

Electric Eye

Constantly measuring the smoke and haze in the Holland Tunnel under the Hudson River connecting New York and Jersey City is the latest job for science's magic lamp, the photoelectric cell, that has made television and talking movies practicable.

Above the main tube of the tunnel, through which traffic passes, is an exhaust duct, a long, cave-like chamber near the New York end. Through this duct is drawn the exhaust air from the tunnel. The duct is at the point where the roadway grade is greatest and where there are the most exhaust gases from the heavy truck traffic. Except for the light admitted through the air openings, the duct is dark.

Here General Electric engineers have installed experimentally a photoelectric device to measure the smoke and haze. A large box contains a lamp and a photoelectric cell in adjacent compartments, light-tight except for a lens at the front of each. The lens in front of the light makes a narrow beam, which shines on a mirror 150 feet away. Thence it is reflected to a second mirror and back to the box, where the other lens focusses the light on the cell. The current from the cell is amplified by vacuum tubes, and passes over wires to the recording device in the tunnel office a half mile away. Here it controls the movement of a pencil over a moving strip of paper.

When the amount of smoke in the air duct increases, the intensity of the light returning to the photoelectric cell is reduced, and the moving pencil immediately indicates the fact. Then the tunnel engineers can turn on more of the ventilating fans to keep the air clear.

Uses for such a device in homes and business offices are foreseen, where it can be used to detect smoke and act as a fire alarm. For some time the Holland Tunnel has used a somewhat similar device to count traffic, by the interruptions by automobiles of a beam of light across the exit.

Physics

Science News-Letter, December 14, 1929

Sun Spots

After a solar disturbance that set a record for recent years, the sun is now becoming relatively inactive, photographs at the U. S. Naval Observatory show. The huge spot, 40,000 miles in diameter, that crossed the center of the sun's disc on Nov. 30 was carried by the sun's rotation

to the western edge and disappeared from view on Dec. 7. This spot was part of a general disturbed region 700,000 miles long, which is also passing out of sight. If it survives, the rotation will carry it into view again on the eastern side about Dec. 21.

A single spot of sizable diameter, that crossed the face of the sun about three weeks ago, came into view again on the eastern side last week. The recent spots apparently produced no magnetic effects or northern lights on the earth, as sometimes happens when a large spot crosses the sun.

Astronomy

Science News-Letter, December 14, 1929

Turtles

There is a rather widespread opinion that turtles grow very slowly and live a long time. This belief is strengthened when an occasional turtle is found by some man who, when a boy, cut his initials and the date on the under surface of the shell. In such instances the turtles seem to have grown very little during the long interval.

Recent observations by Prof. G. H. Parker of Harvard University throw evidence upon this question. Prof. Parker noted that, at birth, loggerhead turtles weigh less than one ounce; three years later they weigh about forty-two pounds; in other words, this species of turtle attained one-fourth of its adult weight during the first three years of its life. These observations indicate, therefore, that turtles grow very rapidly in early life, but that the rate of growth is retarded later.

Zoology

Science News-Letter, December 14, 1929

5,000 Butterflies

A tale like that of a modern Marco Polo, braving bandits, famine, and the perils of the wilderness to bring home to the West a cargo of the spoils of the East, is told by Herbert Stevens, of the Field Museum of Natural History, who has just got home from China. Only his booty does not consist of jade and pearls, silks and spices, but of the skins and bones of birds and animals. It was to bring out these spoils of science that he travelled 1700 miles through famine-stricken and thief-infested territory, going on foot, on horseback, on muleback, on yakback.

Mr. Stevens was leader of one division of the William V. Kelley-Roosevelt expedition of the Field Museum, and his adventures are re-

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lated by Director Stephen C. Simms of the museum. All the other divisions of the expedition have preceded him on the homeward trek, and he was the sole white man left in charge of the great accumulations of biological specimens, with the task of getting them out intact. This he accomplished successfully, his journeyings taking him through the little known interior provinces of Yunnan and Szechuan, and along the Tibetan border.

Now safely returned to the Field Museum, Mr. Stevens is superintending the unpacking of his cases and bales. There are thousands of valuable specimens, many of them rare, some quite new to science. There are in the collection approximately 500 mammals, 1100 birds, 500 reptiles and fishes, 5,000 butterflies, 2,000 moths, 500 beetles and bugs and 10,000 plant specimens.

Biology

Science News-Letter, December 14, 1929

Heart Beat

The potassium in the diet is the radioactive element which normally performs the vital function of starting the heart beat, it appears from experiments conducted in the laboratory of Dr. H. B. Zwaardemaker, professor emeritus of physiology at the University of Utrecht. These experiments have just been reported by Dr. Charles C. Lieb, professor of pharmacology at the College of Physicians and Surgeons, Columbia University, who has himself spent some time on research in Dr. Zwaardemaker's laboratory.

Earlier experiments of Dr. Zwaardemaker seem to have definitely established the fact that potassium is a radioactive element. The recent experiments have indicated that a radioactive element is essential in the initiation of the heart beat, and therefore an indispensable element of diet.

Pursuing these studies further, Dr. Lieb will investigate the pharmaceutical value of radioactive spring waters, such as those found at Saratoga Springs, Arkansas Hot Springs, the Georgia springs owned by Governor Roosevelt of New York, where infantile paralysis cases are treated, and many other famous spas throughout the country. For years it has been known that the waters of these springs were radioactive, but the active charges

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have been so small that leading radium authorities have considered their radioactivity a negligible quantity therapeutically.

Dr. Zwaardemaker's work, Dr. Lieb pointed out, not only indicates that the radioactivity of potassium is one-millionth to one-hundred-millionth that of radium, but that even this minute charge is essential to the maintenance of the heart beat.

Chemistry—Physiology
Science News-Letter, December 14, 1929

Roman Map

Plans for making a great historic map of the Roman Empire have been announced by an international commission of geographers. The commission was appointed to publish the map by the International Geographical Congress, several months ago.

The map sheets will show cities and other geographical features which figured in the development of the Roman Empire from the time the Romans appeared in any region to the fall of the Western Empire. Both ancient and modern names will be given. Distribution and types of population will be indicated, as well as important economic and social conditions. The sheet containing the city of Rome is now in the process of preparation, the commission reported.

Cartography
Science News-Letter, December 14, 1929

Drug Addicts

The prevailing belief that a person who contracts the drug habit will go to pieces mentally and nervously if he is suddenly deprived of his customary narcotic dose has been considerably exaggerated, judging by psychological experiments with drug addicts conducted by Prof. R. W. Paynter of Long Island University.

Prof. Paynter gave various psychology tests to addicts who have been victims of the drug habit for from one to twenty years. The men were tested after they had taken a dose of morphine and were "comfortable," and again when they had been deprived of the drug for ten to twelve hours. They were asked to do arithmetic problems, to memorize facts, to do tasks requiring coordinating of muscles, and to take

tests of their intelligence.

The men performed the tests far better than was expected, the psychologist reported. When they were set to work after being suddenly deprived of the drug there was no serious mental confusion or disintegration, he found, though the addicts experienced some physical and mental distress. In some instances they made better records on the tests in the period of abstinence than after taking the drug.

Psychiatry
Science News-Letter, December 14, 1929

Remembering Pi

"How I want a drink, alcoholic of course, after the heavy chapters involving quantum mechanics."

This hypothetical appeal of the American scientist, who had just finished reading a book on modern physics, is the latest method of remembering the value of "pi", the famous number by which the diameter of a circle must be multiplied in order to find its circumference. Write under each word the number of letters it contains, and you have 3.14159265358979, which is the value of this number, expressed with far greater accuracy than the ordinary 3.1416.

The Observatory, English astronomical journal, gives this sentence, along with several others of a similar nature, in "An Oxford Notebook", in its November issue, with the remark that it is adapted to the United States. J. H. J. is given as the author, and the initials happen to be the same as those of Sir James H. Jeans, leading British astronomer, formerly president of the Royal Astronomical Society and secretary of the Royal Society.

Another sentence for remembering the number called "e", or "the base of the Napierian logarithms", is also given: "To Napier's *e* reciting so ordinary a sentence an easiness gives." The number is 2.7182818285.

Mathematics
Science News-Letter, December 14, 1929

Inca Copper

What is now the world's largest known copper ore deposit was worked by the prehistoric Incas, judging by remains that have been found at and near the copper mines of Chuquicamata, Chile.

Within the mine primitive tools have been found from time to time, such as stone hammers and wooden shovels, as well as mummified remains of early Indian miners, one of which

is now at the American Museum of Natural History in New York.

The ruins of Pucaro, an ancient fortified city destroyed by the Spaniards during their first invasion of Chile, are 25 miles from Chuquicamata. Ancient graves belonging to this prehistoric city have yielded bowls and other utensils of copper as well as bead necklaces made from brochantite and atacamite, minerals characteristic of the chuquicamata deposits.

The Incas, reputed as pre-Columbian America's best miners and metal workers, conquered this part of Chile about 1443, it is reliably believed, and the old mines may therefore have been worked at least ninety years before the discovery of America.

Archæology
Science News-Letter, December 14, 1929

Rats and Students

Twenty college students and forty-three white rats have been given the same task to learn by a psychologist who wanted to compare rats and men. The rats were turned loose in a maze with a food reward at the other end. The students, blindfolded, traced the same maze pattern with their fingers, but got no dinner reward for success.

Results of the experiment, reported in the *Journal of Comparative Psychology* by R. W. Husband, psychologist at the University of Illinois, show that the students were quicker than the rats at learning the maze route.

The students, who were familiar with the idea that maze paths turn right and left confusingly, tended to make mistakes by taking alternate turns to right and then to left too regularly. The rats erred most frequently by taking left turns persistently because one left turn proved correct, or else taking too many right turns.

Rats, as well as students, appeared to exercise some ideation in solving the maze, though in the animals the process is rudimentary, the psychologist suggests. Rats that had tried the maze a number of times and were learning its turns would run into the entrance of a blind alley, and then stop suddenly and change direction into the correct path.

Psychology
Science News-Letter, December 14, 1929

The vitalizing power of ultra-violet light was discovered by accident in 1901, when operators of lamps used in experiments became severely sunburned.