

## SCIENCE NEWS

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## NEW SOURCES OF ULTRAVIOLET LIGHT

To aid America's war effort, new sources of ultraviolet or black light have been perfected which cause fluorescent materials to glow several times more brightly than was previously possible, was reported by E. W. Beggs, lighting engineer of the Westinghouse Manufacturing Company, to the meeting of the American Optical Society at the Massachusetts Institute of Technology.

The new sources, which range from a walnut-sized bulb to a four-foot glass tube, use a new chemical coating that transforms short-wave ultraviolet to near ultraviolet. Chemical coatings also sift out the visible light.

Fluorescent materials glow when illuminated with ultraviolet light and cease to glow when the black light is turned off.

Thus an ultraviolet spotlight may pick up fluorescent markings in the dark which until then had been invisible. Maps, which must be read under blackout conditions, can actually be made to glow in several different colors. Fluorescent dials in an airplane will glow without the glare that would impair the pilot's ability to see out into the dark, and even this glow can be dimmed or extinguished at a moment's notice.

Phosphorescent materials, on the other hand, are like storage batteries of light. Activated for less than one minute by the ultraviolet light, they continue to glow for several hours afterwards. Other artificial sources may be used for this activation, but none is so efficient as the new mercury vapor fluorescent lamp.

Trail-blazing with fluorescent powders or paints is another one of the important possible new uses for black light. By this method, markings left on trees, stones and bushes remain invisible until picked out in the darkness by ultraviolet spotlights.

## THE HEALTH OF THE NATION

THE nation's health continues good, according to reports from state health officers to the U. S. Public Health Service.

Only shadows on the otherwise bright health picture are caused by dysentery, meningitis, anthrax and infantile paralysis. The latter disease has caused a number of cases in Kentucky and Arkansas in the last week or two, but it is so late in the season that health authorities believe a wide-spread outbreak unlikely.

Texas reports the number of cases of bacillary dysentery as "very high." Of the 356 cases for the nation as a whole during the week ended July 25, 261 were reported from Texas. Virginia that same week reported 351 of the total 386 cases of dysentery of unspecified cause. The low reports from other states may mean that not all cases are being reported.

Reports of meningitis cases for some time have been higher each week than for the corresponding week of any year since 1937. Weekly totals for the nation run about 60 cases. Most of the cases are in the East, but so far the disease has not become epidemic.

A total of six cases of anthrax appeared in the latest available weekly report. The usual rate is one or two cases a week for the nation.

No human cases of plague have been reported so far this year. Anti-plague activities are being pushed strenuously by the Federal Health Service and by California, Washington, Oregon, Montana and Idaho State Departments of Health.

Some concern is felt over reports from the field investigators that large numbers of Norway rats have appeared along roadsides and around farm buildings in the Plains states, Kansas, Nebraska and the Dakotas. No plague germs have been found on any rodents within 200 miles of these areas, but the presence of the rats which may become a reservoir of the disease is causing some uneasiness.

Anti-plague units of the Public Health Service are vigorously searching for and destroying plague-infected ground squirrels and other rodents on and near military reservations and airfields in the West and Northwest.

BACTERIOPHAGE AND DYSENTERY  
IN ALEXANDRIA

BACTERIOPHAGE, the germ-eater, is conquering bacillary dysentery in Alexandria, Egypt, is reported by Dr. Arthur Compton, director and pathologist-in-chief of the Laboratory Service, Alexandria Municipality, in *The British Medical Journal*.

In Alexandria, he reports, patients with bacillary dysentery died at the rate of 25 out of every 100 in 1928. Since 1938 only about 5 out of every 100 patients with this disease have died. In Cairo and the rest of Egypt the situation has not been so favorable. Case mortality rates for Cairo have varied between a maximum of over 60 per cent. in 1928 to a minimum of 25 per cent. in 1938.

The difference, in Dr. Compton's opinion, is due to bacteriophage, which physicians of Alexandria now give regularly to patients showing the first signs of dysentery. Since 1930, moreover, the Municipal Public Service in Alexandria has budgeted annually for commercial bacteriophages for the specific treatment of bacillary dysentery and like conditions in the municipal hospitals and children's clinics.

Thus the phage therapy (treatment) has been employed in Alexandria on an important scale for at least twelve years. In Cairo, phage has not been used to any appreciable extent until recent years and the rest of Egypt may be considered as practically not having known phage therapy at all.

VITAMIN DEFICIENCY AND HIGH  
BLOOD PRESSURE

A DEFICIENCY of some of the B vitamins may be a cause of high blood pressure in some cases, it is suggested by experiments with rats reported by Dr. Royall M. Calder, of the Clayton Foundation for Research, Houston, Tex., in *The Journal of Experimental Medicine*. If the

experiments are confirmed and shown to apply to man as well as rats, the remedy for some cases might be better diet or doses of the proper vitamins.

Diets containing vitamin B<sub>1</sub> or thiamin, but lacking somewhat in the heat-stable vitamins of the B group, resulted in a "significant and persistent rise" in the blood pressure of the rats. This could be reversed by restoring the missing vitamins to the diet. The explanation, Dr. Calder believes, is that lack of these vitamins blocked the action of certain enzymes needed to make oxygen available to the kidney cells.

Every cell of the body requires oxygen in order to live and function. The cells of the kidneys may be deprived of oxygen if the arteries carrying oxygen in the blood are constricted. This is known to cause high blood pressure, and it is believed that it is the hardening of the artery walls which causes the constriction in human cases of high blood pressure. Dr. Calder believes that in some cases the high blood pressure due to lack of oxygen may occur, even when the artery walls are not hardened and constricted, as a result of failure of the cells to use the available oxygen. This failure might result from lack of vitamins or from some other condition that would make certain cells unable to use the vitamins.

No immediate human application is suggested by Dr. Calder, who presents his theory and experiments as "a working hypothesis" for further studies of the cause of high blood pressure.

### SUN BATHING BY MINERS IN GREAT BRITAIN

MINERS at the Manvers Main Colliery in England now get daily sun baths by an assembly line method called both "revolutionary" and "unique in this country" by its designer, Dr. William Beaumont, of London, in a report to *The British Medical Journal*.

The miners, after their shower-bath, pass through a door and step onto a conveyer belt which carries them along a corridor which has mercury vapor arc lamps along its walls to deliver ultraviolet light. At the end of the corridor the men step off the conveyer and pass through a door to their clean clothes locker.

The assembly line sun bath is capable of providing sun baths for fifty workers every five minutes. It provides a minimal dose of the artificial sunshine, designed not as treatment but as a prophylactic measure to keep the men in good health in spite of lack of exposure to natural sunlight. The equipment is put into operation by throwing a single switch. Any defect or breakdown automatically breaks the electrical circuit supplying the apparatus.

The problem of providing artificial sun baths for factory and other workers as well as miners who work long hours under artificial light and lack opportunities for spending the week-ends in the open for some time has been exercising the minds of those responsible for the health of the workers and also those whose main concern is production.

Both the Germans and Russians, he adds, faced this situation long before the war. The Krupps mines at Essen, he says, have a "splendid installation" built in

the early days of the Hitler regime and the value of sun baths in factories was recognized in Russia years ago.

### DUST ANALYSIS AND OCCUPATIONAL DISEASES

BECAUSE of the development of an inexpensive and comparatively simple technique of analyzing dust particles, occupational diseases resulting from the inhaling of contaminating dusts may be attacked on a new front.

Research just completed in the Research Institute at the University of Oklahoma has produced the new method, known as the polarographic analysis of industrial dusts, which employs an electro-chemical method of analysis. It was developed through the cooperation of the Oklahoma State Health Department and the University of Oklahoma Research Institute.

The study grew out of the difficulties that the Oklahoma Department of Health was having in attempting to solve the cause of poisoning that was prevalent among workers in smelters of the northeastern part of the state.

The dust particles available were so small that in many cases they could scarcely be weighed on even the best analytical balances, thus making it necessary to develop a new technique. With the polarograph the quantities of lead, cadmium, and zinc which are most detrimental to health were determined. In the new technique, all the elements present in the dust particles are determined with the spectrograph, and the quantities of lead, zinc, and cadmium are determined with the polarograph.

With the use of a polarographic analysis, industries now have a way of measuring the quantities of toxic constituents in the air in the various parts of the plants, and may remove the possibilities of poisoning by ventilating the various parts of the plants that present a health menace.

Robert C. McReynolds, research fellow, who worked under the supervision of Professor J. Rud Nielsen, has directed work on the project since the first of this year. He was assisted by Robert Ady, of the Oklahoma State Health Department.

### THE TREES AND SHRUBS OF FLORIDA

SINCE southern Florida was first transformed from a mangrove swamp into a winter playground, trees and shrubs from all the world's warm regions have been imported and naturalized there. Almost every present and possible future battleground, jungle, bush or semi-desert where the temperatures remain mostly in the nineties and hundreds is represented by plants now growing along the populated coast of peninsular Florida.

First are the many palms and cycads. There are the fish-tail and toddy palms from southeastern Asia, the Areca and Sagisi from the Netherlands Indies, the spindle palm from Mauritius, the fan palm from China, date palms from India, and many specimens from Australia. In conservatories may be found *Actinophloeus Macarthurii* from Australia. This slender-trunked palm is quite rare. Among the cycads, that look like palms but aren't, are two sagos, one from East India, the other from Japan.

Among shade trees, the bunya-bunya, the Moreton bay pines, and the beautiful flame tree come from Australia.

Woman's-tongue, whose greenish yellow flowers rival in beauty the Poinciana, hails from subtropical Asia and Africa. Pink Shower, Mountain Ebony, and the Red Cotton Tree are from India. The so-called Australian pines (they are not pines) including the famous Beefwood or She-Oak range far up Florida's Coast.

There is the camphor tree from China; the eucalyptus from Australia; the Australian bush cherry; the lofty fig from India; the Java fig or weeping laurel from Malaya. From India comes an especially interesting planting, the Peepul or Sacred Bo-Tree. Sacred to the Buddhists, the Peepul is used as a temple tree in India, and may be the world's oldest transplanted tree. One of this species is still growing in Ceylon, brought there from India in 288 B.C. Then there is the Silk Oak and the Cajeput, or punk-tree, from Australia; the Longan tree from India; the Kaffir bean tree from South Africa; the African tulip tree, tamarinds and almonds from south-eastern Asia.

Finally among the shade trees is the sausage tree from tropical Africa. This is planted in Florida for the novelty of its fruit. The dull-red tubular flowers are followed by the large sausage-shaped fruit suspended from the limbs by long cord-like stems.

In Madagascar is found an old familiar friend in the Royal Poinciana. In Florida are many tropical grasses and bamboos, including one of the handsomest of the giant bamboos from Cochin China and *Cyperus Papyrus*, the Egyptian paper reed or Moses' Bulrush. Among the shrubs are many from the Pacific Islands, Java, Arabia, the Himalayas and Malaya. Then there are the snowy-leaved Crotons from Malaya, and the Chinese hibiscus, and many tree ferns from Australia.

As for fruit, Florida grows the East Indian lotus, the Malay apple, the Chinese guava and the Chinese litchie fruit, the madlar, or Japanese plum, and the East Indian mango. Exotic deciduous fruits are the Japanese persimmon and plums.

### ITEMS

AT a recent meeting of the Advisory Council, the National Cancer Institute has been authorized to put "at the disposal of the appropriate war agencies the facilities and personnel available for research aiding the war effort." Dr. Carl Voegtlin, chief of the National Cancer Institute, reported work showing for the first time that it is possible to convert normal mammalian cells growing outside the body into cancer cells. This was done by exposing the normal cells to the action of powerful cancer-causing chemicals. It is expected to aid understanding of how cancer is caused in the human body. The experiments were started in 1936 by Dr. Voegtlin and Dr. Wilton Earl. Four grants-in-aid, amounting to \$21,300, were made to the Chicago Tumor Institute, the University of California, Cornell University and Michael Reese Hospital, Chicago.

WARNING against use of sulfathiazole within the skull, which surgeons might consider as a means of fighting infection in war wounds of the head and brain or in operations for removal of brain tumors, appears in The

*Journal of the American Medical Association*. Convulsions and even death may result. Experiments showing clearly the danger are reported to Dr. Cobb Pilcher, Dr. Ralph Angelucci and Dr. William F. Meacham, of Vanderbilt University School of Medicine. They refer also to a report from English surgeons of five patients who developed epileptic seizures, two of them dying after sulfathiazole had been placed on the frontal portion of the brain to fight infection during brain operations. Sulfanilamide and sulfadiazine apparently do not have so irritating an effect on the brain, but the use of these drugs in brain surgery should be postponed until more is known about their action through microscopic studies now under way.

A NEW treatment for the headache and dizziness that follow concussion of the brain, expected to be more frequent as a result of war injuries, is reported by Dr. J. Y. Malone, of Milwaukee, in the *Journal of the American Medical Association*. The treatment consists of doses of a synthetic chemical, prostigmine. Patients treated by Dr. Malone swallow this medicine in a pill three times a day and also get it by hypodermic injection into the muscles twice a week. Relief of symptoms, in some cases within a week after starting treatment, and ultimate complete recovery was obtained in 14 patients. The treatment of this condition has heretofore been either unsatisfactory or complicated and extensive.

OVER a half million gallons of concentrated citrus juices have been ordered by the Government in Florida alone in an attempt to avoid scurvy outbreaks among the peoples at war due to vitamin C deficiencies. Improved methods of processing the fruits have been developed by the U. S. Citrus Products Laboratory. A large plant to be used for this purpose has been completed for the U. S. Department of Agriculture. The concentrated juice is now being put into medicine bottles for rationing to British children. By preparing the vitamin in concentrate in a special vacuum chamber a thick flavorful syrup is obtained which contains 85 per cent. of the original vitamin content.

A MUSCLE of the ear, the stapedius muscle, which acts to rock that bone in the ear that looks like a horse's stirrup, serves as a damping agent to protect the inner ear against excessive noise. This was learned in animal experiments conducted by Drs. Ernest Glen Wever and Charles W. Bray, of Princeton University, and reported in the current issue of the *Journal of Experimental Psychology*. This function of the stapedius muscle may be partly the explanation of why you become temporarily deafened, especially to conversational tones, while you are exposed to loud noise like that of an airplane engine or a boiler factory. Not only does tension of this muscle reduce the sensitivity of the ear to all noise, but it acts differentially to reduce the response more to low tones than to high ones. A peculiarity of its action is that for certain tones of middle range, a slight tension of the muscle actually improves the hearing. This would seem to indicate a minimum amount of noise may aid the hearing of some tones, such as those used in speech.