the fact that, in an analysis for water soluble salts, a high ratio of water to soil has been used. Under these conditions sodium zeolite will be hydrolyzed almost completely, and the alkalinity when calculated to the dry-soil basis may represent a relatively high percentage of sodium carbonate. The hydroxyl ions that are derived from the hydrolysis of sodium zeolite have heretofore been thought to be derived from the hydrolysis of sodium carbonate. When, in making an extract, the ratio of water to soil is gradually reduced, the percentage of hydroxyl ions is also reduced, until at a ratio that represents the optimum moisture content of the soil, few, if any, OH ions are found in the soil solution.

The titration curves for pH values of black alkali soils have been compared with curves made from solutions of known alkalis, and in this way the results of the soil investigation have been confirmed. This work, which has recently appeared as Technical Bulletin 13 of the Arizona Experiment Station, entitled "Sodium Hydroxide rather than Sodium Carbonate the Source of Alkalinity in Black Alkali Soils," by J. F. Breazeale and W. T. McGeorge, has an important bearing upon the reclamation of alkali lands by leaching, the application of gypsum and other correctives and to other practical soil problems.

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RESPIRATION OF INSECTS

IT has been known for a long time that insects breathe by means of openings called spiracles along both sides of the thorax and abdomen. These openings lead to tubes which branch and rebranch and thus spread to all parts of the body. The abdomen pulsates out and in during respiration.

In order to determine whether some of the spiracles were used for inhaling air and others for exhaling, the following experiments with large active grasshoppers were tried.

The first experiment consisted in placing the body of the grasshopper in a vertical position in a glass vessel. Water was then poured into the vessel until the abdomen was immersed in water and the head and thorax were out of water. The grasshopper was left in this position for twenty-four hours. At the end of that time it was taken out and appeared to be none the worse for its experience. During the course of the experiment I noticed that the abdomen continued to move in a normal manner and that air bubbles kept coming out of the abdomen.

The second experiment consisted in taking another grasshopper and reversing its position so that the head and thorax were under water and the abdomen only was out of water. The grasshopper was left in this position for twenty-four hours and during this time air bubbles came out around the thorax and rose to the surface of the water. When the grasshopper was liberated it seemed quite normal.

In the third experiment a grasshopper was placed in a vertical position in water with only the head out of water to see if air entered the body by any openings around the head. Air bubbles left the body and in ten minutes the grasshopper was limp and apparently lifeless.

CONCLUSIONS

These experiments would seem to prove that no special spiracles are used for inhaling and others used for exhaling, but rather that all are alike in this respect, as the abdomen expands air is taken in and as the body contracts the gases are exhaled.

The same thing is probably true of all insects.

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FOSSIL REMAINS IN THE LOESS OF EASTERN WASHINGTON

IN SCIENCE, page 477, November 12, 1926, announcement is made by O. W. Freeman of discovery of fossil bones of a mammoth (Elephas primigenius) in loessial deposits in the vicinity of Cheney, Washington.

This is of interest in connection with the study of the origin, distribution and age of the loessial soil-forming materials of eastern Washington, a subject which has been touched upon at intervals in the pages of this publication. It is particularly suggestive as indicating the age of accumulation of these great deposits from which the loessial soils of this region are derived, though widespread redistribution and modification of the soil materials have since taken and are still taking place.

The purpose of this comment is, however, to call attention to the fact that while reported fossils are rare, the writer, with Messrs. A. T. Strahorn and E. J. Carpenter, of the Bureau of Soils, found some large fossil bones embedded in loessial deposits exposed by a fresh highway cut in September, 1923. The remains were found about thirty miles northeast of Pasco on the Pasco-Kahlotus highway. They were partially removed during the following day under direction of Dr. Kirk Bryan, of the U. S. Geological Survey, and identified as a fossil elephant, and include thigh and pelvic bones, a number of ribs, vertebrae and the lower jaw. These fossil remains are now in the U. S. National Museum at Washington. The upper jaw and skull, however, which now appear essential to complete identification and restoration, were not recovered.