the NAS review, and because it occasionally reaches a different conclusion, the agency has no intention of releasing the NAS study wholesale. Instead, it is proposing that once it does publish findings on a specific product, those findings must then be included in advertising immediately—before the company issues a rebuttal and before any final regulatory action is taken. That post-publication process can take months to years. Meanwhile, physicians would be alerted to the questions raised about a product and, presumably, might stop prescribing it.

According to Bruce Brennan, chief counsel for the Pharmaceutical Manufacturers Association, the PMA's specific line of legal attack has yet to be drawn. There are, however, a couple of broad approaches. It may challenge FDA's basic legal right to require such specific, negative disclosures. And it is likely to contest the scientific validity of the judgments rendered by NAS scientists, claiming that they do not represent a full range of medical opinion. By and large, members of the NAS review panels were drawn from academic medicine. Admittedly, they were not always unanimous in their views and, to the distress of drug companies, tended to place little weight on testimonials from industry sources. □

LINEAR ACCELERATOR

Saving space with superconductors

AEC

Two miles of superconducting waveguide could raise SLAC to 100 GeV.

The only practical way to construct high-energy electron accelerators is to build them in straight lines. Electrons revolving in the magnetic fields of circular accelerators lose energy by giving off so-called synchrotron radiation. At energies in the tens of billions of electron-volts, they lose energy almost as fast as they gain it from the machine, and very large amounts of energy have to be supplied by the machine to get a very small increase in the net energy of the electrons.

To achieve the present maximum energy of the Stanford Linear Accelerator, 20 billion electron-volts (GeV), required an accelerator two miles long. To achieve an energy of 100 GeV, a conventional electron accelerator would have to be tens of miles long.

The alternative is to change technology to get more energy per running foot of accelerator. Using superconductors instead of ordinary conductors in the waveguides that accelerate the particles is a possibility that now begins to look favorable, and physicists at the Stanford Linear Accelerator Center under the leadership of Dr. Perry Wilson are working on a plan to rebuild their accelerator with superconductors, jumping its energy to 100 GeV without increasing its length.

Heat from electrical resistance is the main problem in conventional technology. The electrons are accelerated by radio waves that run in metal waveguides. The amount of energy that can be delivered per linear foot is limited by the danger of melting the waveguides.

Superconductors will pass electric currents without resistance. With superconducting waveguides the heating problem virtually disappears.

The advantages are threefold: More energy per foot of flight can be delivered to the electrons; more of the total energy delivered to the machine will get to the electrons, and more of the time the machine is on can be used for actual acceleration rather than for cooling. Under the plan the machine will spend six percent of its time on actual acceleration, 100 times the current percentage.

Superconductors function only at temperatures very near absolute zero. The SLAC physicists envision refrigerating the whole two-mile length to 1.85 degrees K. with liquid helium.

Formidable technical difficulties are involved in designing waveguides and refrigeration systems. Work on these problems has been under way for several years at the Stanford University High Energy Physics Laboratory under the direction of Dr. William Fairbank (SN: 6/22/68, p. 599).

The time that a superconducting accelerator the size of SLAC can be built is not yet, says Dr. Wilson, but "to make big improvements you have to start 10 years in advance." One of the major efforts in the work is finding a good waveguide material. Niobium looks most promising now but its electrical qualities deteriorate on exposure to air. Either a very good vacuum system or a protective coating will have to be developed to use it, says Dr. Wilson.

To bypass some of the problems, the SLAC physicists are constructing what they call Project Leapfrog, a 52.5-centimeter section built to the specifications of the larger project. This should be ready for test early in 1971. If it works, the next step is a prototype between 20 and 40 feet long. So far the project is being funded out of SLAC's operating budget, but the prototype would cost about $1 million and probably require a separate appropriation.

According to Dr. Raymond Fricken of the Atomic Energy Commission's high-energy physics division, the SLAC conversion is one of several things the AEC would like to do in the 1970's. Its cost is estimated at between $70 million and $80 million, which Congress would have to be persuaded to authorize. □

MYCOPLASMA

Vaccine for a pneumonia

When Dr. Norman Somerson got out of graduate school in the 1950's, he couldn't find a job in the field in which he had taken his degree. Almost nobody was interested in mycoplasma. Only three laboratories in the world were at work on these cells, almost as small as viruses and lacking the rigid cell wall that encloses most bacteria. Some workers thought these smallest of free-living forms were an early growth state of well-known bacteria.

But when, a decade later, a species of *Mycoplasmatales* was identified as a major producer of human pneumonia, Dr. Somerson quickly got research funds to pursue the pathogens at Ohio State University School of Medicine.

Last week Drs. Somerson and Dennis Pollack were proud producers of an experimental vaccine against *Mycoplasma pneumoniae* that has evoked a high response of neutralizing antibodies in humans and is easy to purify. Clinical trial began Sept. 10 at Baylor University