BIOCHEMISTRY

Metals Needed for Health

In addition to being necessary for maintaining health, trace elements can provide the biologist with a tool for early diagnosis of possible disease in plants and animals.

➤ TINY AMOUNTS of metals such as iron, copper, zinc, manganese and molybdenum, called trace elements, can upset the delicate balance between health and sickness.

They may be one key to early diagnosis of plant and animal diseases.

They may also provide scientists with a way to get tailor-made plant and animal products.

This was disclosed at a National Academy of Sciences lecture, Washington, describing the role of trace elements or micronutrients and their importance to life. In contrast to the macronutrients, such as calcium, phosphorus, sulfur, sodium and potassium that are needed in relatively large amounts, the trace elements are required only in very small amounts.

In fact, the exact amount needed of some trace elements is not known. What is known is that the presence or absence of these chemicals can cause tremendous changes in an individual without affecting growth, generally considered a sign of health.

Dr. William D. McElroy, director of the McCollum-Pratt Institute at Johns Hopkins University, Baltimore, pointed out that yield or growth are not necessarily signs of a normal healthy individual.

"Visual symptoms," he said, "of plant and animal deficiency need not be evident to prove deficiencies in the health and vigor of the organism."

Trace elements can, however, show up these deficiencies. They are believed to play the important role of catalysts in many chemical reactions in the living organism. This means that they must be present if vital enzyme systems, such as those that regulate the release of energy in the cell, are to be successful in carrying out their work.

By studying many of these enzyme systems, Dr. McElroy told SCIENCE SERVICE, the scientist can learn how much trace element is needed and when. He then has a sensitive tool to measure one part of an individual's health. If an enzyme needs zinc to function and cell studies show no zinc where it should be, some form of deficiency may show up in ill health.

The mental disorder phenylpyruvic oligophrenia, for which there is no available treatment now, may be one disease that could be helped with further trace element studies.

The disease is genetic in its origin and is caused when the amino acid phenylalanine is not removed from the body in sufficient quantities. A child inherits an enzyme system in which there is some block in the metabolism of this amino acid.

Possibly, Dr. McElroy said, correcting the absence or oversupply of one or more trace elements might be an answer to treating the disorder.

In the field of agriculture the use of trace elements can contribute more than bigger plants and animals and greater yields. If aroma in tobacco is desired, the biologist pointed out as an example, a plant slightly deficient in sulfur may be essential. Also, a sheep's dietary level of copper may be a factor in the tensile strength and kink of its wool.

Science News Letter, February 8, 1958

METEOROLOGY

First IGY Data Delivered

➤ THE FIRST set of microcards containing weather information gathered during the International Geophysical Year has been received by Dr. F. W. Reichelderfer, chief of the U. S. Weather Bureau.

As permanent U. S. representative of the World Meteorological Organization, Dr. Reichelderfer was presented with the first of some 18,000 sets of microcards expected to result from the 18-month intensive study of this planet's atmosphere being made during IGY.

The presentation was made at the American Meteorological Society meeting in New York. The complete set of microcards will include descriptions of weather conditions from 2,000 continental stations and 2,000 ships reporting four times a day for the 18-month period.

Issuance of the microcards marks the first time that any vast body of scientific knowledge has been made available in complete raw data form, not condensed or abstracted, on a truly international scale. Since the microcards require no data processing equipment and the information is recorded entirely in Arabic numerals, weathermen from any part of the world can use them.

A microcard is a photographic paper print made from a composite negative of any kind of written, typed or printed material. A card three by five inches will hold from 20 to 80 pages of text, photographs or charts.

Microcards can be read by magnification, or special viewers are available.

Prof. Sverre Petterssen, Norwegian meteorologist and now a University of Chicago professor, will direct the American Meteorological Society's affairs during 1958-59 as its newly elected president.

Science News Letter, February 8, 1958

● RADIO

Saturday, Feb. 15, 1958 1:30-1:45 p.m., EST

"Adventures in Science" with Watson Davis, director of Science Service, over the CBS Radio network. Check your local CBS station.

Father Francis J. Heyden, S. J., director of the Georgetown University Observatory, Washington, D. C., will discuss "Satellite Photography."

TECHNOLOGY

Atomic Fallout Punches Its Own Time Clock

➤ A NEW device by which atomic fallout punches its own time clock has been developed at the Atomic Energy Project of the University of California at Los Angeles by Ross W. Farmer and Oscar Reiner, Jr.

It shows the precise time at which fallout arrives in areas up to 100 or more miles from "ground zero."

Such data are important in field studies of fallout, particularly in determining the amount of radiation exposure people in the area may have received.

The unit is relatively inexpensive, consisting of a standard six-volt automobile clock, a tiny Geiger counter and a transistorized oscillator power supply. In field tests, it has operated unattended in extreme temperatures and under rugged field conditions.

When increased radiation intensity reaches a pre-set rate, the electrical circuit is shorted, blowing a fuse and stopping the clock instantly, thus showing the fallout arrival time.

Science News Letter, February 8, 1958

PHYSICS

Make Conducting Crystal From Non-Conductor

➤ CRYSTALS that normally do not conduct electricity can be made conducting for short periods of time by bombardment with high energy electrons, tiny negative particles.

Such investigations, which yield basic information regarding the physics of solids, were reported to the American Physical Society meeting in New York by Dr. Martin A. Pomerantz of Bartol Research Foundation, Swarthmore, Pa.

In addition to the conductivity, other properties of solids Dr. Pomerantz and his associates have investigated include the energy levels of the atom's electrons and the mobility of charge carriers. Collaborating in the studies, supported by the Army's Office of Ordnance Research, were J. F. Marshall and R. A. Shatas.

Electrons used to bombard the magnesium oxide crystals had energies of about 1,500,000 electron volts. Temperatures ranged from about 400 to 1,100 degrees Fahrenheit.

Science News Letter, February 8, 1958