MEDICINE

Hint New Kind of Insulin

► A NEW kind of insulin that would be a boon to those diabetes patients who now must take insulin twice a day to control the unstable form of the disease seems in the offing.

Studies of two new types of long-acting insulins suggest this. The studies were made by Dr. Joseph L. Izzo, with the assistance of Miss Alfreda M. Gabiga and Miss Joanne Hoffmaster of the University of Rochester (N. Y.) School of Medicine. They were reported at the meeting of the American Diabetes Association in New York.

One of the new preparations is called insulin 2958. It is a long acting zinc insulin preparation. The other is called special insulin 190-4B-111. It is a clear preparation of a new chemical modification of insulin without basic protein. These two were compared with the standard long-acting insulin now used, called NPH insulin, which contains both zinc and the protein, protamine.

An insulin and zinc preparation without protein, Dr. Izzo pointed out, would have the following advantages: 1. possibly more uniform and consistent absorption from the depot under the skin; 2. fewer hypersensitivity reactions; and 3. greater flexibility in adjusting the best timing.

Insulin 190-4B-111 is considerably faster and insulin 2958 definitely slower than NPH insulin in timing, Dr. Izzo found. Insulin 190-4B-111 tended to produce low levels of blood sugar in the middle of the day and high levels at night and in the morning. Insulin 2958 had the opposite effect, high levels during the day and low levels at night and morning.

Although neither of these insulins seems to be the final answer to the problem of unstable diabetes, the studies suggest that preparations of this type may be found which will be more suitable.

Science News Letter, June 13, 1953

ENGINEERING

Practical Heat From Earth

► NEW INFORMATION which may make the earth-source heat pump practical and popular has been discovered by researchers at Texas A. and M. College, College Station, Texas.

The major failing of heat pump installations in the past has been lack of accurate information as to proper lengths for the buried coil portion of the pump, with regard to soil types and avearge temperatures.

Now, through use of a formula developed by Donald M. Vestal, Jr., working with the Texas Engineering Experiment Station, the exact length of the buried coil can be figured out in advance through use of available information.

Development of the formula, however, required three years of continuous research. It involved constant checks on soil temperature and moisture content, and finally the development of a new measuring method—the heat-meter method.

This method was worked out by Mr. Vestal and his four-man staff after tests showed that two recognized unsteady-state methods were inadequate.

In the new method, "heat meters" composed of bismuth are used to measure the quantity of heat energy flowing through a test specimen of soil at steady-state conditions. At the same time the steady-state thermal gradient within the specimen is checked by means of embedded thermocouples.

Unknown thermal conductivity at various points within the specimen are then computed on the basis of the rate of flow of heat energy as shown by the "meters."

Ten main soil types, some from other regions, were tested in this manner and classified. They are representative of the soil types likely to be found at buried coil sites.

Mr. Vestal's formula which allows accurate calculation of coil length for any given set of conditions, consists of dividing the time rate of heat transfer between coil and soil by the difference between coil temperature and average natural seasonal temperatures of soil at coil depth, times soil thermal conductivity, times a constant that depends upon whether heating or cooling is wanted, and upon such other factors as coil spacing and the intermittency of operation.

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TECHNOLOGY

Robot Keeps Reactor From Blowing Its Top

► A ROBOT safety system which will automatically keep an atomic pile from blowing its top has been developed.

It is a packaged automatic control system to monitor the operation of the piles in which nuclear fission takes place. A series of electronic instruments control the beginning of nuclear reaction and, once in operation, regulate the rate of power generation at predetermined levels.

In A-bombs, nuclear fission is uncontrolled and happens in an instant's time. In a nuclear pile, it is controlled and the power resulting from the splitting of atoms is permitted only to dribble off in required amounts. Rods of boron steel control the activity of neutrons. The robot system will keep pushing these rods in and out so that the precise amount of control desired is obtained.

The system includes a multiplicity of electronic instruments, amplifiers, servo-amplifiers, recorders, controllers and servomotors. It was developed by the industrial division of the Minneapolis-Honeywell Regulator Company. The company say this is the first nuclear pile control system all in one package.

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