SCIENCE NEWS

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COLD LIGHT

THE "cold light" of living things, such as fireflies, and the bacteria and fungi that cause rotten wood to glow in the dark, has been made the subject of scientific measurement by Dr. W. W. Coblentz and Dr. C. W. Hughes, of the U. S. Bureau of Standards. These humble organisms are so much more efficient in getting light out of a given amount of energy than the best incandescent lamp which man has yet devised that they are at once the admiration and the despair of scientists, and they may some day furnish a hint that will revolutionize the whole art of illuminating engineering. For this reason physicists and biologists are always at them, trying to pry open their secret.

In their present study, the two government scientists have split up the light of these organisms by means of a spectroscopic prism to learn accurately of what colors it is composed, and they have also measured the amount of energy in each of the color bands with a device that makes use of a sensitive photographic plate. The photographic exposures necessary varied from an hour in the case of the firefly to three days with pieces of "fox-fire" wood.

They found that the various organisms varied widely in the range of colors that go to make up their light, as well as in the particular color most intensely present in the glow. Thus, the light of "fox-fire" wood, which comes not from the wood but from a fungus in it, included all colors from blue-violet down to red-orange, with the highest intensity in the green, and a smaller high point in the yellow. In a certain glowing sea-creature the range shifted toward the violet end of the spectrum, going beyond the light of the "fox-fire" and almost to the limit of visibility, but stopping short at orange and excluding red at the lower end. The point of highest intensity for this animal's light was a slightly greenish blue. The firefly with which they experimented had an uneven distribution of color in its spectrum, but was strongest in the yellow. They also tested certain zinc compounds that glow in the dark, for purposes of comparison.

The light from these glowing animals and lowly plants does not come from a slow combustion of their substance, as was once supposed, but from a sort of digestive process which involves a special material secreted by the organism and a special enzyme that works upon it and causes it to shine, according to Professor E. N. Harvey, of Princeton, who has studied this phenomenon of "bioluminescence" from the biological point of view. When these two things come into contact, other conditions being favorable, the light appears. It is also possible to take the "luciferin" of one animal and cause it to glow by adding the enzyme, or "luciferase" of a different species.

IMMUNITY TO MEASLES

WHEN either measles or whooping cough make their appearance in a German family it is the current practice to prevent those diseases or to forestall serious complications by inoculating the exposed children with blood from their parents, according to Professor Rudolf Degkwitz, who is director of the children's clinic at the University of Greifswald in Germany and is engaged at present in research on measles at the U. S. Public Health Service.

In the densely populated countries of Europe, he explained, the chances of reaching full-grown manhood or womanhood without contracting measles or whooping cough are very small. It has been established, he said, that the periodic subsequent exposures to both diseases resulting from the contacts of every-day life stimulates during the whole life production of antibodies in the blood. Consequently the blood of most of the adult population of Europe or of any big city in any country is a convenient immunizing agent that can be used to prevent those diseases or to mitigate their severity in children.

"When a German child 'comes down' with either whooping cough or measles," said Professor Degkwitz, "the physician uses the blood of the father or mother to inoculate the other children in the family. When this is done early enough in 50 per cent. of the cases treated the diseases are prevented and an immunity for several months is established. In the other 50 per cent. very mild forms of the disease ensue that confer as lasting an immunity on the young patient as a severe case. Measles and whooping cough in such cases are so mild that as a rule the children do not feel ill at all and can not be kept in bed. Since the efficacy of this method depends on its early use, German health authorities are endeavoring to teach this vital point to parents through propaganda distributed to school children." The health section of the League of Nations likewise advocates this mode of treatment.

Professor Degkwitz has been working with an animal serum to be used as a measles preventive and curative which is made from the blood of immunized sheep. To obtain the best results it should be administered the first day of the disease, when the temperature begins to rise. He claims that the serum administered at this time prevents measles and finishes the fever after 24 to 36 hours or else modifies the disease to a very mild form. In both cases a lasting immunity follows. The serum is on the market in Germany and is being tried out experimentally in England and other countries. British health authorities, however, maintain that up to the present the reports on the uses of the serum have not shown satisfactory results.

THE PREVALENCE OF CANCER

CANCER data recently collected for fifteen different cities in the United States and Canada are revealing some

striking new facts. Perhaps the most suggestive is the wide variation disclosed in cancer incidence by different organs and parts of the body in different sections of the country. For men, the death rate from cancer of the stomach was 45 per 100,000 for San Francisco and only 19 for Buffalo. For cancer of the esophagus the rate was 7.7 for men in San Francisco but only 4.2 for white men in New Orleans. For cancer of the larynx, the rate was 5.1 for white men of New Orleans but only 2.0 for men of Buffalo. Cancer of the pancreas prevailed to the extent of 4.6 for San Francisco, but the rate was only 1.2 for white men of New Orleans. The rate for cancer of the breast was 29.7 for women of Albany and 26.4 for women of Boston, against 18.8 for white women of New Orleans and 15 for women of Buffalo. Mortality from cancer of the uterus was 52.9 for colored women of New Orleans, 33.7 for women of San Francisco and 26 for women of Chicago.

The extended investigation is being carried on by Dr. Frederick L. Hoffman, consulting statistician of the Prudential Insurance Company, who has the cooperation of fifteen American and Canadian cities and three Canadian provinces. The investigation includes attention to living cancer patients, of which some 3,000 have been reported upon.

Among other facts disclosed is the apparent increase in cancer of the lungs. As a general rule, cancer and tuberculosis rarely coincide in the same person.

Dr. Hoffman's Canadian investigations show that French Canadians have a much lower cancer death rate than English Canadians. As yet, no satisfactory explanation for this difference has been forthcoming. Cancer of the lip and mouth is apparently more common among French Canadians in Montreal than among the remainder of the population, but cancer of the esophagus and gall bladder is less common. Cancer of female organs is also decidedly more infrequent among French Canadians than among other Canadians in Montreal. The investigation is being extended to other sections of Canada as far as the Pacific Coast.

THE CONSERVATION OF GRASS

"SHOULD this harvest of grass fail for a single year, famine would depopulate the land." With this excerpt from a speech of the late Senator Ingalls as his text, Will Barnes, of the U. S. Forest Service, painted a vivid picture of the importance and romance of the grasslands in the history of the American nation, before the New Haven meeting of the American Forestry Association.

The cow is the foster-mother of the race, and her sons have hauled the ponderous covered wagons of its migrations and pulled the plows that broke the pioneers' first furrows, Mr. Barnes reminded his hearers; and where cattle are to go, there must be grass. Many of the finest of the grasses in the older parts of the country are naturalized citizens: the brome grasses, orchard grass, even the famous Kentucky bluegrass; but out on America's real grasslands in the West there are none to equal the native gramagrass and curly mesquite and bunch grasses.

"No other country has such valuable winter ranges as we have throughout the arid regions of the far West, where the native grasses grow in regions of extremely limited rainfall," according to Mr. Barnes. "They cure on the ground equal to hay, furnishing feed for livestock during the winter months. Neither are there any other countries of which we know that can claim such areas of purely summer range as are found in our West in the high mountain regions, where the lush feed grows with astonishing rapidity in the spring. All this must be removed from these ranges each season or be lost forever.

"As with all our other resources, however, we Americans have been wanton destroyers of our grasslands, mainly through overgrazing. To-day this country has nearly 180 millions of acres of strictly grasslands—areas which under no known system of cultivation can ever be used for any purpose other than grazing livestock. This is an area larger than our largest state, Texas. Even at the low valuation of $2 an acre it means over $300,000,000 worth of public property lying idle and deteriorating in usefulness—a liability rather than an asset."

Mr. Barnes appealed for a scientific program of development for American grasslands. Conservation measures, he pointed out, are now effective in all the public domain except only in the grazing country, where they are of immediate and pressing importance.

ADVERTISING TO AID PARKS AND RECREATION

NEW ENGLAND plans to recoup a part of her threatened prestige in industry by getting full value out of her "stern and rockbound coast" and the "murmuring pines and the hemlocks" of her forests as national recreation grounds; and she intends to tell the world about them, through a scientifically planned campaign of advertising.

The value to this picturesque and historic section of the country of what he termed its "intangibles" was discussed recently by Albert M. Turner, field secretary of the Connecticut State Park and Forest Commission, speaking before the annual convention of the American Forestry Association at New Haven. Mr. Turner announced that as an engineer he had always been used to dealing with things of strictly tangible value, but that he has come to realize the "use" of beauty and that his section had lagged behind the rest of the country in providing areas for the specific purpose of recreation.

"New England has two per cent. of the land in the United States, seven per cent. of the people and nine per cent. of the wealth," he stated, "yet of public land available for recreation we have now only one half of one per cent. and this in spite of the fact that we have twenty-five million acres of land, or sixty per cent. of our total area, in wooded lands. The people of the United States have now set aside or acquired a hundred and forty-seven million acres of public park and forest, or almost eight per cent. of the land area of the forty-eight states, and they are steadily acquiring more."

The ratio of public land available for recreation is greater in the West, Idaho heading the list with thirty-three per cent. of her total area, while the percentage is "almost nothing in certain states that need not here be advertised." Yet the East is not wholly asleep, for

"New York has seven per cent. and is buying more, while New Hampshire has seven per cent. and seems to like it."

Mr. Turner disclaimed any intention to lay down details of a scheme for "parking" New England, but he recommended that "for the benefit of its own people, its own timber supply and its own watersheds, the section should promptly begin to formulate plans for the acquisition of at least eight or ten per cent. of its land area, or from three to four million acres."

THE ANTI-EVOLUTION STATUTE OF TENNESSEE

VIOLATION of Tennessee's anti-evolution statute is now virtually impossible, under the interpretation placed upon the much-discussed law by the state supreme court, according to Henry E. Colton, counsel for the Tennessee Academy of Science in the appeal from the decision of the lower court after the Dayton trial. The only way in which a Tennessee teacher could now force himself into the law's clutches would be by directly inculcating doctrines of materialism or atheism in connection with evolution. Evolution pure and simple he can teach as much as he pleases, so long as he leaves religious denial out of the discussion. "The supreme court has rather clearly indicated that it wishes to get rid of this case, and the attorney-general is apparently likewise of the opinion that it is to the best interest of Tennessee not to prosecute this case further," Mr. Colton says. "In fact, under three opinions rendered in the case by the four judges now living it would seem probable that the state could not obtain a conviction in this case unless upon retrial and reappeal to the Tennessee supreme court it should win over the fifth judge, Swiggart, who did not participate in the case.

"An examination of the record indicates that John Thomas Scopes taught the generally accepted scientific theory as to the evolution of man without in any way denying the divine origin of man. Under liberal interpretation of the Biblical stories there is no conflict between the scientific theory of the evolution of man and the Biblical stories which teach the divine origin of man but do not specify the gradual process by and through which he was created.

"Two of the judges, Chambliss and McKinney, have held in substance that the mere teaching of the scientific evolution theory as to the origin of man does not constitute a crime under Tennessee law. Judge McKinney so holds because in his opinion the Anti-Evolution Act is unconstitutional for uncertainty. Judge Chambliss so holds because in his opinion the contention of the defense is correct that the teaching of the generally accepted scientific evolutionary theory as to the origin of man is not made an offense under the Anti-Evolution Act unless the teacher goes further and denies the divine origin of man. In other words, Judge Chambliss construes the statute as condemning the teaching of materialism or atheism, but not as condemning the mere teaching of the scientific theory of evolution of man as generally taught. Under the foregoing circumstances and facts, if the state, after having spent thousands of dollars in the prosecution of Scopes, sees fit to dismiss Scopes without undertaking to convict him, it seems scarcely worth while for the defense to run the risk of antagonizing the court by arguing for a further hearing when it has already for all practical purposes won two out of the four judges now living who heard the case, and the state seems to be so tired of the prosecution that it is of its own accord dismissing the indictment against Scopes; and when it is known to all the world that he has taught the scientific theory as to the evolution of man.

"If the state does not have sufficient confidence in the act to proceed against Scopes under the foregoing circumstances it seems questionable whether it will ever undertake to enforce the act unless a teacher should not only teach the scientific theory as to the evolution of man but go further and undertake to teach materialism and deny the divine origin of man."

ITEMS

THAT the wave of influenza that has been sweeping over Europe is settling down before it touches our shores is the conclusion reached by officials of the U. S. Public Health Service based upon failure to receive further information on the progress of the epidemic. Both the Epidemiological Intelligence Department of the League of Nations and the Health Organization in England announced their intention recently of broadcasting radio reports on the character and progress of the disease. Up to date, however, no reports have been picked up, Surgeon-General Hugh S. Cumming declared recently. The fact that the Arlington Naval Wireless Station has been unable to pick up any of the signals for the Public Health Service is interpreted as meaning that the epidemic is subsiding and that no bulletins have been sent out from the European stations. The decision of the health section of the League of Nations to make available by broadcasting the information received by extensive epidemiological intelligence section it has been building up, was determined, it is said, by the numerous inquiries received from all over Europe as well as Australia and the United States.

NICOTINE, thus far practically unrivalled as an insecticide against plant lice, may soon have a serious competitor in the field through the results of experiments carried on at the U. S. Bureau of Entomology. An oil prepared from pyridine, which forms an essential part of nicotine, combined with sodium, has been found to be poisonous to plant lice. Like nicotine it destroys the lice without injuring the infested plants. Entomologists believe it possible that dipridyl oil, as the new compound is called, may prove more effective than nicotine for the practical control of some injurious insects. Thus far the economic phase of large-scale production of the new insecticide has not been thoroughly gone into, but it is believed that it can be made as cheaply as the manufacture of nicotine.