

block in the mechanism of transporting vitamins across membranes and into cells in the body. When this is the case, massive doses may work by so saturating the exterior cellular environment that there is enough vitamin to get through. Second, an intracellular inability to break vitamins down, converting them to coenzymes, may be at fault. Third, there may be an abnormality within the cell in apoenzymes, proteins which hook up with vitamin coenzymes to form an active unit which interacts with cellular enzymes.

In a vitamin B<sub>12</sub>-responsive disorder known as methylmalonic aciduria, conversion appears to be the defective mechanism. Biochemical studies of a child diagnosed with this condition at eight months of age confirm this hypothesis. Clinical treatment with 1,000 micrograms per day (the normal requirement is less than one microgram per day) appears to substantiate the validity of vitamin therapy. At eight months the child was underweight and showed signs of slow mental development. A year later, his weight and mental growth were normal.

**The mechanism** by which vitamin B<sub>6</sub> reverses the biochemical defect in homocystinuria is thought to be somewhat different and is one that raises both hopes and problems. Unlike true enzymes which are highly specific in their reactions—presumably each enzyme in the body performs but a single function—vitamin coenzymes operate in a variety of metabolic processes. Vitamin B<sub>6</sub>, for example, plays a role in several unrelated metabolic events. In homocystinurics, Dr. Rosenberg suggests, massive B<sub>6</sub> doses act not by correcting or overwhelming the defective metabolic pathway but, by virtue of their versatility, by opening a new one. In effect, the doses create a new channel in which the necessary biochemical reactions can take place.

Says Dr. Rosenberg, "This hypothesis should infuse an extra measure of caution into the experimental treatment of homocystinuria. It is one thing to activate a normal enzymatic process that for one reason or another is failing to function, as in methylmalonic aciduria. It is something else again if, in the course of treatment, we open an alternate, normally inactive process. While doing so might correct the immediate biochemical abnormality, it might also generate abnormalities on its own."

With that caution duly taken, it is also possible that by deliberately activating nonfunctional metabolic pathways, scientists may be able to one day correct a host of metabolic disorders by using drugs specifically tailored to unblock unused metabolic routes. For this, vitamins are a model and a beginning. □

DUBRIDGE LEAVES

## New man for Nixon

Since the post was created under President Eisenhower, the Science Adviser to the President has been either a physicist or a chemist. Now for the first time an engineer will hold the job. President Nixon has appointed Dr. Edward E. David Jr. of Bell Telephone Laboratories to be Science Adviser and has nominated him to the companion post of Director of the Office of Science and Technology. (The latter post requires confirmation by the Senate; the advisership does not.)

Dr. David, whose work has been mainly in the fields of computers, cybernetics and communications theory, is executive director of communications research at Bell Labs.

The 45-year-old engineer will succeed Dr. Lee A. DuBridge, former president of California Institute of Technology, who has held the joint position since the Nixon Administration assumed office. In tendering his resignation Dr. DuBridge cited his age—he will be 70 next year—as a ground for retirement. He also mentioned his disappointment at the amounts of money being appropriated for science. In his letter to Mr. Nixon, he blames Congress for not voting all the money asked by the President.

Scientists outside the Government tend to blame the Administration for the lack of funds. In their view the amounts the President asked for are insufficient. Budgets of most Government agencies that fund science are down. Some government laboratories are closing; others are discharging employees. There is less money for research grants.

**All this** has caused a depression in the pure sciences that is particularly severe for physicists, but is being felt by all categories of researchers. Many see the decline as expressing a Government policy of decreasing the nation's effort in pure science. Since the scientists generally regarded Dr. DuBridge as their ambassador to the White House, he had been hearing more and more expressions of their discontent in recent months. Some of the scientists felt that he has been more concerned to justify Administration policy to them than to express their anguish to the President.

Appointment of an engineer to succeed Dr. DuBridge seems to mean that the policy, if it is a policy, is likely to continue. Dr. David says the President feels science should be used for the benefit of people. In statements that he has made so far Dr. David has emphasized such things as health services, transportation, defense and housing. According to White House



Bell Labs

*David: Advice from a cyberneticist.*

officials some of the things the President is particularly interested in are treatments for cancer, heart disease, emphysema and dental caries.

Two of the Government's highest scientific officials have responded to the appointment with expressions of welcome. Dr. H. E. Carter, chairman of the National Science Board, says, "The board looks forward to a continued close relationship between the National Science Foundation and the Office of Science and Technology under Dr. David's direction. As a former member of the Foundation's Advisory Committee for Engineering, Dr. David is already familiar with the Foundation's role in the Federal support of science and its utilization for the betterment of mankind."

Dr. William D. McElroy, director of the National Science Foundation, says the appointment means "continuing progress in the development of Federal science policy."

**The reaction** of nongovernment scientists is less enthusiastic. Although Dr. David is a member of both the National Academy of Sciences and the National Academy of Engineering, few scientists seem to know him. Says one: "DuBridge is, well, conservative, but he was President of Caltech, and nobody could object to that."

Another remarks, "I understand the main criterion was that he [David] be a full-blooded Republican."

Says Dr. Jeremy Stone, executive secretary of the Federation of American Scientists, "I am concerned that the office of science adviser might gradually become diminished in prestige through the appointment of scientists who are not well known to the scientific community."

Dr. David is scheduled to take up his duties Sept. 1. A spokesman for the Senate Committee on Labor and Public Welfare says the committee will probably not get to confirmation hearings until after Labor Day. □