

Largest human calorimeter under construction

BELTSVILLE, Md. — The mystery of why some people get fat while others do not on similar amounts of food and exercise may be solved by a new live-in calorie counter being built here by U.S. Department of Agriculture scientists.

C.E. Bodwell, research chemist for USDA's Agricultural Research Service, says construction of the new calorie counter, known as a human calorimeter, was prompted by the need to know how much energy is in foods and how people make use of this energy.

Bodwell, who heads the research agency's Protein Nutrition Laboratory, says "no one really knows how much food a woman or a man really requires for today's modern, take-the-elevator, watch-it-on-television living."

The calorimeter looks much like

a large, white walk-in refrigerator with two small windows. But it is, in fact, the largest, most sophisticated chamber to measure human metabolism in the United States, Bodwell says.

Bodwell says the new Beltsville calorimeter will be the first room-sized unit in the United States to combine direct and indirect

calorimetry to measure energy produced by metabolizing food in the human body.

Sensors in the walls and in the air flowing out of the calorimeter will provide the direct measurements of heat given off through the skin of the person inside. Indirect calorimetry will measure the normal decrease in oxygen and increase in carbon dioxide in the air caused by breathing, and the amount of urea in waste products.

Bodwell says measurements will then be used to calculate the amount of food or body tissue used to produce heat. Ideally, he says, the direct and indirect methods should agree closely.

To gather all this data, a sleek, gray computer will continuously monitor over 16,000 temperature sensors imbedded in the interior walls of the calorimeter. Another instrument under the computer's control, a mass spectrometer, will constantly compare the percentages of oxygen, nitrogen and carbon dioxide in the air entering the chamber and in the air coming out.

On the outside, the calorimeter may resemble a refrigerator, but it's rather homelike on the inside, Bodwell says. The unit is comfortably heated and well lighted. A volunteer may bring along books, magazines and similar material. But researchers won't permit television sets inside because of the heat they produce.

Bodwell says clothing and furnishings in the chamber have to be lightweight to avoid blocking heat radiating from a person's skin.

According to Bodwell, detecting the heat given off by an individual will pose no problem to the chamber's sensitive equipment.

Designed to measure temperature changes in the air of as little as one thousandth of a degree, the calorimeter will easily monitor the 1,600 to 2,400 calories per day an average size adult expends. That amount of heat can bring 90-135 cups of water to a boil.

Volunteers will stay in the chamber from two days to two weeks depending on what foods and exercise patterns researchers are studying. Living conditions in the chamber will be as close to normal as possible, Bodwell says.

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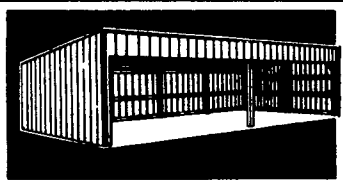
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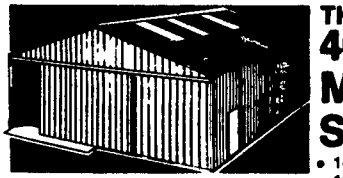
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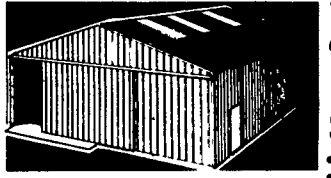
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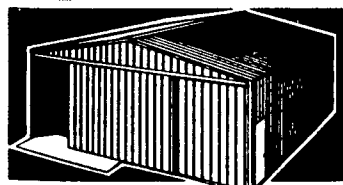
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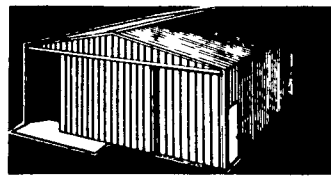
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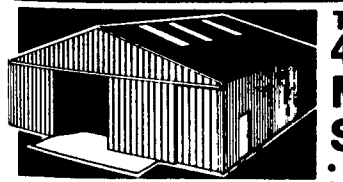
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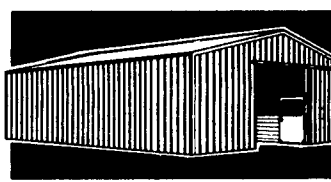
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The workshop will be held Monday, June 4th from 7 to 9 p.m. at the Chester County Cooperative Extension Service, 235 W. Market Street, West Chester. Call 696-3500 to reserve a spot. Preregistration is requested. A small fee is required.

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