SCIENCE NEWS

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THE NOBEL PRIZE MEN

THE Duc de Broglie, scientific scion of a proud French family, is wearer of the Nobel laurels for physics for 1929. In this high award, physicists see a compliment to a new way of looking at the phenomena of light, electricity and other stuff of which the universe is made. For Duc de Broglie was the pioneer in the development of that most modern branch of physics "wave mechanics" which the German physicist, Schroedinger, developed to an even greater extent.

The theory of wave mechanics as propounded by de Broglie and Schroedinger makes the differences between matter and radiation a shadowy borderland. An electron, the unit of electricity and the smallest particle of matter, becomes a sort of manifestation of a group of waves, while waves of light or other radiation at times take on the properties of particles. And then at other times matter is best explained as acting like waves of radiation.

All this is disconcerting to those who learned about light, X-rays and other radiations some years ago when they were considered wave motions. Despite the new wave mechanics, the classical wave theory of radiation accounts for ordinary optical phenomena with satisfaction and for practical purpose it is not thrown overboard. Yet wave mechanics explains some mysteries unsolved by earlier conceptions and therefore the physicist is in the position of having more than one fundamental law. He uses the one that fits best, confident in the hope that future progress will destroy their apparent inconsistencies.

One daring prediction made by Duc de Broglie when he first developed his wave mechanics a few years ago was fulfilled by the discovery of the American physicists, C. J. Davisson and L. H. Germer, that electrons, particles of matter, act like waves in the same sense that light and X-rays are waves.

THE investigator who discovered the fundamental laws connecting the production of electricity from a hot wire with the temperature of the wire, a phenomenon utilized to-day by every tube radio set, received the 1928 Nobel Prize, just awarded this year. He is Professor Owen Williams Richardson, director of research in King's College, London, who, from 1906 to 1913, was professor of physics at Princeton University in this country. He is considered father of the branch of physics which he christened "thermionics," which deals with the effect that heat has on matter in generating electrically charged particles, called ions or electrons. While Professor Richardson's work for which he has received the Nobel Prize was done in the interests of the advancement of pure science, his laws find intense practical application in the design of electron tubes now so widely used in radio, the talkies and other applications of physics to industry.

STUDIES of yeasts, sugars and the fermentation of sugars, carried on over many years, won the 1929 Nobel Prize in chemistry for Dr. Arthur Harden and Professor Hans von Euler. Dr. Harden, professor of biochemistry in the University of London and head of the biochemistry department at the Lister Institute, has published a book on alcoholic fermentation, besides reports of his many chemical studies, some of which were in the field of vitamins.

Professor von Euler is director of the new biochemical institute of the Stockholm High School, which is really a university, where he has been professor of chemistry for some years. Like Dr. Harden, Professor von Euler has made studies of vitamins, although his main interest has been in the field of enzymes and sugars. He has published two books on the chemistry of enzymes, besides many reports of studies conducted alone and in collaboration with others.

The studies of Dr. Harden and Professor von Euler are known to chemists in this country, but they have not heretofore attracted wide attention.

THE PRODUCTION OF COTTON

COTTON is still king in the Southland, but his throne is a bit uneasy under him, and in the course of a few years he may have to share domain with younger King Cottons who are growing up in other lands. This is the gist of a prophetic report to *Economic Geography*, by Professor Earl C. Case, of the University of Cincinnati.

The very factors that helped to establish the southern part of the United States as the leading cotton-producing area in the world are now helping in its decline, and in the rise of rival cotton regions. Our cotton belt is a compact block of fertile soil with a climate well suited to cotton growing. But the fertility of the soil is declining, and the climate has been as favorable to the enemies of cotton—boll weevil and the rest—as it was to the cotton itself. Bad years affect the whole area and may cut down the yield fifty per cent., because it is all in one piece; whereas cotton lands elsewhere in the world, being cut up into smaller and scattered blocks, escape in most parts when disaster visits any particular point.

Another important factor that is threatening the supremacy of American cotton is the rise in the cost of cotton-farming labor in this country. Even though the Negro and "poor white" labor of the South is among the worst-rewarded of all American agricultural work, its wage is still many times higher than that of cotton-field workers in South America, India, Egypt, the Sudan and China. And the northward migration of Negroes that has been going on ever since the new immigration laws cut down the supply of unskilled laborers in northern industrial plants is seriously cutting into the rural population of the South.

The apparent determination of British cotton spinners and weavers to reduce the degree of their dependence on American cotton by increasing the quantities of the fiber grown "within the Empire" is another influencing factor. Great new cotton areas have been opened up within the past few years in India, in the Sudan and in Tangan-

yika; and the cotton fields of Egypt still have strong British connections in spite of the changed political status of that nation. South American nations, notably Brazil and Argentina, are making strong efforts to become at least partly self-dependent.

China, one of the greatest cotton markets of the world, now raises a great deal of low-grade cotton. Professor Case believes that the Chinese farmers, though the world's most obstinate conservatives, may in time be persuaded to introduce improved varieties and to adopt improved cultivation methods. If and when that happens, China will need a great deal less foreign cotton.

THE SAHUARO CACTUS

THE giant sahuaro cacti that stand like sentinels in the southern Arizona desert are fruit trees to the Papago Indians. Their red fruits, filled with sweet pulp, figure so largely on the red man's bill of fare that when the sahuaro and wheat harvests chance to be ripe at the same time he will divide his family into two groups so that he may still gather his share of the "figs from thistles."

In a report to *The Journal of Heredity*, Frank A. Thackery and A. R. Leding, of the U. S. Department of Agriculture, tell of the high value set by the Papago on his cactus crop and of the methods he uses in gathering it.

Sahuaro fruits are the best sources of sugar known in the desert country, and the Indian has as much of a sweet tooth as his Caucasian brother. The Papago make use of the fruits mainly in the preparation of a syrup, which they keep in sealed clay jars until they are ready to use it. It will stay good for a year.

When the fruits show by their red color that they are ripe, a large part of the Papago community leave their villages and journey to their campsites in the midst of the sahuaro "forest." The women have charge of gathering the fruit and preparing the syrup. Gathering fuel and hauling water is the men's job, and since water often has to come from a distance of fifteen miles, the squaws are not necessarily getting the worst of the division of labor.

The women knock the ripe fruits off the tops of the giant cacti with long poles made of spliced cactus ribs and armed with a couple of hooks made of thorns. They pick them up off the ground, slit the skins with a swift slash of the thumb-nail, and empty the pulp into a basket. It takes a good half-day's work to gather fourteen or fifteen quarts of this pulp.

Back in the camp, the pulp, with a little water added, is simmered over a fire in an earthen pot. The cooked juice is strained away from the pulp and then boiled again until it is reduced to a syrup. This is poured into earthen jars and sealed shut.

Besides the syrup, the Indians sometimes prepare preserves of the sahuaro pulp. They also dry some of it without cooking and eat this "as is" or moistened with water during the winter. The seeds left over from the syrup-making are either ground into meal or kept for chicken feed.

SPONTANEOUS COMBUSTION

THE strange phenomenon of hay-racks catching fire through no human agency was recognized as a natural process by wise men of old Rome, and yet two thousand years later the process is still as baffling and inexplicable to modern science as it was to Columella and Pliny. Citing the knowledge of ancient observers regarding spontaneous combustion, Dr. Henry G. Knight, chief of the U. S. Bureau of Chemistry and Soils, recently outlined a program of scientific research which would solve the mystery and enable mankind to forestall the destructive process. Dr. Knight, speaking before the Conference on Spontaneous Heating and Ignition of Agricultural and Industrial Products, in session at Washington, D. C., said: "There is evident need of careful investigation of the exact conditions that produce the spontaneous ignition of agricultural materials as the basis for our future course of action. It will require a cooperative investigation by chemists, bacteriologists and engineers upon quantities of materials sufficiently large to duplicate actual farm conditions."

Outlining the points requiring special attention, he said:

"Chemical analyses should be made of the fresh material and the chemical changes which take place throughout the heating period should be noted carefully. The rate of heating in different parts of the mass should be determined. The avidity for oxygen of the fresh and fermented material should be studied. The migration of moisture throughout different parts of the experimental material should be carefully observed. The production of gases and their character should receive study. The effects of aeration at various stages of storage should be recorded. Studies of conditions existing in the areas of high heats should be carried on, and the various methods of curing in the case of hay and the effects of adding other substances such as salt to hay and to cattle feed should receive special study. Along with this work and based upon it should be studies of methods directed at the reduction of spontaneous heating and actual firing of agricultural materials."

Spontaneous ignition costs American farmers millions of dollars a year, and the chief products which go up in smoke or are spoiled for use by this cause are hay, grain and horse manure.

TREATMENT OF COLDS

BECAUSE colds are not unchanging but have three distinct stages, treatment must be planned for each stage, Dr. Walter A. Wells, professor of otolaryngology at Georgetown University, has advised. Treatment by a physician will do much to relieve the discomfort and shorten the duration of a cold, but not every one can have medical treatment for all colds. Remedies to apply at home are described by Dr. Wells in his recently published book.

In the first and second stages treatment should be general, not local, so as not to irritate further the tender membranes of the nose. Dr. Wells describes the first

stage as the one when there is stuffiness, chilliness and possible fever and general discomfort. In the second stage there is marked secretion of watery acrid material. This changes to a mucous or muco-purulent discharge during the last stage.

Prevention is the best of all home remedies for a cold, Dr. Wells stated, but having once got a cold, the wise thing is to remain indoors in a comfortable warm room, resting in bed for a day or so if possible. Cold baths, cold showers and strenuous exercise, valuable hardening methods in the intervals between colds, should be stopped while one has a cold.

"Nothing could be farther from the right than the injunction, 'Feed a cold and starve a fever,'" Dr. Wells explained. "A cold is a fever, the inflammation being localized in the respiratory mucous membranes. Overloading the stomach is directly harmful, and meats, gravies, fried stuff and richly spiced food are especially to be avoided."

Plenty of fluids, including milk and fruit juices, are advisable. For the beginning stage of a cold, free perspiration helps and for this hot drinks may be taken.

During the acute, feverish stage of a cold, the blood tends to be less alkaline than usual. To combat this, alkaline treatment, such as taking bicarbonate of soda in water, is advised. Gentle local treatment may be begun in the second stage. Steam inhalation of menthol or menthol and eucalyptus are healing and soothing. For the last stage of a cold, alkaline antiseptic solutions used locally as a douche are in order.

The chlorine treatment of colds Dr. Wells and his associates found was frequently helpful in simple uncomplicated cases when used in the first stage. When tonsils or sinuses were involved this treatment had little effect. Dr. Wells has found no scientific foundation for the now-popular vaccine treatment of colds, and attributed the occasional good results from it to coincidence.

PREHISTORIC INDIANS

INDIANS of prehistoric America constitute rare material for the laboratories of science, Dr. A. V. Kidder said in a lecture at the Carnegie Institution of Washington on November 12.

Dr. Kidder, who directs the archeological activities of the institution, spoke on the oldest known inhabitants of America and their importance to science. Two factors, he said, combine to create an unparalleled opportunity in the Southwest for study of the growth of early human culture. The first is the favorable climate of the Southwest, where shriveled mummy-like bodies of Indians who lived before the time of Christ have been preserved in the dry hot earth. These burials and possessions of the Indians found with them and in their shelters enable archeologists to study the progress of their culture in the greatest detail, Dr. Kidder pointed out.

The other favoring factor is the scarcity of water in the Southwest which caused the Indian groups to congregate where water supplies were good and to inhabit the same places, generation after generation. Thus the remains of their habitation have accumulated in the soil in successive layers and scientists can use principles of stratigraphy in determining the relative age and the order of development of various groups.

The remains thus preserved are worth study because they reveal the course of progress when human beings succeeded in taming a wild grain to insure a cereal crop. The transitions of the nomadic and farming periods are lost in Egypt and Mesopotamia. In the Southwest, where corn was the cereal crop, the earliest farmers, the basket makers, grew only a primitive variety. Later, the cliff dwellers and Pueblos grew a number of kinds, and improved the crop. The development of farming brought leisure to the people and made home life possible. Building arts could be experimented with, and community life with rites and rules became complex.

ITEMS

THE division of fish and game of the California Department of Natural Resources reports a novel method for securing natural food for baby trout, used by J. W. Ricker at the Cold Creek hatchery. An insect trap in the form of a funnel-shaped cloth sack, over which was suspended an electric light, was hung near the water and the light left burning the entire night. In this way, using a number of traps, several hundred pounds of insects were collected and fed to the young trout. Mr. Ricker said the captured insects provided splendid food, but that this diet should be supplemented by other types of food, as the young trout did not do so well unless their diet was varied.

BISON herding may yet come to rival reindeer raising, the newest of Alaska's great industries, if the preliminary experiments reported by L. J. Palmer, of the U. S. Biological Survey, prove successful enough to justify their extension on a larger scale. About a year and a half ago, Mr. Palmer states, 23 head of bison were shipped to the northern territory from the National Bison Range, Montana. Nine were released near the town of McCarty, and fourteen held at the reindeer experiment station at Fairbanks. The animals came through their first winter in good shape, in spite of heavy snows, feeding on natural fodder, chiefly the wild vetch.

REINDEER moss, the crisp and curly lichen that is the chief dependence of reindeer in the far North, is an enemy of forest growth farther south, reports Anna E. Allen in *Ecology*. This lichen is by no means confined to the lands where reindeer pasture, but grows over great areas, especially as a ground cover under trees, as far south as Florida and Mexico. It forms dense mats like fine shavings, and the seeds of trees and other plants, caught on top, are held away from the moist earth where they might sprout and grow. They just hang there in the air until they die of drought. Even if they do work their way down to the earth and sprout, their troubles are not necessarily over. The reindeer moss heaves and moves about restlessly as it is alternately wetted and dried, and in doing so frequently breaks or uproots seedlings that have pushed their way through its meshes.