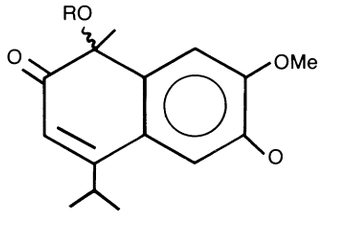
Brown lung theory some don't cotton to

A secret agent in cotton causes brown lung disease — the pulmonary illness of textile workers. Some believe that the agent is a toxin produced by bacteria present in cotton dust. Others believe the agent is an inherent chemical component of cotton. At the American Chemical Society (ACS) meeting in Atlanta last spring, the bacteria toxin believers presented their case (SN: 4/11/81, p. 231). Now comes a word from the other camp.

John P. McCormick and Teruo Shinmyozu of the University of Missouri at Columbia have synthesized a group of compounds they believe not only could be natural components of cotton, but also could be causative agents of brown lung disease, or byssinosis. The researchers — whose work will be presented next month at the ACS Midwest Regional Meeting in Columbia — have synthesized chemical cousins of a compound called Lacinilene C Methyl Ether, or LCME.

McCormick and Shinmyozu started with LCME as the parent compound, because this substance already has been isolated from branches and leaves of cotton and has been shown to display some byssinosis-related activity — such as histamine release — in animals. Researchers do not suspect that LCME itself is the chemical culprit responsible for byssinosis, though, because the levels of activity it displays are fairly low. In addition, LCME is not extremely water soluble, and researchers know that the byssinosis agent can be washed from cotton (an impractical solution to the work-environment problem, because it renders the material exceptionally difficult to work with). McCormick and Shinmyozu therefore set out to synthesize compounds related to LCME that are more water soluble and that show higher levels of activity related to brown lung disease.



Lacinilene C Methyl Ether:
R = H
Glycosides synthesized:
R = glucosyl, galactosyl

Such compounds are glycoside derivatives of LCME, or LCME compounds with glucose or galactose groups attached. The researchers have synthesized a variety of these derivatives, and some show up to five times more byssinosis-like activity in animals than does LCME. Moreover, because glucose and galactose are major constituents of cotton-plant carbohydrates, it is entirely possible that glycoside derivatives of LCME are components inherent to the plant. McCormick and Shinmyozu now are picking through cotton components to determine whether their hypothesis is correct.

But even if one of their LCME-derivatives is discovered in cotton, the search for the elusive brown lung disease agent will be far from complete. Explains McCormick, "The chances are damn good that there is more than one." □

Another novel tack against Chagas disease

An effective, safe drug for Chagas disease, a form of sleeping sickness that infects 10 million South Americans, may at long last be in the works. Scientists at Albert Einstein College of Medicine recently reported success in using the experimental anti-tumor drug taxol to inhibit in the test-tube the parasites that cause the disease (SN: 8/29/81, p. 134). And now chemicals that help counter sleeping sickness in rats have been identified and may eventually be used to treat Chagas disease patients, Allen B. Clarkson Jr. and George H. Mellow of New York University School of Medicine in New York City report in the Oct. 9 SCIENCE. The compounds appear to be rheumatoid factors, which are produced in the blood of rheumatoid arthritis patients.

First, Clarkson and Mellow showed that lactating rats have an unusual resistance to *Trypanosoma lewisi,* the parasite that causes sleeping sickness in rats; that blood from lactating rats tends to clump *T. lewisi,* and that nursing enhances rat pups' survival from sleeping sickness. These findings suggested that blood from lactating rats contains some chemical or chemicals that help counter sleeping sickness.

The researchers knew that rats infected with *T. lewisi* help fight off infection with a class of antibodies called IgG antibodies. Rheumatoid arthritis patients manufacture IgM antibodies that react specifically with IgG antibodies and are called "rheumatoid factors." So they hypothesized that the chemicals in blood from lactating rats that help counter sleeping sickness might be these rheumatoid factors — and that by so interacting, the IgM antibodies would enhance IgG antibody protection against the disease.

To test their hypothesis, they first used standard immunological techniques to identify the *T. lewisi*-clumping chemicals in the lactating rats' blood as IgM antibodies. Then they put the IgM antibodies from lactating rats' blood, as well as blood from nonlactating, uninfected rats, in the presence of IgG-coated *T. lewisi* and of nonIgG-coated *T. lewisi.* The IgM antibodies adhered to the IgG-coated parasites; blood from the nonlactating, uninfected rats did not. Neither the antibodies nor the blood adhered to nonIgG-coated parasites. These findings suggested that the IgM antibodies were specific for the IgG-coated parasites and that, by reacting with the IgG-coated parasites, they enhanced the IgGs' protection against sleeping sickness. "This is the first evidence of a rheumatoid factor helping control an infection," Clarkson and Mellow conclude.

The investigators now have to see whether rheumatoid factors also react specifically with IgG-coated *Trypanosoma cruzi,* the parasite that causes Chagas disease in humans. They are also trying to find some way of temporarily inducing rheumatoid factors in Chagas disease patients, Clarkson told SCIENCE NEWS, in hopes that the factors might eventually be used to treat such patients. □

Final test set for Ariane

The fourth and final test flight of the European Space Agency's Ariane rocket has been scheduled for Dec. 14, from the ESA launch site in Kourou, Guiana. The first Ariane was launched on the day before Chirstmas of 1979, and scored a resounding success. The second, on May 23, 1980, ended in a mid-air explosion that slowed the program by eight months while engineers sought to find and fix the problem. The third flight took place on June 19 of this year, again a success. If the remaining test is similarly trouble-free, Ariane will graduate to become Europe's principal gateway to space, and significant competition to the U. S. space shuttle.

From the second flight on, the Arianes have been carrying satellite payloads to orbit (those aboard number 2 were destroyed in the blast), and flight 4 is no exception. Aboard will be MARECS-A, the first of two MARitime European Communications Satellites, as well as an instrumented capsule designed to monitor the new booster's performance. (The capsule will also house an ionospheric electron-density experiment designed by a group of young people from France — Ariane's principal participant country.)

From there on, Ariane will be considered an officially operational vehicle, although its first six launches following the test program have been dubbed the "promotional series." A private organization called Arianespace has been set up to market the rocket's earth-to-orbit services, but the launch business is already looking good: Ariane's manifest shows firm commitments for 13 launches, with reservations (some of them double-bookings that may end up on the U. S. shuttle) for 14 more, extending through the end of 1985. □