

PHYSIOLOGY

# Those Most Sensitive to Electricity Stand Shock Best

**J**UST as some persons see better than others, some animals are able to withstand electric shocks—seemingly without injury—that cause other animals to suffer permanent harm.

This is one of the discoveries of Dr. W. B. Kouwenhoven, Johns Hopkins University electrical engineering professor, who with a group has been investigating the effect of electric shocks with the ultimate purpose of saving human lives and making the use of electricity safer.

One seeming paradox which he reported to the New York Electrical Society is that rats most sensitive to small amounts of electricity have the greatest resistance to electric shock.

This bears out the experience of electrical workers and linemen in the field, Dr. Kouwenhoven said. Electrical workers found that those among them who feel the weakest currents are best able to withstand and recover from strong shocks. The reason for this resistance of sensitive individuals has not yet been discovered.

The relation of resistance and sensitivity to electricity was discovered in the course of studies which have been made on rats. In one experiment the animals were placed in a basket through the bottom of which a weak electric current was passed. At first the rats did not seem to notice the electricity. Then as the amount was gradually increased, some of the animals stopped feeding and jumped out of the basket. Others did not interrupt their feeding until a stronger current passed through the grid at the bottom of the basket.

## Two Groups

The rats were divided into two groups, sensitive and comparatively insensitive. Dr. Kouwenhoven and his associates expected the more sensitive animals to suffer greater injury from a stronger electric shock. To their surprise, the sensitive animals showed the greatest resistance.

Best method of reviving a person shocked by electricity is the Shaffer prone pressure method of artificial respiration, which is also used to revive

victims of drowning accidents and gas poisoning. The artificial respiration should be started as soon as possible, Dr. Kouwenhoven said, and should be kept up until rigor mortis, the stiffening or rigidity which follows after death, sets in. This is because the heart may be beating enough to keep the brain and the rest of the body alive even when beating so feebly that its pulsation cannot be detected by a stethoscope, he explained.

## Danger at Home

The danger of death from electric shock from the ordinary household current was stressed by the scientist. He and his associates found that alternating current is much more dangerous at low voltages than at high voltages. On high voltages the muscle contraction may be severe enough to throw the person away from the contact with the electricity, while on low voltage circuits it is often impossible for him to let go. Low voltage direct current is not nearly so dangerous as low voltage alternating current. There is only one authentic record of a man being killed by 110 volts from a direct current circuit, but there are many such deaths from the 110 volt alternating circuits. The danger from household circuits is particularly great in bathrooms, cellars, garages and other damp places.

Never reach for an electric device while in the bathtub or while still wet from the bath, Dr. Kouwenhoven warned. Don't use an electric curling iron in the bathroom. He noted with approval the Massachusetts law which forbids placing electric switches inside the bathroom. Neither switchplates nor pull sockets should be within reach of the bathtub, and there should be no electric heaters in the bathroom.

Low voltage shocks kill because of their effect on the heart, the Johns Hopkins scientists have found. The low voltage current puts the heart into the state called fibrillation, which means that the heart fibers, instead of all contracting together as a unit, contract separately. The force of these separate contractions is not great enough to pump

the blood and the animal soon dies. A strong shock will stop the heart action all at once, it was found, and the victim may then be revived by artificial respiration.

Dr. Kouwenhoven and associates have found a strong counter-shock will stop the fibrillation caused by low voltage shocks and give the victim a chance to be restored. However, he has so far applied this method only to animals.

They have in this way revived animals dead of electric shock for as long as five minutes, but after five minutes, while the heart action can be started, the animals die. The reason for the failure, Dr. Kouwenhoven believes, may be that the nursing given after the heart action started was not good enough. Since animals can not tell how they feel, it is difficult to give them the efficient nursing care that can be given human patients.

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PUBLIC HEALTH

## Demand For Spotted Fever Vaccine Rises

**T**HE number of requests for Rocky Mountain spotted fever vaccine received at the U. S. Public Health Service's Laboratory in Hamilton, Mont., was nearly 50 per cent. greater this year than last, Dr. R. R. Parker, who is in charge of the laboratory, has reported.

It is at this laboratory that government scientists carry on the dangerous task of making the vaccine to protect ranchers, sheepherders and others whose occupation exposes them to the highly fatal disease.

Over 212 quarts of the vaccine were made during the 1934 season. Of this amount, about 80 per cent. was suitable for use. The demand, however, exceeded the supply. It was necessary to refuse many urgent requests and many others could not be filled completely.

A little less than two quarts of the precious stuff was sent to Brazil, at the urgent request of the Brazilian government, for use in the region of Sao Paulo, where the disease is prevalent in the same highly fatal form as that found in certain sections of western United States.

Much of the work at the laboratory has been seriously hampered by lack of funds. Studies of the relationship of spotted fever to other similar diseases; studies of the tick that carries the disease; field surveys of the prevalence and

habits of the ticks and animals in the Rocky Mountain and adjacent area; spotted fever treatment studies; and a long-term investigation under way for several years past, to determine the causes of variations in the virulence of the spotted fever virus all had to be greatly curtailed or altogether stopped. Only the vaccine production went on, but even this was hampered somewhat by the construction activities in connection with building a new laboratory and remodelling the old one.

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## PHYSIOLOGY

## Infant's One-Pound Weight Called Outstanding

"AN infant that weighed sixteen ounces at birth and that lived to be forty-three days old with a gain of two ounces is an outstanding record."

This comment on the reported record-breaking one-pound baby of El Paso, Texas, was made to Science Service by Dr. Julius Hess, of the University of Illinois College of Medicine, who has made a special study of premature infants of small size and weight.

According to Dr. Hess, the El Paso baby breaks the record for small birth-weight by five ounces.

"To my knowledge the smallest infant recorded in the literature that lived through its third year weighed one pound and five ounces," Dr. Hess said.

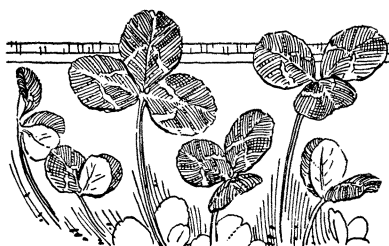
One other baby in this class, seen by Dr. Hess in Chicago, weighed one pound, three and one-half ounces at birth and lived twelve days.

Such so-called "midget" babies are not dwarfs in the true sense of the word but are infants who are born prematurely. Babies weighing two pounds or less at birth have a vary small chance of surviving. At the premature infant station at Michael Reese Hospital, Chicago, there have been cared for over a period of a few years some 83 infants whose weights at birth or shortly thereafter were under 1000 grams (about two pounds). Of these 65, or three-quarters, died.

When these tiny babies do survive and grow up, they usually become perfectly normal persons both physically and mentally.

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Letters by George Washington show that he recognized the bad effects of soil erosion on his own farms and took steps to "bind together and prevent the earth from gullyng."



### One Acre: One Man

THE TINY peasant-owned farms of France, meticulously cultivated to the last centimeter by the patient labor of human hands—and backs—have long been standard subjects of travel-comment, whether in sympathetic admiration by the more discerning, or in derisive superiority on the part of victims of the common American disease of megalophilia. To all of us, however, it has seemed something alien, something quite out of our world, that any people should actually still be living by the ancient rule, "one acre, one man"; that there should have survived into the twentieth century a rural ecology which even in the eighteenth century Oliver Goldsmith lamented as already past for England:

"When every rood of ground maintained its man."

Yet even in our America, America of the mile-wide farms and Western rangelands still resentful of any fences at all, the land averages out to something like the old-time, Old-World acre-man ratio, at least so far as first-class land is concerned. So says Dr. Isaiah Bowman, director of the American Geographical Society and chairman of the National Research Council, in the current issue of the *Geographical Review*.

"Today there is only one acre of first-class land per inhabitant of the United States, and only one additional acre of second-class land," he states. "Marginal, submarginal and doubtful land amounts to five acres per person and desert or otherwise useless land, six acres."

Nevertheless, the crux of the farm population problem, in Dr. Bowman's opinion, is not lack of land but maldistribution of population on the land. He says:

"The federal government has embarked upon a scheme for the purchase of submarginal land. Anyone who has examined at first hand some of the precarious homesteads in the semi-arid and arid West will agree that it is better to buy out a family and subsidize it for a fresh start than to supply it with food four years out of five as a measure of charity.

"When whole counties are in distress and require state or national help for a period of years it is time that at least experimental efforts be made to improve the lot of the settler. Rural slums are as definite a menace as city slums."

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## MEDICINE

## Sheep Die of "Rabbit Fever," Carried by Ticks

SHEEP in the Northwest developed a highly destructive epidemic of tularemia or "rabbit fever" last spring, which Dr. Cornelius B. Philip, U. S. Public Health Service, told the American Society of Parasitologists was borne by the parasitic ticks common on the range.

Corroborative evidence included the death of many jackrabbits from tularemia at the same time, the discovery of tularemia bacteria in the bodies of some of the ticks, a case of tick-transmitted human tularemia, and bacteriological tests on the blood sera of diseased sheep.

Dr. Philip had as associates in the research William L. Jellison, Rocky Mountain Spotted Fever Laboratory of the U. S. Public Health Service, and H. F. Wilkins of the Montana Livestock Sanitary Board.

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Cranberry rye bread is a new bakery food, says Cornell University.

## ● RADIO

Tuesday, January 22, 4:30 p. m.

OUR STONE-PELTED PLANET, by H. H. Nininger, of the Nininger Laboratory.

Tuesday, January 29, 4:30 p. m.

DIGGING UP HISTORY, by Horace H. F. Jayne, Director of The University Museum, Philadelphia.

In the Science Service series of radio addresses given by eminent scientists over the Columbia Broadcasting System.