

PHYSICS

Analyze Phone Voice to Find Recognition Factors

► HARVARD UNIVERSITY scientists are breaking down the sound of a voice as heard over the telephone to show what it is that enables you to distinguish the voice of your boss from that of your wife or mother-in-law and to recognize whether the speaker is happy or upset. This new job is being undertaken at Harvard's Division of Engineering and Applied Physics.

It is hoped this analysis will also show why a word sounds like the same word when spoken by a bass voice or by a soprano. The new analysis breaks sound into a new kind of element called a damped curve, described as "dying away like the vibration of a plucked guitar string."

Once the sound is separated into its components, the components can be studied to determine which of them are significant in recognition, and to show which of them remain constant in different voices speaking the same word.

A possible application of the research is machine recognition of speech. The day is foreseen when you can give your number orally to a dial-less dial telephone and when you can dictate your letters direct to a listening typewriter.

A second possible application is the saving of channel space on long-distance telephone lines. The man talking to a business associate in Europe wants to hear his words clearly but he does not need to hear the sounds that tell him that his associate is angry or has a bad cold.

If a telephone system were built which carried only the minimum required message, about a hundred times as many telephone calls could be sent over the same wire.

The research project is being conducted by Ladislav Dolansky, a candidate for the doctor's degree, working under the supervision of Prof. Dwight Wayne Batteau.

Science News Letter, August 2, 1958

ZOOLOGY

Debate Legislation Affecting Wild Ruminants

► THE GIRAFFE as well as the vicuna may be on his way to becoming an undesirable alien, either not permitted to enter the United States or assigned to an Ellis Island for animals instead of a zoo.

Testimony has been heard by the Senate subcommittee on agricultural research and general legislation to decide the fate of imported wild ruminants such as wild goats, cattle, and giraffes. Should they be kept out, put in quarantine, or permitted free entry?

U.S. Department of Agriculture livestock experts say exclusion may be a necessary step to protect the nation's livestock against the dread foot-and-mouth disease.

Representatives of zoos and animal farms, who depend on the animals for their exhibits, point out legislation barring the wild ruminants would discriminate unfairly against zoos. Also they point to the fact

that since 1890 no U.S. outbreak of foot-and-mouth disease has been traced directly to a wild animal.

Legislation already passed by the House of Representatives, H.R. 12126, would put the wild ruminants under the same rulings as domestic cattle and sheep: no importing of animals from countries where there is foot-and-mouth disease.

Strict quarantine measures and research costing millions of dollars have kept the nation's \$10 billion livestock industry free of this disease, despite major outbreaks in Mexico and Canada.

One proposal, made by Dr. Leonard Carmichael, secretary of the Smithsonian Institution, may be acceptable to both groups. His suggestion would give the Secretary of Agriculture the authority to establish regulations governing the quarantine and importation of wild ruminants. It would also provide for defining an "approved zoo" where the animals could be kept and exhibited. Now only publicly administered zoos are "approved" and standards of qualifications for approval are vague.

USDA experts say that any legislation may very likely be temporary, however, because research on foot-and-mouth disease may soon lead to methods of diagnosis and detection that would eliminate lengthy and costly quarantine.

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ENGINEERING

Air Replaces Oil for Bearing Lubrication

► AIR IS replacing oil for the lubrication of bearings in many machines and instruments.

A lubrication idea more than 100 years old has gone into routine practice on a variety of instruments. It is also finding specialized uses on some machines, Manfred Wildmann, Autonetics Division of North American Aviation, Inc., Los Angeles, reported to the American Society of Mechanical Engineers meeting in Detroit.

By floating bearings on a thin layer of air or other gases instead of on a film of oil, engineers have been able to eliminate much cleaning and maintenance of machinery designed for long, uninterrupted operation.

Gaseous lubrication can be accomplished by two methods, Mr. Wildmann said:

1. Air or other gases are injected at high pressure around the bearing.

2. "Normal hydrodynamic action" is utilized. This method of gaseous lubrication relies on the wall of air that builds up in front of a rapidly rotating bearing.

Neon and helium, as well as air, have been used experimentally, Mr. Wildmann said. Air bearings already have found use in memory devices for digital computers and in high precision gyroscopes, he said.

Lazar Licht of the Franklin Institute, Philadelphia, suggested gaseous bearings for use in machines sensitive to contamination from lubricating oils, and in radioactive atmospheres where ordinary lubricants tend to break down.

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IN SCIEN

ZOOLOGY

Rare Goat Specimens Brought From Japan

► AN ANIMAL so rare that it is known as a "national monument" in its native land, Japan, has been brought to this country for study.

Three specimens, including two females and one fetus, of the Japanese serow, a small, shaggy, hooved mammal that somewhat resembles a Rocky Mountain goat, have been received by the American Museum of Natural History, New York. The animal is so shy and wary that in two months of hunting a Museum expedition saw only three serows.

Permission to hunt the rare goat-antelope is seldom given by the Japanese Government which has a program to conserve the species. Population estimates of the serow, or *Capricornis crispus*, range between 3,000 and 30,000.

It lives in the sub-alpine forests of Japan at elevations as high as 7,000 feet. Blackish-brown in color, the serow has tapered black horns. The specimens will not be exhibited at this time, Hobart M. Van Deusen, assistant curator of the Museum's department of mammals, reports.

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SURGERY

New Surgical Technique Enlarges Bladders

► URINARY BLADDERS shrunken as the result of disease or chemical injury can be enlarged by a new surgical technique.

Dr. Willard Goodwin of the University of California at Los Angeles Medical School described the new technique, which involves use of a segment of the small intestine, before the American Urological Association meeting in New Orleans.

Dr. Roderick D. Turner and Dr. Chester C. Winter cooperated in development of the new technique.

In the procedure, known as the "cup patch" operation, a segment of the ileum is removed and cut lengthwise so that it lies flat. The edges are sewn together so as to form a cup or patch, which is then sewn to the bladder. When healed the bladder and patch act as a unit in voiding the urinary bladder.

Chief advantage of the method, the doctors said, is that it leaves no residual urine, such as may occur in other types of operations using the ileum to enlarge the bladder.

The new technique has been used in 17 cases by UCLA surgeons. Results are promising, especially in cases involving such bladder disorders as interstitial cystitis, tuberculosis of the bladder and chemical injury of the organ.

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CE FIELDS

ARCHAEOLOGY

Scientists in Middle East Find Language Link

► THE MIDDLE EAST is yielding more than just world tension these days. This is evident from a report that American archaeologists in Turkey have unearthed an important link with the past.

Digging at Sardis, a site 50 miles east of Izmir, Turkey, and once the capital of wealthy King Croesus, the American scientists found an inscription in the little known Lydian tongue.

This is believed to have been the language of Croesus' kingdom in the sixth century before Christ. The Lydian inscription was found incised on a fragment of a pottery vessel.

American archaeologists from Harvard University and Cornell University began digging at the site in June seeking to uncover the ruins of Sardis, once a major world capital.

Each new inscription is a major aid in progress toward understanding the Lydian tongue, Prof. George M. A. Hanfmann of Harvard said. Some scholars believe it to be related to the language of the Hittites, who flourished in Asia Minor more than 700 years before Croesus.

The joint Cornell-Harvard Expedition is being sponsored by Cornell University, the Fogg Art Museum of Harvard, and the Bollingen Foundation under the auspices of the American Schools of Oriental Research. It is a five-year program, during which time the archaeologists hope to uncover a large building that may prove to be the palace of Croesus, the man who gave the modern world the expression "rich as Croesus."

The pottery fragment is the first fruit of the Expedition's work.

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ZOOLOGY

Tiny Bat Brain Tells Information From Noise

► A BAT'S BRAIN, weighing only a small fraction of an ounce, can pick out sounds needed for safe flight even when there is loud surrounding noise.

The bat can dodge wires less than three-tenths of a millimeter in diameter while loud noise "jams" the faint echoes bounced back by the wires.

Apparently, the bat brain contains a highly efficient data processing mechanism, Dr. Donald R. Griffin and Alan D. Grinnell of Harvard University's biological laboratories in Cambridge, Mass., report.

It seems conservative to conclude that bats can hear echoes that are at least 35 decibels below the level of surrounding noise, the scientists report in *Science* (July 18). Experiments show further that this

ability must involve "selective recognition" of the echoes.

Possibly, the scientists suggest, characteristics of the echoes such as their pulses, frequency sweep, and the time relations between the bats' emission of a sound pulse and the arrival of echoes, may aid the bat in this "impressive auditory discrimination."

In experiments, individual long-eared bats or *Plecotus rafinesquii*, were flight-tested in a room containing wire obstructions. Four staggered rows of 28 wires, ranging in size from about 1.5 mm to 0.28 mm diameter, were arranged so the bats had to fly a zig-zag course to avoid merely chance misses in collisions. Thermal or "white" noise was generated by electrostatic loud-speakers.

It is unlikely, the scientists report, that the bats learned the position of the wires. Variations in noises themselves also do not seem to be the way the wires are detected. To test this, paper muzzles were put on the bats. This cut down their obstacle avoidance to the chance level.

When blinded, one bat even outperformed some of his fellows in avoiding one of the smaller wires during a "noisy" trial. The wire provided echoes well below the noise level.

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ROCKETS AND MISSILES

Rocket Launching Pads Will Present Problem

► LAUNCHINGS of nuclear-powered intercontinental ballistic missiles and space rockets will involve the same type of radiation hazards as encountered in actual weapons tests, the joint Congressional Committee on Atomic Energy was told in secret testimony recently released.

Many radioactive fuel elements, probably in gaseous form, are expected to spew from the nozzles of nuclear rockets and contaminate the launching pads, Dr. Raemer Schreiber of the Los Alamos, N. M., Atomic Energy Commission testified Jan. 22, 1958.

For this reason, and because accidents could cause the reactor engines to "fall apart, not explode" and release all their fuel into the launching area, Dr. Schreiber said it will be necessary to use launching pads "which you do not expect to use again for several months."

Such pads, he said, "can be located on centers that are not perhaps more than a half a mile apart, but you do have a problem of remote firing and of having a local contamination at the time of launching."

Such "blast-off" radiation will be much smaller than that encountered in tests of our smaller nuclear bombs, he said.

It is also possible, Dr. Schreiber told the Subcommittee on Outer Space Propulsion, that by the time we are ready to use nuclear engines in ICBM's and rockets, the reactors may have been perfected so that none of the radioactive fuel spews from the rear.

However, he stressed, there still will be the problem of neutron-activated steel, ground and concrete at the launch pads. It will take perhaps a few months "decay time" for this effect to wear off.

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ORNITHOLOGY

Emperor Penguin Mother Gets 9-Week Vacation

► ONCE THE female emperor penguin lays her single egg, she takes off for a nine-week vacation at sea while the male incubates the egg.

She returns, however, just in time to help feed her newly-hatched offspring.

This was revealed in studies of the feeding habits of this unusual Antarctic bird made by Richard L. Willing, of the Antarctic Division of the Australian Department of External Affairs, Melbourne.

The young penguins grow rapidly, as do their appetites, Mr. Willing says, causing both parents to work hard at bringing their only chick food.

The adult emperor penguins depend on feeding holes or tide cracks for their food supply. Glacial movement keeps the cracks open, enabling the penguins, which gather at them in large numbers, to gorge themselves on fish and small animals and plants known as krill.

An interesting fact, he says, is that the birds do not feed for very long at these holes. The onslaught of many hungry birds, he suggests, depletes the feeding hole larder and the birds move on to another.

Once back at the homestead the mother and father penguins regurgitate the food for the chick.

Mr. Willing, who reported his studies in *Nature* (July 19), points out that the female emperors apparently travel far out to sea during their nine-week vacation because they are never seen near the coast.

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PUBLIC HEALTH

Cautions Against Hot Weather Food-Poisoning

► THE HOT summer season brings with it the increased chances of food poisoning.

Special precautions that can be taken to preserve foods safely are suggested by Dr. Herman E. Hilleboe, State Health Commissioner for the State of New York.

1. Meats, poultry, salads, pie fillings and sauces should not be kept at room temperature. They should be kept at 50 degrees Fahrenheit or lower.

2. Since not all bacteria causing food poisoning can be destroyed by cooking the food, the best method of preventing food poisoning is to make certain bacteria contamination does not occur and that bacteria growth is not encouraged by storing under improper conditions.

3. Avoid cream sauces when preparing salads during hot weather. If a sauce is used, it should be kept under refrigeration until the salad is ready to be served.

4. Keep left-overs under refrigeration at all times.

5. Avoid handling food if you have a cold or if you have a sore on your hands.

6. Keep cooking utensils and dishes thoroughly washed.

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