

# THE SCIENCE NEWS-LETTER

A Weekly Summary of Current Science

EDITED BY WATSON DAVIS

ISSUED BY  
**SCIENCE SERVICE**

B and 21st Streets  
WASHINGTON, D. C.

EDWIN E. SLOSSON, Director  
WATSON DAVIS, Managing Editor



SUBSCRIPTION: \$5 A YEAR, POSTPAID

The News-Letter, which is intended for personal, school or club use, is based on Science Service's Daily Science News Bulletin to subscribing newspapers. For this reason, publication of any portion of the News-Letter is strictly prohibited without express permission.

Vol. VI. No. 207

Saturday, March 28, 1925

## TWELVE YEARS HUNT FOR A GERM-KILLER

By Dr. Edwin E. Slosson

Readers of the item appearing recently in the papers, that a new disinfectant had been discovered fifty times as strong as carbolic acid, had no way of knowing what lay behind it - or before it.

In the first place the word "discovered" is misleading. This conveys the impression of a lucky strike, like the diamond that a child in South Africa picked up as a pretty pebble or the nugget of gold that a sheep herder stumbled upon in Australia. Such is a true discovery, the accidental finding of something already existing. But this new germicide is not, properly speaking, a discovery; it is an invention, as much an invention as a new radio apparatus. It is not a natural product, suddenly found to be of value, like quinine in Peruvian bark. It is the successful culmination of a long, arduous and systematic study of how to construct a molecule that would serve a particular purpose; this particular purpose being to produce a chemical that would distinguish in the dark between the friends and foes of the human body, that would pass through the blood stream killing all the disease germs it met and not injuring the body cells which are so much like them in size, shape and composition that the microscopist has difficulty in telling them apart.

The beginning of this research, the germ of the germicide, is to be found in a paper which Prof. Treat B. Johnson of Yale University published in the "Journal of the American Chemical Society" in 1913, and which has now resulted in one of the triumphs of modern medicine.

The material for the new disinfectant comes from that same big black grab-bag from which the chemist has drawn so many useful dyes and drugs, the coal-tar barrel. One of these products, phenol or carbolic acid, is a valuable antiseptic, strong but clumsy, careless in discriminating between the invading microbes and the home guard. It sears the flesh like a hot iron when applied in full strength.

A near relative to phenol is resorcinol, a milder substance which some of us have used in the vain attempt to make two hairs grow on a head where none would grow before. Now both these compounds consist essentially of a ring of six carbon atoms, and what Professor Johnson discovered was a new way of attaching a chain of carbon atoms to this ring. This enabled Dr. Veader Leonard of Johns Hopkins University to have made a series of similar compounds with side chains composed of from one to any number of carbon links, and it was found that the power to destroy germs increased as the chain was lengthened until there were six carbon atoms in the chain,

but fell off thereafter. So the most powerful germicide of this series is the sixth which is accordingly called "Hexyl-resorcinol", though doubtless a name with less than six syllables will be selected for it before it is put on the market, otherwise people would be reluctant to call for it at the drugstore.

Dr. Leonard who has been testing the antiseptic power of these compounds and seeking their chemical application finds this compound is about fifty times as effective as our old carbolic acid. That is to say, it could be diluted with fifty times as much water and would still be as poisonous to the microbes without injuring the bodily tissues. It can be safely taken internally by the mouth, and since it passes out largely through the kidneys it may be used to destroy the microbes and parasites of a tract of the body that has been hitherto difficult of access.

The member of the family with four carbon atoms in the side chain, known as "butyl-resorcinol", is about half as powerful, but may prove on investigation to be useful for such purposes as gargles, tooth-paste and the treatment of skin wounds, for it is stable and does not stain.

All these compounds and many others are being systematically prepared and their physiological effects investigated by a committee of the National Research Council. Such team work is likely to bring about much better results, quicker and more reliable than the haphazard efforts of isolated individuals. The ideal germicide is yet to be found, and it is quite possible that in time something may be found, or rather made, to take the place of such metallic poisons as mercury and arsenic, which do kill the parasites of the body but not without danger to their host. We also have reason to hope that the chemist may make something that will hunt out and destroy the bacillus of tuberculosis in its most secret lairs. Prof. Johnson is now hot on the trail of such an ally of man in his fight against his microscopic enemies.

#### ROTOR SHIP INVENTOR PLANS GIANT WINDMILL

Anton Flettner, the German inventor of the rotor ship, is planning a gigantic windmill designed on aerodynamical principles which will be some 300 feet in diameter mounted on a tower 650 feet high, higher than the Washington Monument and nearly as tall as the Woolworth Building.

This immense structure for obtaining power from the wind will not make use of the Flettner rotating cylinders such as used on the rotor ships but will have two large wings or propeller blades so constructed that they will obtain the most out of the moving air.

The famous Flettner rudder which is used in steering both ships and airplanes will be used to keep the propellers at the most efficient angle for the particular wind velocity. The cross-sections of the wings will resemble those used on airplanes and they will be designed so as to decrease to a minimum the air pressure on the rear side of the driving wing.

The proposed windmill is striking in size but it is also unique in the method of generating power. Instead of having the large wheel geared to a single electric generator, it is planned to mount a small high-speed windmill on the tip of each propeller arm. These auxiliary windmills will actually generate the power by driving directly generators. Flettner claims that the rotation of the large wheel will multiply the velocity of the small windmills ten times and that this will aid in the regulation of the voltage of the electric current obtained.

The huge structure that would support the 300 foot propellers presents a very difficult engineering problem and it is a problem of major design to make the windmill wheel itself structurally safe and strong. The reason for such a high tower is said to be that the winds are steadier at such heights.

No estimates of cost are contained in the information published in Germany nor is it indicated whether actual construction of the windmill is contemplated.

-----

#### BRITISH MAKE INCUBATORS EFFICIENT AS HENS

The hen's efficiency in hatching eggs may at last be rivaled by the incubator, if work of a British electrical engineer, Llewelyn B. Atkinson, can be applied in commercial hatcheries.

Mr. Atkinson believes that the missing link in modern incubation methods is that the eggs are heated too nearly alike on both sides. In the hen's nest there is from 14 to 20 degrees difference between the top of the egg, which is close to the hen's body, and the lower surface of the egg. With this apparently shiftless method of protecting the eggs, a setting hen hatches about 90 per cent. of her chicks, if she is ordinarily responsible and doesn't leave the nest or break the eggs.

Designers of modern incubators attempted to improve on the hen's system by heating the eggs about the same all over. Incubators sometimes make as high an efficiency record as that of the mother hen, but 60 per cent. is said by poultry experts to be average.

In the British experiment a thin sheet of india-rubber was placed like a blanket over the eggs.

Mr. Atkinson reports: "This method produced very remarkable results. In an incubator which has rarely given above 55 per cent. of the eggs placed in it, this percentage was raised to over 95 per cent. of the fertile eggs."

Dr. M. A. Jull, poultry expert of the U. S. Department of Agriculture, says that the Atkinson experiments may have great significance to the American poultry business. Half a million or a million chicks are hatched each year in some of the mommoth commercial hatcheries in this country, and the baby chick crop turned out by American incubators probably exceeds 100,000,000. A 40 per cent. increase in efficiency would mean millions of dollars to the industry.

"One of the big factors of cost in the poultry business is the mortality of baby chicks," said Dr. Jull. "The results of Atkinson's experiments should be checked and tests made to determine their practical application."

-----

A manuscript of a book of forty thousand words was recently taken down on a shorthand machine in Braille characters and transcribed by a London typist blind from birth.

-----

## NEW LINES FOUND IN ECLIPSE SPECTRUM

Many bright lines, never before observed and each indicating the presence of some chemical element, have been found in photographs made of the red and infra-red light from the sun at the time of the total eclipse of January 24 by Prof. H. D. Curtis, director of the Allegheny Observatory of the University of Pittsburgh. These photographs were made at New Haven, Connecticut, where Dr. Curtis accompanied the eclipse expedition from Swarthmore College. They were made both of the flash, the outer layer of the sun which can only be seen just before or just after totality, when the remainder of the sun's surface is covered by the moon, and of the corona, which is only visible when the sun is completely covered.

The apparatus used is a grating spectrograph in which a curved piece of metal on which are ruled many fine parallel lines, 3,600 to the inch, takes the place of the usual glass prism in spreading the beam of white light out into a colored spectrum. Dr. Curtis states that this apparatus is especially adapted to recording the spectrum in the deep red region, and the part beyond, called the infra-red.

The deepest red waves visible to the eye are about one thirty-three hundred thousandth of an inch long, and the longest previously recorded in the flash spectrum are about one four-millionth of an inch in length. Dr. Curtis's plates show many lines, up to those corresponding to a wave length of about one twenty-eight hundred thousandth of an inch. Among these are many lines never before observed. Some of them have been identified as being due to elements known on the earth, while several cannot be found to correspond with any known element. One of them, found in the coronal spectrum, Dr. Curtis stated may possibly be due to the element coronium, known only in the sun's corona. It is believed that similar photographs made at another eclipse will throw much light on their origin.

-----

## COCAINE GRIPS BODY NO MORE TIGHTLY THAN TOBACCO

Human beings can not continue taking cocaine indefinitely nor can a tolerance to this dangerous drug be built up as is commonly supposed, Prof. A. L. Tatum of the University of Chicago, has found as a result of experiments and observations in the university laboratory of physiological chemistry and pharmacology.

Taking cocaine away from an habitual user has no more disastrous effect than taking tobacco away from a confirmed smoker, Dr. Tatum maintains, since the body does not require the continuance of the drug once it has been withdrawn. The contrary is true of morphine, the drug to which cocaine addicts often turn.

Experiments recently completed on laboratory animals show that cocaine addicts, after a considerable period of time, suffer from a poisoning which produces tissue degeneration, causing painful physiological reactions that force them to abandon the habit.

"Cocaine administered to laboratory animals develops an increased sensitivity toward the drug," Prof. Tatum explains. "This is in confirmation of results obtained by other investigators. Cocaine poisoning over a considerable length of time produces tissue degeneration. Similar degenerative changes produced by other means such as phosphorus or chloroform poisoning increases the sensitivity toward cocaine.

"Consequently it is our view that the increased sensitivity in laboratory animals has its basis in cell injury."

Addicts "cured" of the cocaine habit can go back at once to the dosage used at the height of their so-called addiction with no excessive or exaggerated effects, contrary to morphine addiction in which case after a cure the subject must begin again with a small dosage with gradually increasing dosages as he redevelops a tolerance.

Cocaine addiction is usually of relatively short duration, estimated from one to three years, when the subjects voluntarily stop the use of cocaine because of the undesirable effects.

The absence of a developed human tolerance, lack of abstinence symptoms on withdrawal, and the short course of the addiction, all point to a similarity of bodily effects on man and laboratory animals; man and laboratory animals differ essentially in their psychic reactions which is the basis of the human addiction. The lower animal counterpart of the human cocaine psychosis has so far never been discovered.

---

#### BOTANY OF THE SHAMROCK NOT YET A CERTAINTY

The thousands of "wearers of the green" on St. Patrick's day who sport shamrock emblems may be representing any one of three distinct plant species. And there seems to be no way of clearing up the uncertainty. For "seamarog", the ancient Erse word from which modern "shamrock" has been derived, means merely "little three-leaf", and explains nothing.

Modern usage has pretty well settled on a kind of white clover as the favorite shamrock, though a three-leaved clover-like plant related to alfalfa is also sometimes worn. But the three-leaved oxalis, a plant only remotely related to the clovers, is also a claimant for the honor. It is included in many ancient herbals as a "trefoil", and at least one old writer refers to it as a sour plant eaten by the Irish, and reputed to have miraculous medicinal powers. The confusion is quite natural, for early botanists classified plants by their leaves rather than by their flowers and fruit, according to the modern practice. But though this may have caused no concern to the herbalists, it has left a heritage of doubt to present day botanists, and there can be no "officially certified" shamrock.

---

#### DEBATED SKULL DECLARED HUMAN

The famous Piltdown skull, which has been pronounced pre-human by some anthropologists, is most assuredly human, according to Sir Arthur Keith, probably Britain's greatest physical anthropologist, in the latest revision of his chief work, "The Antiquity of Man".

His latest computations on the skeletal fragments indicate a brain capacity for the creature of about 1,300 cubic centimeters. He holds that 1,000 cubic centimeters is the lowest human level.

---

### GAME REFUGES SET ASIDE IN AFRICA AND ANTARCTIC

The French Minister of Colonies has set aside by executive decree a number of islands owned by France in the Antarctic regions as game sanctuaries for polar bear, walrus, sea lions, and other animals. The protected area includes the islands of Crozet, St. Paul and Amsterdam, Adelia Land, and the Antarctic coast between Doigt de Sainte Anne and Port aux Lapins.

----

An Albert National Park in the Belgian Congo will be created in the near future by royal decree. The region selected is a high table land between Lake Kuon and Uganda. Protection will be given to both animals and plants, and hunters will be forbidden to penetrate into the region.

-----

### AMERICAN CITIES VIE IN WAR ON TYPHOID

In spite of the recent typhoid scare in several large population centers, American cities have shown notable progress in their efforts to rid themselves of this disease, officers of the American Medical Association state.

Compilations just completed reveal that New England is the section making the best showing. Two cities there, Fall River and Hartford, reported no typhoid deaths for the year 1924. These cities hold the honor of being the only communities in the United States with absolutely clean slates; though other New England cities, notably Providence, have very good records.

The Middle Atlantic section was hardest hit by the oyster infection. New York had a higher rate than for several years, at least 650 cases being blamed on the oyster before this source of infection was finally cleared. Washington had about fifty cases due to the same cause. Trenton, on the contrary, distinguished itself by getting from the high-rate into the low-rate class.

In the south, Richmond made the best showing; and Baltimore, though the capital of the oyster industry in the United States, reported relatively few cases of typhoid. Baltimoreans claim this as evidence that the oysters of the Chesapeake were innocent of wrongdoing. Louisville and Birmingham have very low rates, but Nashville and Memphis have poor records. West coast cities have shown little change, though their rates are higher than the experience of eastern cities would indicate as unavoidable.

-----

### TWO MILLION VOLT TEST PLANT BEING BUILT FOR STANFORD U.

Equipment for the most powerful electrical testing plant ever constructed has been ordered by Leland Stanford Junior University, of California, from the General Electric Company. It will be capable of furnishing the highest voltage ever produced at commercial frequency, and will be the only two million volt installation in existence. The most powerful plants in the field at present are a million volt set built for the Commonwealth Edison Company, of Chicago, and a similar one for testing high voltage switchboard apparatus in the General Electric Company's plant at West Philadelphia.

The laboratory at Stanford will be in charge of Prof. Harris J. Ryan,

past president of the American Institute of Electrical Engineers, and a well known authority on high tension currents. Prof. Ryan has been relieved of all teaching duties so that he may devote his entire time to research.

A special feature of the new plant will be a transmission line of considerable length, the first of its kind in any high-voltage testing laboratory. It will make possible tests under actual operating conditions.

---

#### ELECTRICAL THIEF DETECTOR STOPS METAL LOSSES

Valuable metal had a habit of disappearing from a German factory recently. So a clever scientific thief detector was rigged up by the physicists connected with the works.

At the end of the day's work each employee was required to remove his knife and other metallic personal possessions from his pockets and pass through a specially constructed gateway. This was so wired that any concealed metal being taken away illicitly would make itself known by inducing a current in a device that emitted a loud warning signal for the guard's benefit. The loss of metal has decreased markedly since the installation of the device.

---

#### SOUTH AMERICAN DOCTORS STUDY AMERICAN DISEASE FIGHTING METHODS

Nine medical officials from Central and South America are in America in response to the invitation issued by Dr. H. S. Cumming, surgeon general, U. S. Public Health Service, to begin a two months' study of health conditions in the United States. Several weeks will first be spent in the southern states looking into conditions there.

This is part of the interchange of health officials provided for by the League of Nations. Last year Switzerland acted as host; the next country visited will be in Jugo-Slavia. No delegation has ever been sent out from America but a number of Americans have attended the previous meetings.

The work of the U. S. Public Health Service in guarding against epidemics, the work of state medical boards, and public hygiene questions will be given most of the visitors' attention. The representatives, coming from Argentina, Brazil, Cuba, Costa Rica, Mexico, Paraguay, Peru, Salvador, Uruguay, and Venezuela, met at Havana to spend a few weeks studying epidemic diseases in Cuba.

---

#### SUN AND MOON SHARE BLAME FOR LATE ECLIPSE

The astronomers have determined the responsibility for the five second tardiness of the solar eclipse of January 24.

Both sun and moon have been found guilty on the following counts:

Misplaced sun - 2 seconds  
Misplaced moon - 2 seconds  
Sun and moon diameter - 1 second.

Prof. E. W. Brown of Yale University explained that if the sun is ahead of its predicted schedule or if the moon is behind, a solar eclipse will be late. Inquiries at the U. S. Naval Observatory at Washington and the Royal Observatory at Greenwich reveal that the sun on January 24 was sufficiently ahead of schedule to account for two seconds. Although the actual position of the moon is still to be determined accurately from observations made all over the world, it was probably in error sufficiently to account for about two seconds. The remaining second of discrepancy between actual and predicted time was probably the result of using a too small diameter of the sun in the astronomical calculations, a too large diameter of the moon, or both.

-----

#### NINE YEAR OLD EGG STILL POWERFUL IN VITAMIN A

A strictly fresh egg has almost no advantage over an egg that has spent a nine years in cold storage so far as vitamin A is concerned, government scientists have found.

Experts in the U. S. Bureau of Chemistry tried nine year old eggs on rats suffering from a malnutrition disease known as xerophthalmia. When as little as a tenth of a gram of a storage egg was served daily to a rat, the important Vitamin A had noticeable effect. The condition of the animal's eyes improved, the decline in its weight was arrested, and it began to grow at a moderate rate.

The bureau reports that a slight deterioration in the vitamin may take place in the course of long freezing, but that "such slight differences as were found in the vitamin A content of the fresh and storage eggs cannot be very significant."

-----

#### SWANS AND RACERS AUTOMATICALLY SOLVE PHYSICS PROBLEM

Swans and motorcycle racers take the same ungraceful attitude in times of great effort and for the same reason. H. S. Rowell, director of research, Research Association of British Motor and Allied Manufacturers, has observed both and comes to the following conclusion, according to *Nature*, a British scientific periodical.

"When a swan is rushing to the attack of an adversary, the head is lowered and the neck is protended almost horizontally. I had always associated this posture with mere anger, but during the excessive Thames floods of last December, when swans could often be seen striving against the stream, sometimes, so far as could be judged, in the apathetic state of desperate exhaustion, the same pronation of the neck was frequently evident.

"The explanation seems to be dynamical, for the reactions on the feet of the bird would, without the counterpoising action of the neck, tend to rotate the body about a horizontal axis, head backwards. Air resistance also plays a part.

is

"It is of interest to note that the racing motorcyclist, in his unreasoned but experimentally justified preference for forward weight, has found a solution akin to that of the swan. Many sprinters, especially when starting, use the same principle."

-----



## BRITISH HONOR FOURTH DIMENSION PIONEER

The mystical mazes of hyperspatial mathematics are in a fair way to becoming humanized by the figure of a Galahad of science.

This comes about through the posthumous publication of the mathematical papers of Samuel Bruce McLaren, formerly professor of mathematics at University College, Reading, England, who threw aside his work at the outbreak of the world war and was killed at Abbeville in 1916. These papers reveal that McLaren, a young man who was an athlete and sportsman as well as a mathematician, had anticipated some of the results of Einstein by the inductive method. They are considered as among the most valuable contributions to fourth dimensional literature ever made.

McLaren believed in the physical reality of the fourth dimension. He went further in his conception than Minkowski, the high priest of all fourth dimensional cults. McLaren's fourth dimension is without change but not without time or motion. Time appears as a purely logical succession.

-----

## STANDARDS FOR COTTON CHOSEN WITH CEREMONY

The ceremony of selecting copies of the international cotton standards for another year recently took place in Washington. By an international agreement, representatives of the cotton industry from Holland, France, Germany, Italy, and other countries gather annually to select samples of different grades of cotton. Forty sets of these samples are made and they are carefully preserved as standards for the cotton exchanges and associations of the different countries.

The grades range from pure white staples over an inch long used in fine fabrics, down to lint cotton which is almost powder and is used in felting and explosives. A fraction of an inch difference in length of staple means a great deal to the cotton industry, and by establishing standards of quality the producers and manufacturers are reasonably sure of knowing what quality of material they are using.

Each nation draws its set of standards from among the 40 sets by casting lots. The United States keeps one set at the Department of Agriculture and deposits a second set in a vault of the U. S. Treasury as a reserve in case of accident.

The standards for the coming year are selected by comparison with a set of the standards of the preceding year. During the process these are guarded by deputy United States marshals.

Last year middling fair cotton was plentiful. This year, the government spent \$2,500 searching the cotton belt in order to get a bale of middling fair grade suitable for standards. The indication is that the quality of the cotton crop this year is somewhat lower than last year.

The reason why representatives of the industry make the long trip to Washington, each spring is that the standards deteriorate with the passage of time. The cotton fiber has a hollow center, and oils in the fiber cause it to discolor after a time. Even when cotton is kept in a vacuum away from the air a slight change takes place.

The conference was asked by the Liverpool and Manchester representatives

to consider trying the plan of holding the conference only once every two years. This is to be discussed later.

The United States has standards for 38 farm products, but cotton is the only one for which international standards are adopted. The Department of Agriculture is interested in extending the practice of international standardization to wool and other products.

Secretary of Agriculture, W. M. Jardine, addressing the cotton conference, said "Orderly marketing is not possible until you have orderly production, in which standardization is an essential feature. Our desire is to try to come to a common understanding on a workable plan of standardization that will help all concerned, that will cut down the spread and get back to the producer as much as possible for his efforts."

-----

#### AMERICAN UNIVERSITY HOLDS CLASSES IN TROPICAL JUNGLE

Courses in the natural science of the tropics are to be carried on right in the jungles themselves during the coming summer by the University of Pittsburgh. The Tropical Research Station of the New York Zoological Society, located at Kartabo, British Guiana, has been turned over to the university for several years. The main work will be carried on during the summer months, but a permanent custodian has been stationed at the laboratory, so that it will be available at any time. A group of fifteen students, under Prof. S. H. Williams of the department of zoology, plans to leave in June.

-----

#### TABLOID BOOK REVIEW

**MATTER AND CHANGE:** By W. C. D. Whetham. Cambridge University Press, \$2.50.

Matter and Change, while it is an introduction to physical and chemical science, tells of the reasoning that led to developments in this field. Mr. Whetham gives the interesting side lights on the subjects he treats as well as the bare facts of theories and formulae. It is a splendid book for refreshing the memory or introducing chemistry and physics to an interested reader.

**HANDBOOK TO THE EXHIBITION OF PURE SCIENCE:** Arranged by the Royal Society. On sale at Messrs. A. & F. Denny Ltd., 163a, Strand, London, W.C.2. 7s post free 1s.3d.

The Handbook to the Exhibition of Pure Science, arranged by the Royal Society, might be called a handbook to science. In it are short, easily understood articles by eminent scientists telling of scientific development in many lines. Subjects range from "Electrons" to the "Origin of Seed Plants". One of the most interesting, to the layman, is the article on the "Origin of Man." Concise articles explaining the exhibitions at the British Empire Expedition are found in the second part of the book.

-----

A chemical method of determining the kinds of beans used in vanilla extract independent of tasting and smelling tests by experts, has recently been devised.

-----