PHYSIOLOGY

Different Breathing May Cause Scientists' Diverging Views

Those Who Hold Everest Cannot be Conquered Without Oxygen Said to Have Sea-level Respiratory Centers

THE CONQUEST of Mt. Everest, the world's highest mountain, altitude 29,141 feet, is a future feat which interests scientists greatly.

Physiologists are divided into two camps over the question of whether oxygen should be used to assist the climbers who attempt to scale this great height. Some, like Prof. J. Barcroft of Cambridge University, contend that the climbing of Everest is now merely an engineer's problem, that of designing a light and efficient oxygen breathing apparatus. Others, particularly Dr. J. S. Haldane of Oxford, feel strongly that the attack on the mountain can be made without the aid of oxygen and that the mountaineers can become acclimated to the rarefied air.

That this disagreement arises not so much because these British scientists think differently but because they breathe differently, is contended by Prof. Yandell Henderson, the Yale physiologist and authority on respiration.

There are two types of men, those who acclimatize slowly and with difficulty and those who readily become adjusted to low pressure of oxygen.

The first type suffer from prolonged mountain sickness and it is they who earnestly advocate the use of oxygen. They have what Prof. Henderson calls "sea-level respiratory centers." For them oxygen is the breath of life. They are the ones who should fly direct and wholly unacclimatized to the North Col of Mt. Everest, don an improved oxygen apparatus, make the ascent and get back below 15,000 feet while the supply of oxygen holds out. For them the ascent is an engineering problem.

But the other sort of person becomes so well adjusted during the slow ascent through Tibet to the starting place of the real climb, that Prof. Henderson believes a party of such persons might reach the summit without oxygen apparatus. The feat would be difficult and the risk great, but it would be safer without oxygen apparatus for this type of mountaineer.

The serious disadvantage in wearing an oxygen apparatus after acclimatization at a great height is due to the physiological fact that the blood alkali is reduced in proportion to the altitude and oxygen pressure. As the ratio between the blood acid and alkali must be kept balanced at high altitudes as at sea level, breathing must be speeded up at great heights in order to remove the blood's acid in the form of exhaled carbon dioxide. Prof. Henderson finds that a man adjusted to sea level breathes at rest 5 to 7 liters (quarts) of air per minute and when exercising 40 to 60 liters per minute. At the altitude of the North Col of Mt. Everest, an acclimatized person breathes 10 to 14 liters at rest, and 80 to 120 liters when exercising. Exhaling and inhaling 80 to 120 liters of air a minute is intolerable for more than a minute or two, and a man can not walk while breathing at this rate.

Donning an oxygen apparatus after becoming adjusted to rare air does not make the heavy work of climbing easier, for the increased amount of carbon dioxide produced induces so large a volume of breathing that the climber can take only a few steps at a time.

Science News Letter, October 22, 1932

ENTOMOLOGY

Raising Houseflies Now a Business

HOUSEFLIES, usually regarded as pests to be swatted or sprayed out of existence as quickly as possible, are purposely raised in large numbers, and improvements in the technique of their rearing are matters of real scientific and commercial concern. Flies are desired by manufacturers of fly-killing sprays, who test the deadliness of their products on them.

Henry H. Richardson of the U. S. Department of Agriculture has developed a medium for feeding the young or larval stage of flies, which is stated to be an improvement over the hitherto universally employed stable waste. The latter is disagreeable to handle, sometimes unobtainable, and often harbors parasitic red mites which attack flies and render them unsuitable for experimental purposes. Mr. Richardson's medium consists of wheat bran, alfalfa meal, water, yeast and diamalt, a commercial product containing a large percentage of malt sugar.

The research on the new fly-raising food was conducted by Iowa State College at Ames, as a Crop Protection Institute project, backed by funds from a prominent oil refining company. Mr. Richardson's description of his medium is published in *Science*.

Science News Letter, October 22, 1932

PALEONTOLOGY

Important Mammoth Find Uncovered on Golf Course

FIVE TEETH and several bone fragments of the woolly mammoth, the largest single find of this huge Ice-Age mammal ever made in the East, have been discovered on a golf course near Philadelphia, and were placed on display at the Academy of Natural Sciences in Philadelphia.

The fossils were found by a workman during the course of steam shovel excavation for a new water hazard. They were buried four feet under ground. The teeth weigh from three and a quarter to six and (*Turn Page*)

FIVE ENORMOUS TEETH

These teeth of the Woolly Mammoth, with several bone fragments, constitute the largest find of Mammoth remains yet made in the East. The huge curved tusk was already in the Museum of the Philadelphia Academy of Natural Sciences. The model shows how the animal appeared in life.

three-quarters pounds each, and are in a good state of preservation.

Edgar B. Howard, of the Academy's museum, identified the specimens as belonging to *Elephas primigenius,* one of three species of genuine elephants that roamed North America during and immediately after the Pleistocene, or glacial period. Although this species was the smallest of the three, it was still huge, the beasts averaging nearly ten feet high at the shoulders, with tremendous curving tusks bigger than those of any living elephant. It was protected against the cold by a thick coat of wool, overhung with long hair.

When this great animal lived in North America, its kindred were hunted by cave men in Europe, who also drew and sculptured their likenesses on the walls of their caverns and on ivory of their own tusks. Whether such hunters existed also on this continent has not yet been definitely determined.

Science News Letter, October 22, 1932

PALEONTOLOGY

Monkey-Like Animal Found In German Lignite Mine

THE SKELETON of an exceedingly primitive lemur, a lower form of monkey-like animal, has been found in one of the great lignite or brown-coal mines in the valley of the Geisel, by Prof. Johannes Weigelt of the University of Halle. It is quite small, its length without the tail being only about four centimeters (1 3-4 inches), of which one-third is skull. The structure of the animal, especially of its skull, offers support for the theory of Prof. William K. Gregory of the American Museum of Natural History, that all ape-like animals evolved from tree-shrews. Because the mine in which it was found bears the name "Cecilie," Prof. Weigelt has named his new genus *Ceciliolemur dela saucei.*

The skeleton was found in one of two great masses of animal bones, which probably represent deep places in some long-lost stream bed. Into these the bodies of drowned animals sank, and in them water animals like crocodiles, perishing of summer drought, found their last refuges. The deposits are of middle eocene age, dating back approximately fifty million years.

Prof. Weigelt has reported the details of his find to the German scientific journal *Forschungen und Fortschritte.*

Science News Letter, October 22, 1932

PHYSICS

Super-Atomic Bullets Smash Lithium Atoms for Americans

California Physicists Confirm Work of British With New Machine That Promises to Blast Atoms of Any Element

USING ATOMIC BULLETS speeding with the energy of over 700,000 electron-volts, Prof. E. O. Lawrence of the University of California and his associates have succeeded in smashing the lithium atom into two alpha particles or ionized atoms of helium gas.

Prof. Lawrence thus confirms work done by British physicists who used lower energy protons as the bombarding projectiles. They found that protons shot at the lithium atoms combined with them and released energy.

A special apparatus that imparts high energies to atomic particles by whirling them in a magnetic field was used by the University of California investigators.

With this machine, designed by Prof. Lawrence and Dr. M. Stanley Livingston, serving as a source of proton bullets or hydrogen atom nuclei endowed with high energies, the physicists bombarded a crystal of lithium fluoride with a stream of some ten billion of these subatomic bullets per second.

In the first test proton bullets with energies of 360,000 volt-electrons were used. Then the energy of these tiny projectiles was raised to 510,000 volt-electrons, and finally to 710,000 volt-electrons. In each case the number of lithium atoms disintegrating under the bombardment was obtained by counting the helium ions which shot out of the crystal. The number of disintegrating atoms increased as the energy of the proton bullets was increased.

With the equipment now on hand, Prof. Lawrence and his associates, Dr. Livingston and Milton G. White, believe they are in a position to carry these disintegration experiments to a further point than has yet been possible. The machine now in use is capable of producing protons with energies as high as 1,200,000 volt-electrons. Although this is a higher limit of energy than has ever been officially reported, Prof. Lawrence says that he has a larger machine of the same type which will record a still higher limit of energy. This machine, which contains one of the world's largest magnets, is now producing hydrogen molecule ions with an energy of 3,600,000 volt-electrons.

The highest energies previously reported were those obtained in the department of terrestrial magnetism of the Carnegie Institute of Washington. The limit was about 1,000,000 volt-electrons, and the number of protons with this energy was very small. In comparison, the University of California machines produce projectiles at the rate of about ten billion per second, and reach energies well over one million volt-electrons.

With such means available it is believed that it will be possible to blast apart any atom in the table of chemical elements. This will in effect open a new field of physics, and far-reaching discoveries may be anticipated in the future.

Science News Letter, October 22, 1932

PUBLIC HEALTH

Discarded Batteries Caused Lead Poisoning Outbreak

DISCARDED casings of storage batteries now appear as a new source of lead poisoning. Thirty-six cases of poisoning from this cause were reported to the City Health Department of Baltimore. The casings had been given away by junk dealers of the city to be used as fuel after the lead plates had been salvaged from them. Lead, which is usually deposited in the form of lead sulfate, vaporized into poisonous fumes when the casings were burned.

The victims were all children, with the exception of one woman, mother of one of the children. All the patients were Negroes and, with three or four exceptions, all lived in the same neighborhood. Apparently they had all obtained the battery casings from the same dealer.

The Baltimore Health Department has warned junk dealers that the bat-