

## SCIENCE NEWS

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## THE EFFECT OF SUPER-SONIC WAVES ON BLOOD CORPUSCLES

SUPER-SONIC waves which are sound-waves vibrating too rapidly to be heard, have now been brought under such control that observers can watch their effects through a high-power microscope. Using a small electrically driven crystal to produce these waves at a rate of 406,000 a second, Professor E. Newton Harvey, of Princeton University, and Alfred L. Loomis, of Tuxedo Park, N. Y., have watched blood corpuscles warp, twist and disintegrate, and have seen the living protoplasm in plant cells whirl in a dance of death, faster and faster until it has separated into spinning bits, broken and disorganized.

The apparatus used in these experiments is a refinement, on almost a jeweler's scale, of an earlier form devised by Mr. Loomis and Professor R. W. Wood, of the Johns Hopkins University. It takes advantage of the fact that when a rapidly alternating electric current is fed into a quartz crystal cut in a certain fashion, the crystal vibrates at the speed of the electrical oscillations, producing sound-waves. By cutting the crystal small, and using an electrical oscillator of the type employed in radio stations, it is possible to produce sound waves twenty times as fast as the 20,000-per-second waves which represent the upper limit of human hearing ability. And these extremely rapid waves, at high enough intensities, have a tearing, killing effect on living substance. They have been nicknamed "the death whisper."

"Observing under a high-power microscope," Professor Harvey and Mr. Loomis state, "it has been possible to follow the progressive destruction of frog blood corpuscles. The oval cells at first become warped and twisted. Strained areas appear and the color fades, leaving a pale distorted shadow. Human blood corpuscles are likewise twisted and sometimes broken up into many small globules like an emulsion of oil."

Vibrations on the leaves of a water-plant, in which the living protoplasm usually keeps up a constant circulation around the wall of each cell were also investigated. "High frequency waves of low intensity passed through these cells caused the protoplasm to rotate very much as in the normal rotation. Increasing the super-sonic intensity increases the movement until the whole cell is a rapidly whirling mass of protoplasm, fragments of which are torn loose and rotate as small balls in the vacuole. The effect is very striking.

"The microscopic method offers a promising means of attack upon the problem of influencing the development of eggs of various species, as forces can thus be applied inside an egg at different stages of its development without the necessity of puncturing the cell wall or enveloping membrane. The results immediately suggest the interesting possibility of converting an egg with determinate cleavage into an indeterminate one by thoroughly mixing and redistributing the organ-forming sub-

stances of its interior. We are now engaged upon this and allied problems, the results of which we expect to publish in due course."

## TESTS OF HEARING

HOLDING a watch near the ear to test hearing may soon be a thing of the past. Ear tests developed by scientists of the Bell Telephone Laboratories, New York, make use of accurate instruments which, with psychological aids, determine a person's exact degree of hearing. False claims of either deafness or exceptional hearing are of no avail, for the truth can now be easily discovered.

A push-button on the instrument which measures the tone emitted for the test permits the interruption of the sound at any moment. If a patient says he hears a tone, and then claims that he still hears it when it has been cut off, it is evident that he has been deceiving himself.

Another device makes it possible to switch the sound to either ear or both. A loud tone in either ear causes the eye nearer it to blink slightly, though the patient may claim that he hears nothing.

The patient is made to read aloud in his normal voice in another test, while a tone is switched from ear to ear. The intensity of the voice is regulated by the sound of the voice and this can be drowned out. One who has normal hearing in both ears will, however, be able to hear his voice with one ear while the tone is switched to the other, and he will not change the level of his voice as the tone is switched back and forth. If he is deaf in one ear, he will raise his voice every time the tone sounds in his normal ear.

When the tone is switched on and off both ears, a person with normal hearing will raise his voice each time the tone is turned on, while one who is deaf will continue to read without changing his voice.

To detect a false claim of deafness in one ear, the tone is switched repeatedly back and forth between the ears at varying intensity, and the patient is asked to signal each time he hears a sound. A truthful signal can be made almost instantaneously, but if the patient must stop to decide each time in which ear he hears the sound, much more time is required and he quickly becomes confused, thus betraying himself. These tests are expected to prove valuable in compensation cases where loss of hearing is involved.

## PROBABLE FLOODING OF THE WHITE AND BLACK RIVERS

THE low-lying areas along the White and Black Rivers in Arkansas and Missouri are in danger of another flood. Heavy rains which fell in that region on April 20 will so swell the waters of these rivers that rises of one to six feet above flood stages were expected, beginning on April 21 in the upper portion and extending to the lower parts of the White River the first few days of May. These predictions are made by Dr. H. C. Frankenfield, in charge

of the rivers and flood division of the U. S. Weather Bureau.

These areas suffered severely in the great Mississippi Valley flood of last year and the farmers have not yet fully recovered. Moreover, high water caused them damage and concern about two weeks ago. News of hardship and privation are therefore to be expected from this region in the next few weeks.

The Mississippi River will feel the influence of these floods in its tributaries, but on the whole this great river is behaving itself this year.

There are no large cities along the White and Black Rivers, but towns which were expected to feel the flood include: Batesville, New Port, Georgetown, DeValls Bluff, Clarendon, all in Arkansas and on the White River, and Poplar Bluff, Missouri, on the Black River.

Heavy rains in the lower basin of the Ohio River, some of them having sent to earth as much as three inches of rain in the last twenty-four hours, will cause a considerable rise in that river. It is, however, expected that the excess water will flow down to the Mississippi without great trouble.

### A REMEDY FOR SEASICKNESS

SEASICKNESS may cease to be the voyager's bugbear if experiments of Drs. J. Frank Percy and Daniel Hayden, of Chicago, are substantiated by further tests.

The possibilities of the new remedy came to light when the doctors were making experiments to determine the depressant effects of the common drug, sodium nitrite, on the mechanism of the middle ear that controls the balancing of the human body. The experiments were reported to the American Medical Association.

"Believing that seasickness is due mostly, if not completely," the authors explained, "to overstimulation of the vestibule (of the middle ear), we felt that the nitrites offered a direct attack at the long-sought but never attained cure for the terrible malady of the ocean voyage."

So when Dr. Hayden was about to take a trip abroad he sought to put his theory to the test, but none of the passengers on the trip going over the Atlantic accommodated him by becoming ill. On the return voyage, however, he had better luck. Sixteen succumbed and were divided into two groups of eight each, one of which received the nitrite treatment while the others were kept under observation as controls. Every attempt was made to have patients with equally acute symptoms in each group.

The controls were prostrated for about two days, but the others who received from three to five grains of sodium nitrite every two hours until they were relieved were comfortable on deck and able to eat meals in four hours. There was no recurrence of symptoms.

Although the work has a sound experimental basis, the actual tests having been adequately controlled and 100 per cent. cures obtained, the authors expect to use nitrites in a much greater series before drawing final conclusions. They are certain, however, that they will cure many cases of seasickness, but it is also possible that there are cases that will not be cured.

### ITEMS

THE U. S. Bureau of the Census is waging a campaign to bring every state in the Union into the birth and death registration area before 1930. The registration area is slowly growing, with some expansion in 1927, but federal health officials feel that it is extremely important for the country's warfare against disease that accurate information concerning the birth and death records of the entire nation be available to epidemiologists and health workers. The birth registration area at present covers 40 states and the District of Columbia, which takes in 87.3 per cent. of the total population of the country. In the death registration area are 40 states, the District of Columbia and 21 cities in non-registration states of the death registration area. This gives information on the cause of death of 91.3 per cent. of the population of the United States.

NORTH sky light, long accepted as the perfect standard of white light for examining colors, has been found to vary in intensity and color, not only from day to day, but also from hour to hour. The American Institute of Electrical Engineers reports that north sky light is not white, but blue and the examination of colors under such light exaggerates blues and minimizes reds and yellows. It is claimed that noon sunlight and not north sky light should be accepted as the standard, and that artificial white light for color discrimination purposes should approximate noon sunlight.

VICTIMS of Addison's disease and other conditions associated with adrenal insufficiency may be greatly benefited by a method of treatment now under development by Drs. J. M. Rogoff and G. N. Stewart, of Western Reserve University, according to an announcement made at the meeting of the Federation of American Societies for Experimental Biology at Ann Arbor. By means of injections of extracts made from adrenal glands obtained from the slaughter house, Dr. Rogoff has enabled dogs completely lacking the adrenal glands to survive for periods from 18 to 78 days. This extract when sufficiently purified can be used to treat Addison's disease, a condition in which the function of the adrenals is greatly impaired. Progressive anemia develops in this disease, which usually results in death. The functions of the adrenal gland are obscure at the present time and the work by Drs. Rogoff and Stewart will probably lead to new developments in the treatment of other serious ailments associated with adrenal insufficiency.

FAR under the feet of pedestrians who are serenely unaware of what is happening, two parallel subway tunnels are being blasted and bored through the bed rock of Manhattan. At the rate of twelve feet per day, the tunnels are pushing their way, ninety feet below Fifty-third street. At the East River they will meet tunnels dug under the East River from Long Island. The rock taken out of the tunnels in Manhattan is being used to fill in deep spots in the river where the tunnels pass. The same rock will thus be dug out for a second time before being finally disposed of. The use of electrical machinery in this remarkable operation is eliminating almost all manual labor in tunneling.