were fed on the best of milk. When the rickety infants were put out on the porch in the sun their bones stiffened up and their blood showed an increase of the phosphates necessary for bone building.

Experiments on white rats gave the clue to the secret. They developed rickets even in the sunlight if kept in a glass box but not if they received occasionally the direct rays of the sun. The mercury vapor lamp - those bluish tubes that make you look so ghostly at the photographers - worked as well as the sun provided that the

enclosing tube was made of quartz instead of glass.

This indicates that the curative part of the rays are those with the very short wave length that lie beyond the violet end of the spectrum, for these rays cannot pass through glass although they will through quartz. The X-rays which have the power to penetrate to the depths of the body and break up the flesh, causing sores, if left on too long, lie far beyond these and have very much shorter wave lengths. Sunlight does not contain X-rays, otherwise we should not be able to carry our photographic plate holders into the open.

What is the action of the ultra-violet rays on the human system is not yet known. The sunlight falling on the skin somehow changes the composition of the blood and may cause it to resist the poisons and possibly the germs that cause disease. Sunning is said to alleviate rheumatism and to hasten the recovery of convalescents, from fevers and wounds. The "blue glass" fad that some of us are old enough to remember may have been on the right track - if they had only left out the glass.

But those who propose to try heliotherapy on the beaches or meadows this summer should look out for two things, one is the local police regulations, and the other is to take the remedy in small doses at the start. For you may be one of those who burn instead of browning. Also it has been found that certain drugs and foods will sensitize the system and that exposure to the sun's rays will develop a serious case of fagopyrism, or something of the sort. If you don't know what that is, all the more reason for looking out for it.

DO YOU KNOW THAT -

Bumble bees work overtime in Alaska. In the absence of darkness, they have been found going about their business at 10:30 at night in Fairbanks.

There are 19,067 radio sending stations licensed by the Department of Commerce; 15,495 amateur, 2,783 American ships, 439 commercial, and 348 experimental.

At Bibi Eibat, in Russia, one oil well is said to have produced three and three quarter millions of barrels in thirty days.

One kind of soy bean/bean yields 22 per cent of oil. The equivalent of milk and butter for table use is also obtained from this bean.

DO YOU KNOW THAT -

Fifteen years ago many British railroad cars were heated by foot-warmers. These devices were oval-shaped iron cans containing either hot water or a chemical substance and did not retain heat long.

In Japan a vegetable leather is made from the inner bark of a plant called the mitsumata.

Before he invented the steamboat, Robert Fulton experimented with a submarine at the bottom of Brest Harbor in France using funds obtained by portrait painting in Paris.

Police of Scotland Yard have been experimenting to test the use of wireless in directing the movements of officers in pursuit of criminals.

DO YOU KNOW THAT -

Trials of motorless airplanes are to take place on an extensive scale in France this summer.

Some whales travel twice a year more than a quarter of the circumference of the globe, being in the Arctic in summer and on the other side of the equator in winter.

Peter Henlein invented the mainspring as a driving power for clocks about 1500. This improvement opened a new field for clocks as it made them portable.

In the midst of an arid Arizona desert the copper mining company working the celebrated Ajo mine has created a beautiful oasis.

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FRAGMENTS OF SCIENCE

As a matter of fact, no phenomenon of nature is better understood than that of the origin of species, taking the word species in its original and natural definition as a definable form of animal or plant life as now existing on the globe. - David Starr Jordan.

The storage of heat in the earth while the days are long, its gradual delivery back to the surface while the daily supply from the sun is comparatively small, and the poleward drift of warm water at all seasons, together produce, as explained, the paradoxical result so admirably expressed by the proverb: As the days grow longer, the cold grows stronger. - W. J. Humphreys.

Mars has given to this world a most interesting and instructive line of research - I might almost say vital to the future welfare of the race on Earth.- Dr. G.H. Hamilton, Lowell Observatory.
