

to be taken to the point where patients could survive on only one milligram per day of concentrated liver extract. This is about the equivalent in weight of one piece of a postage stamp cut into 50 parts.

Of this one milligram, only a very small fraction is the part responsible for the extract's healing properties. Yet it takes about a ton of liver to get around 20 milligrams of the potent extract. So the search for the powerful portion continued.

Isolate B-12

In April, 1948, Dr. E. L. Rickes and associates of Merck and Co., announced they had isolated, from highly concentrated liver extract, a few small crystals, the new vitamin B-12. The following week, Dr. E. Lester Smith, of the Glaxo Laboratories in England, announced that he had also isolated the anti-pernicious anemia factor.

Now pernicious anemia victims need take only very tiny doses of vitamin B-12 to hold the disease in check. Recent studies have indicated that each new red blood cell gets one molecule for its very own.

Vitamin B-12 is now being made from the same mold that produces streptomycin, but it is possible that an even cheaper method of production may be found when the riddle of its chemical formula is solved.

Nutrition Research

If it had not been for research in an entirely different field, discovery of the B-12 producing qualities of streptomycin mold might have been long delayed. Scientists in this field wanted to learn more about the diet needs of animals and so improve their growth, thus give humans better food. Intensive work on this problem has also been going on since the late 1920's, although most of the studies were made recently.

In 1946, Drs. C. A. Cary, A. M. Hartman and their co-workers at the Department of Agriculture reported a new factor—they called it "X"—that seemed to be essential for normal growth in young rats. Milk and commercial liver extract were among the substances that would correct a deficiency of this factor.

"Guinea Pig" Micro-Organism

Looking for a guinea pig on which to test this rat-growth factor, Dr. Mary Shorb, working at the University of Maryland, studied the micro-organism, *Lactobacillus lactis Dorner*. She found that this micro-organism required not one, but two factors for growth. One is called the TJ factor for the tomato juice in which it is found. The other is the LLD factor. LLD is the short name for *Lactobacillus lactis Dorner*. This LLD was found in the highest concentrations in liver extracts, and the more potent the liver extract in helping pernicious anemia patients, the more powerful the LLD factor.

Because of this, Dr. Shorb thought the LLD factor required by the micro-organism for growth and the chemical that gave such relief to anemia victims were identical. After

crystalline B-12 had been isolated, it was tested with the micro-organism and showed LLD activity. Dr. Shorb's suggestion had been right.

Dr. Rickes then looked for the new vitamin B-12 in other biological materials besides liver, using Dr. Shorb's micro-organism as a guinea pig. He found several. One, a red crystalline compound, was isolated from the mold that gives us streptomycin. Tests showed that this crystalline compound had the same chemical and physical properties as the just-isolated vitamin B-12.

The accidentally discovered growth spurt given by the vitamin-antibiotic combination can be shown by example. Here is how the combination puts extra weight on animals:

Use Less Feed

A typical chicken grower, using the so-called high-energy diet, containing some animal proteins, is doing well if his chickens weigh three pounds at the end of 12 weeks. And that weight is reached only by feeding the flock three pounds of animal-protein enriched feed per pound of gain.

If however, he adds vitamin B-12 to the same amount of feed, his broilers will be up to three pounds in 11 weeks. But with a combination of B-12 and an antibiotic, he can get a three-pound broiler at the end of ten weeks, using only two and a half pounds of feed per pound of gain to reach this added weight in a shorter time.

Exactly which antibiotic combined with vitamin B-12 will give the best growth for chickens, for turkeys and for hogs is now being tested. There is some evidence that results are more promising with one antibiotic for chickens, another for swine.

Thus the search for the anti-pernicious anemia factor in liver and the hunt for better animal feed came together in one vitamin, the twelfth in the series of B vitamins. And this vitamin, combined with one of the antibiotics, is adding greatly to our poultry and hog production.

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GENERAL SCIENCE

Draft Deferred Students Should Have Way Paid

► **BOYS WHO** would be deferred to go to college under new Selective Service regulations but who cannot afford it should have their way paid by the federal government. This is the opinion of Dr. M. H. Trytten, general chairman of the six advisory committees to Selective Service Director Lewis B. Hershey. The six committees were responsible for the new college deferment regulations.

"I believe the time is here when the federal government must give consideration to the support of qualified young men who desire to go to college and cannot afford it," Dr. Trytten reported.

"It has been necessary to provide through Selective Service for the deferment of large numbers of college students in training for the many fields of specialization the nation needs," he went on.

"Congress recognized this need when it wrote the 1948 Selective Service law."

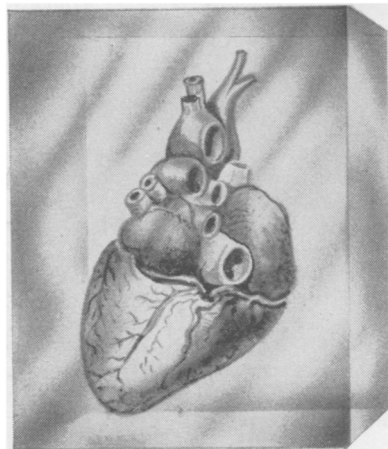
Dr. Trytten pointed out that the six advisory committees strongly advised that something be done about the youngster who did not have the money for college but who did have the ability.

"However," he said, "their responsibility was only to provide a way of carrying out the mandate of Congress. That mandate was that an adequate flow of trained personnel should be provided to meet national needs in the national health, safety and interest through a Selective Service procedure.

"The Committees," Dr. Trytten said, "felt very strongly that this clearly pointed up the question of how to provide equal opportunity for equally qualified youngsters and recommended strongly that early consideration be given by Congress and the government to a program of assistance to such qualified persons."

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