

systems. The House had asked for \$24.6 billion and the Senate for \$20 billion. The House figure is the one in the final bill. Federal grants will be provided on a 75-25 matching basis, with states and localities working out their own systems for sharing their 25 percent of the total costs. For \$18 billion of the funds, the authorization in effect becomes an appropriation because it allows the local agencies to obligate themselves for contracts in advance in this amount.

Other new legislative action includes:

- A joint resolution introduced by Senate Majority Leader Mike Mansfield of Montana and other Western Senators would impose a moratorium on all coal mining on Federal lands until Congress passes, and the President signs, a strip-mine reclamation bill.

The resolution is aimed mainly at halting massive coal-mining operations planned by electric utilities in Western states (SN: 3/4/72, p. 156) until there is some assurance that the mined land will be maximally reclaimed. In remarks in support of the resolution, Sen. Lee Metcalf (D-Mont.) claimed that Federal agencies have been negligent in enforcing existing regulations for mining on the Federal lands, which make up a major percentage of the Western coal lands.

Metcalf also asserted that claims by utilities and other energy companies that the nation is suffering a severe energy shortage are unconvincing; 22 million tons of coal were exported from the United States the first five months of this year.

Hopes for an effective strip-mine reclamation bill meanwhile dimmed, as the Senate Interior Committee reported out an earlier committee version that did not include strengthening amendments offered by various coal-state Senators. But an aide to one of these Senators said the amendments will now be offered on the Senate floor.

- A House-Senate conference committee reached agreement on a bill that reportedly goes further than a June 5 Presidential order in opening up at least some Federal advisory committees—including possibly those of the National Academy of Sciences and the National Science Foundation—to public scrutiny. A print of the bill was not available at press time but a Senate staffer said the bill would probably “disappoint people like Ralph Nader” who had wanted full press and public scrutiny of the myriad Federal agency advisory groups.

- The Senate passed a bill to establish an Office of Technology Assessment to help Congress in evaluating new scientific and technological projects. A conference committee will now consider the Senate bill and an earlier-passed House bill.

- Sen. Edmund Muskie (D-Me.) and Sen. John Sherman Cooper (R-Ky.) introduced an amendment to the Federal-aid highway bill. The amendment would allow cities to use money from a proposed “urban transportation fund” for rail transit as well as buses. The urban transportation fund legislation—earlier made a part of the highway bill by the Senate Public Works Committee—provides, however, that only \$800 million a year of the two-year, \$14-billion highway authorization can be used for public mass transit. □

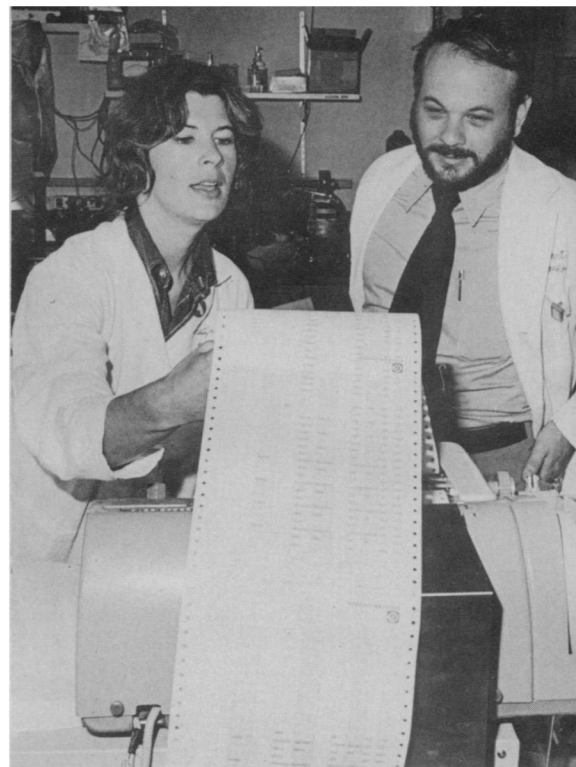
Nicotine may lower resistance to infection

Drug actions in the human body are provokingly elusive. In many instances pharmacological studies are difficult, if not impossible, to carry out on humans or in experimental animals. Consequently pharmacologists often opt to conduct *in vitro* (cell or tissue culture) experiments, although the results of such experiments must be extrapolated to the total organism—human or animal—with caution.

It is within this context, then, that pharmacologist Sorell L. Schwartz of Georgetown University Medical Center, and his colleagues Jane E. Lundin and James C. Bond, have found that nicotine can lower resistance to infection. Their work, which will soon be published in the *JOURNAL OF PHARMACOLOGY AND EXPERIMENTAL THERAPEUTICS*, was conducted *in vitro*. It is not unequivocal proof of what nicotine does in the human body.

The immune system of the body is complex and far from elucidated. Nevertheless investigators are fairly confident that the first immune response of the body to harmful foreign organisms is provided by macrophages—cells that roam throughout the bloodstream and various tissues. When the macrophages encounter harmful microbes they engulf them. Each macrophage is equipped with tiny organelles known as lysosomes. After a macrophage engulfs microbial material, its lysosomes coalesce with the material and release enzymes that digest it. Then the macrophage regurgitates some of the digested material so that lymphocytes—the body's second line of immune defense—are able to make antibodies against it.

Schwartz, Lundin and Bond took macrophages from the stomachs of mice and exposed them to foreign substances, which happened to be test proteins instead of microbes. They placed a radioactive tag in the extracellular fluid the macrophages swallowed along with the test substances. They could then follow the fate of the test substances. They found that nicotine decreased the macrophages' ability to engulf the foreign substances. Nicotine also caused the



Georgetown Univ.

Lundin, Schwartz: Interrupt immunity.

macrophages to release lysosomal enzymes prematurely, so that the macrophages were not able to completely digest the foreign substances.

Extrapolating these findings to cigarette smokers, the researchers conclude that nicotine might do more than impair macrophages' ability to engulf dangerous microbes. Nicotine might also impair macrophages' ability to digest these microbes, and to regurgitate digested material for lymphocytes to make antibodies against. Either or both ways, nicotine, Schwartz declares, “could interrupt the first step in the long, complex immune process.”

Schwartz is the first to recognize, and to stress, that caution must be used when applying these results to humans. The amounts of nicotine his team used in their cell studies are higher than those usually found in the bloodstreams of smokers. Yet he points out that his group's *in vitro* findings are reinforced by epidemiological and clinical evidence. For example, smokers are known to lose more work days than non-smokers because of bronchitis, flu, lethargy, malaise, muscle pain, nausea and other ill-defined conditions usually attributed to a “bug.” Smokers' heightened susceptibility to such conditions, Schwartz says, “could be related to their increased susceptibility to low-level infectious diseases.” Other evidence, although arguable, suggests that smoking does not make people more susceptible to heart attacks, but rather makes them less likely to recover from heart attacks. If this is indeed the case, Schwartz says, failure to recover might be attributed to lowering of the body's immune system by nicotine. □