# SCIENCE NEWS

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## PICTURES BY TELEPHONE

How the method of transmitting photographs by telephone lines has been developed into a regular commercial service, by which either a photographic negative or positive may be sent regardless of the character of the original, was described to the members of the Optical Society of America, meeting at Cornell University on October 30, by Dr. Herbert E. Ives, who has been largely instrumental in making the method a success. Dr. Ives is now retiring as president of the society, and he spoke on the subject in his presidential address.

"One is apt to imagine," said Dr. Ives, "that when photographs are sent by wire the apparatus might be looked upon merely as a long distance photographic printing frame and that its function would be simply to take the negative from the camera at the sending end and make a print at the receiving station some hundreds or thousands of miles away. The problem, however, is not quite so simple as this. In ordinary photography, the man who makes the print has the negative in his hand to look at, and he can decide how it should be handled. He is apt to make several trials before he gets it right, but this is not possible in sending photographs over wires because of the cost of the line time. This cost is similar to that for telephoning for the same time, several minutes, and so it is the ideal to have conditions so standardized that the telephone line can be used exactly as it is set up for transmission of the voice."

But this is not the only way that telephonic transmission of pictures differs from ordinary photography," said Dr. Ives, "for it opens up new possibilities. Thus it is possible," he said, "by adjusting parts of the apparatus, for a picture to be received as a positive or a negative, no matter which form the original may have. It is also possible to make the picture-transmitting apparatus produce the received picture with a structure of dots which may be directly used in making the zinc printing plates for use in the newspapers. Altogether, there are at least eight different ways in which a photograph might be handled in sending from one point to another."

As the chief justification for sending photographs by this method is the need for speed, the apparatus has been designed from the start to work with as few operations as possible. For instance, he said, the original picture may have been taken on a film or plate of any size, and so it is always necessary to make a photographic copy of it before it can be sent. Therefore, the machine is so constructed that the transparency films may be used while they are still wet, and it is not necessary to wait for them to dry.

At present, a regular service for anybody who wishes to use it is maintained between Chicago, New York and San Francisco. Where only one print is required it is usually received directly on paper as a print, but when it it done for a news agency, said Dr. Ives, it is preferable to receive a negative from which any number of prints may be made.

## BACTERIAL LIFE BELOW EARTH SURFACE

FIRST direct evidence of the existence of living things a thousand feet or more beneath the surface of the earth is claimed by Dr. Edson S. Bastin, head of the department of geology at the University of Chicago, and his associates, Frank E. Greer and Gail Moulton.

During the last summer the party, working in cooperation with the Illinois State Geological Survey, made chemical and bacteriological analyses of oils and associated waters from twenty-five oil wells of southern Illinois. The samples were taken from continuously flowing wells, the depths of which range from 500 to 1,500 feet below the surface. In twenty-three out of the twenty-five samples, cultures made in the university bacteriological laboratory show an abundance of bacteria.

"Ever since reading Sir John Murray's classic ocean researches," said Dr. Bastin, "I have always suspected the presence of bacteria in natural oil and its associated waters. Murray found that the waters enclosed in the black muds at the bottom of the ocean were different in composition from the typical ocean waters above them. The conspicuous differences were the paucity of sulphates and the abundance of hydrogen sulfide gas, having the odor of rotten eggs.

"Surely, the last place where one would think of finding living and thriving organisms is a thousand or more feet below the surface, encased in seemingly impervious rock. But since the cultures give undoubted proof of their presence I do not credit bacteria with being the least fastidious as to the situations in which they live.

"One is inclined to discredit the presence of bacteria more than a thousand or more feet below the surface because of the food problem," said the investigator. "But the lack of sulphates and the presence of hydrogen sulfide gas leads us to believe that the minute organisms are eating the sulphates and giving off hydrogen sulfide gas as a waste product of their simple bodily processes."

The bacteria found in the oil sands are, moreover, similar to those living in the ocean to-day. This is not surprising when we note that the oil-field waters are very similar to ocean waters in chemical composition. They are believed by many geologists to be ancient sea waters buried within the rocks millions of years ago and there preserved, with minor changes, to the present day.

Whether the bacteria in the oil-field waters are the lineal descendants of those living in the ancient seas and buried alive at the time the rocks were laid down in the sea-bottom, or have been introduced into the rocks later from the underground water circulation, is an interesting question that perhaps can never be answered. It is entirely within the realm of possibility, however, that bacteria may have existed in these oil-sand waters from very ancient times, for bacteria were among the earliest forms of life to appear on the earth, as is shown by the preservation of their impressions in some of the oldest rocks known to the geologist.

## CHANGES IN OCEAN DEPTHS

VESSELS of the U. S. Navy will soon be employed in an effort to locate a reported shoal extending southeast from Cape Hatteras, and reported recently by a merchant vessel, the *West Selene,* says Captain W. S. Crosley, chief hydrographer of the navy. This boat was forced towards shore in foggy weather and made soundings to avoid getting too close to the beach, but they found depths of only 300 feet where the navy department's charts showed three times as much.

Apparently, the report is correct, according to Captain Crosley, but alterations are not to be made on the charts until the changes have been officially verified. For this reason soundings by naval vessels in this region will soon be made. If the shoal is found, it will be most remarkable, he said, because it is certain that it was not there at the time the soundings on which the charts are based were made. The hydrographic office has no record of any such changes in the ocean bottom on any part of the Atlantic coast.

Changes have been found in other parts of the world, however, especially around Japan. They followed the great earthquake of 1923, and the Japanese navy is now engaged in an extensive survey to determine the extent of these changes. Similar changes in the Bay of Biscay, where, at a supposed depth of 24,000 feet, a depth of only 120 feet was reported, have not been verified. Soundings over this region have been made by a French naval vessel, the *Loriet,* and they found nothing abnormal.

Captain Crosley suggests that such reports might arise when a lead is used for soundings, as the line may become fouled before the weight reaches the bottom. The sonic depth finder is not subject to this source of error, and American naval vessels are now being regularly equipped with them. During the recent Pacific cruise of the fleet an extensive series of soundings were made, which the hydrographic office is now engaged in tabulating. This is expected to be especially valuable, as the only soundings now available of much of this area are those made when cables were laid to Alaska and to Guam.

## TICK JUICE AS A PROTECTION AGAINST ROCKY MOUNTAIN SPOTTED FEVER

A VACCINE has been made from the ground bodies of disease-carrying cattle ticks that gives immunity to Rocky Mountain spotted fever, transmitted by the same parasites. Dr. R. R. Spencer and R. R. Parker, of the U. S. Public Health Service, have successfully vaccinated rabbits, guinea pigs, monkeys and human beings against this much dreaded fatal infection of the western cattle range. Up to the present time 34 persons have been vaccinated against the infection and none of these have succumbed to the disease.

We see no reason why injections may not be repeated each spring, said Dr. Spencer, in persons whose occupations definitely expose them to infection. It would be impracticable to vaccinate the general population of the spotted fever region, but it is believed the vaccine would afford a protection to those exposed. This would include residents, vacationists, laboratory and field workers, foresters, lumbermen, sheep herders, surveyors, hunters, prospectors and fishermen in the badly infected area.

The vaccine must be prepared from the infected ticks at the time when the virulence of the parasitic organisms that cause the disease is at its height. This is when the tick is in the adult stage. But the potent virus can not be obtained from the tick at the time of infection, for the organisms need an earlier start.

The experimenters brought up healthy adult ticks and placed fertilized females in pill-box wards, where they laid eggs. The eggs hatched to larvae and these were given a square meal off an infected rabbit. The larvae were nursed through the nymph stage and molted into adult ticks. These ticks were given a three months' rest and were well fed. Then they were eviscerated and ground up with sterile sand and salt water.

The liquid thus obtained was sterilized by means of carbolic acid, and used as vaccine. Guinea pigs treated with this serum were immune to the disease for eight months, which was as far as the tests extended. Vaccinated monkeys remained immune and others that had not been treated died.

A cattle dipper in the affected area had been vaccinated before he was bitten by infected ticks that he picked by hand off the cattle. He developed a mild form of the disease but was never in danger. He recovered completely while four other persons infected died within ten days.

## ITEMS

INSULIN, Dr. F. G. Banting's world famous remedy for diabetes, the discovery of which won him a Nobel Prize, may be superseded within a few years in all but the most serious cases of the disease. Another Canadian research worker, Dr. J. M. Rabinowitch, has prepared a substitute for it, which has the great advantage that it can be taken by the mouth. Insulin is administered by injections. The substance which has been prepared by Dr. Rabinowitch is a sweet syrup, analogous to sugar, which is obtained from glycerin on which a certain bacterium has been allowed to act. It is known as dioxyacetone. Dr. Rabinowitch, assisted by Miss A. B. Frith and Miss E. V. Bazin, gave dioxyacetone by the mouth to sufferers from diabetes in the Montreal General Hospital. It was found to lower the blood sugar. It is expected to act as an efficient substitute for insulin in the future in most cases of diabetes where the disease has not advanced too far. Dr. Rabinowitch is at present preparing a detailed record of the cases in which dioxyacetone has been used.

RICH veins of radium, gold and other rare metals have been discovered in the Ekimchansky region of the Amur province, Siberia. A telephone line has already been constructed, cooperatives organized and general signs of life are present in this formerly desolate region. New deposits of phosphates were recently found in fourteen different localities of the government of Voronesh. The total area of these localities covers about 140 square miles and the deposits are estimated at 125,000 tons.