

Three results are first from HEAO-3

The third High Energy Astronomical Observatory satellite has been in orbit for about nine months. That pregnant time interval was probably not the reason for releasing the earliest results now. More likely it was the successful extraction of some significant things from the data in time for the meeting this week of the American Astronomical Society in College Park, Md., that prompted the scientists working with HEAO-3 to authorize Martin Israel of Washington University to make a first report.

Israel stresses the preliminary character of these results ("some of them were gotten out last week") and cautions against drawing far-reaching conclusions from them. The main conclusion for the moment, he says, is that the three experiments succeeded in doing what they were sent up to do.

The three experiments on HEAO-3 are a

emission at sharply defined wavelengths such as is found characteristically in optical astronomy observations and frequently in radioastronomy observations. There was one previous report of a gamma-ray line observation, the electron-positron annihilation line at 511 kilo-electron-volts coming from the center of the galaxy. HEAO-3's gamma ray spectrometer has evidence to confirm the existence of this line.

The isotopic composition experiment reports determinations of the relative abundances of iron and cobalt isotopes, particularly cobalt-57, which indicate that cosmic rays spend some time at relative rest after they are made. It is a period of a few years at least, but could be a billion years, Israel says. That still remains to be determined, but the relative abundance of cobalt-57 to iron shows that there is a rest period. Cobalt-57 decays by capturing one of its electrons into the nucleus. It can do this during a rest period, but not after acceleration when it has been stripped of its electrons.

The third experiment, measuring rela-

Miners' lungs: Smoking to blame?

Lung disease in coal miners is caused primarily by cigarette smoking, not by inhaling coal dust, say three researchers who also claim that serious respiratory impairments are "distinctly uncommon" in miners requesting compensation for lung problems.

The three University of West Virginia researchers measured lung function in 200 miners who petitioned the Department of Labor for disability benefits. Only ten of the miners met the requirement for those benefits, they report in the current issue of the *JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION*. All 200 men claiming disability were smokers, and none had progressive massive fibrosis, "the only true disabling form of coal workers' pneumoconiosis [lung disease caused by inhaled dust]," the researchers noted.

These findings have generated a lot of comment. Anthony Robbins, head of the National Institute for Occupational Safety and Health, says, "It would be a mistake to conclude that coal miners face no respiratory problem from coal mine dust, or that coal workers' pneumoconiosis is a thing of the past."

Eldon Callen, a spokesman for the United Mine Workers, says that coal companies have been using these charges to attack black lung legislation since 1969. "I'm not advocating smoking," he says, "but the figures are not impressive for saying tobacco causes the lung problems in miners."

The principal author of the study, W. Keith C. Morgan, now at University Hospital in London, Ontario, says, "We're not saying pneumoconiosis isn't a disease or coal miners don't develop it. But the common cause we found among miners complaining of lung problems wasn't coal dust, it was smoking." There are indications that emphysema is seen just as often in the general population, and with the same cause, he says.

The study is not a conclusive cause-and-effect analysis of smoking and respiratory problems in miners. It is actually an evaluation of two lung function tests. No non-smokers were studied for comparison. But Morgan feels the connection has already been made. In 1975 he estimated that more than 80 percent of the respiratory disability seen in coal miners is related to cigarette smoking.

The editor of *JAMA* stated in an accompanying editorial that disability, where it exists, is usually due to other factors besides coal dust, and benefits are handed out too freely. "A man in whom emphysema develops and who has a history of being a coal miner can receive compensation, while another victim of the same disease, who never worked in a coal mine, receives no compensation," he wrote. □



The French-Danish cosmic-ray isotopic composition experiment is placed aboard the HEAO-3 satellite.

gamma-ray spectrometer (principal investigator Allan S. Jacobson of the Jet Propulsion Laboratory), an instrument to study the isotopic composition of the cosmic rays (principal investigators Lydie Koch of the Center for Nuclear Studies at Saclay, France, and Bernard Peters of the Danish Space Research Institute in Lyngby, Denmark) and an instrument to study the elemental composition of the heavy nuclei (atomic charge above 26) in the cosmic rays (principal investigators Israel, Cecil Waddington of the University of Minnesota and Edward Stone of Caltech). Israel reported one thing from the data collected by each instrument. If the findings are supported and extended by further results, they could lead to some important conclusions.

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