

PHYSIOLOGY

Bone Test for Diet Clues

► SOME DAY doctors will make a test of your bones to see whether your diet needs improving, just as they now test a drop of blood from your finger or ear to see whether or not you are anemic.

This is foreseen from research by Dr. Walter N. Brown Jr. at Pennsylvania State University. Sparked by an idea of Dr. Pauline Beery Mack, now at Texas State College for Women, Denton, Dr. Brown developed a machine known as the bone density computer.

Besides showing up nutritional deficiencies, the machine is expected to tell physicians how quickly a broken bone is knitting and to help in the fight against polio and arthritis.

"Measuring bone density," Dr. Brown explained, "involves measuring the amount of calcium in a bone. We first had to learn how to do this technically. That work, which took several years, led to the development of the computer. Now we are ready to start large scale measuring experiments."

Such experiments involve the cooperation of physicians and organizations throughout the country, who will take special X-ray films. Regular equipment is used, but an aluminum-zinc alloy wedge is sent to help standardize film conditions.

"When a picture is taken," Dr. Brown says, "the bone absorbs X-rays, and where it absorbs them, the film registers clearer. That means the more transparent the film

is, the denser the bone is. Accordingly, we use film transparency to help tell us about bone density.

"But any number of factors can affect the film itself. Different X-ray machines blacken film to a different extent. Film is manufactured by many methods and variations occur because of this, as well as when it is being developed.

"The wedge, however, is not subject to these variables. By laying it alongside the bone to be X-rayed, a constant standard is established, against which film variables may be checked in the computer."

The bone density computer finds the density of bone for each tiny area of the X-ray film, by comparing these areas with the wedge picture. It then averages all the spots together to get the density of the desired section of bone.

The bone density technique is set up to handle only extremity bones in the hands and feet. University scientists are now trying to develop a machine that will find the density of bones inside the body, like the spine or pelvis, or the skull, which are surrounded by areas of soft tissue.

Once films have been taken, they are sent back to the University lab, to be put through the computer. A report is then sent to the physician. With one shift of operators working, the machine will process some 3,000 films a month.

"Two experiments are currently being run," Dr. Brown said. "One is with a mixed age group, under the auspices of a nutritional organization in eight western states. The other is in a Philadelphia home for the aged.

"We hope to get a series of bone density measurements on the same individuals. From these, we may learn whether the amount of minerals or calcium in the bones varies as a person grows older, when he changes locale, or when his diet is altered. If such changes can be verified, they would be pretty important for medical researchers."

Science News Letter, July 24, 1954



LENSLESS MICROSCOPE—With this field emission microscope, invented by Dr. Edwin W. Muller of the Pennsylvania State University, he is able to view the tiniest particles of matter yet seen by man. The lensless microscope consists of an extremely sharp needle sealed into one end of a cone-shaped vacuum tube. The needle is pointed at a fluorescent screen, and high voltages strip electrons off the atoms in its tiny, rounded tip. A photograph of the microscope's screen, shown in the inset, reveals molecules of an organic dyestuff sitting on a tungsten crystal. The white, paired circular objects are the molecules.

ANIMAL HUSBANDRY

Turkeys' Growth Normal At 10,500 Feet Altitude

► TURKEYS SUFFER no ill effects if they live in an altitude of about two miles above sea level, 10,500 feet.

Day-old turkeys hatched at Davis, Calif., which is just above sea level, were taken to the higher altitude of the White Mountain High Altitude Station at Big Pine, Calif., where their growth was compared with similar stock at sea level.

There was no interference with their growth or the attainment of sexual maturity. The only reported change was an increase in heart size. The birds did not show the increases in lung and spleen size that have been observed in mammals raised in the mountains.

The research was performed by A. H. Smith, W. O. Wilson and N. Pace of the University of California.

Science News Letter, July 24, 1954