arate condensations, which means that the binary was very likely formed by capture in the early stage when stars were just emerging from the interstellar medium.

The interplay of magnetic fields, rotation and gravitational contraction is often invoked in connection with the formation of galaxies. The difference between normal galaxies and radio galaxies, which generate considerably more energy, can be explained in terms of the angle between the initial directions of the magnetic field and the axis of rotation.

If the angle is small, relatively featureless flat galaxies result. If the angle is nearly 90 degrees, the magnetic field is wound in a spiral form, from which it ultimately buckles explosively to produce a radio galaxy. Several scientists, including Dr. J. H. Piddington of the Commonwealth Scientific and Industrial Research Organization in Sydney, have developed similar theories, Commission 42 reported. ◈

CIGARETTES

Government Pressing Toward a Safer Smoke

The Federal Government's three-year campaign against cigarette smoking has had little success. When the Surgeon General's report on the hazards of smoking was released in 1964, cigarette sales declined somewhat, but the drop was only temporary.

The Government's $10 million effort to educate the public to the dangers of smoking was countered effectively by a $297 million advertising budget from the tobacco industry, which last year collected $8.2 billion from cigarette sales alone.

Now, in the face of such competition, Government leaders are changing their line of attack, pushing for development of safer cigarettes instead of no cigarettes at all.

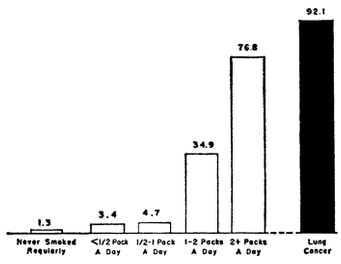
Health, Education and Welfare Secretary John W. Gardner says "We must get going . . . to persuade the tobacco industry to pursue the kinds of research that will result in a safer cigarette." Two weeks ago, HEW issued a follow-up to the 1964 document. Additional evidence from 2,000 studies, it said, confirm the earlier findings relating smoking to lung cancer, cardiovascular disease, bronchopulmonary ailments and others.

The Tobacco Institute scored the report as "an inaccurate and misleading interpretation" of scientific findings that ignored what it calls "important new studies" that show no link between smoking and lung cancer or heart disease. The Institute takes issue with Secretary Gardner's statement that "the accumulated evidence strongly suggests that the lower the tar and nicotine content of cigarette smoke, the lower the harmful effect." There is no concrete data to demonstrate that either tar or nicotine is a health hazard, says the industry.

The primary goal of the anti-smokers is to force industry into producing reduced tar and nicotine cigarettes.

Supporting this position, Dr. George E. Moore, newly named director of Public Health Research for New York State and former head of the Roswell Park Memorial Institute, Buffalo, says "the fact that the exact compounds which cause cancers to develop are not known is not a valid reason for any delay in instituting preventive measures."

Last week, Senate Commerce Committee chairman Warren G. Magnuson (D-Wash.) held three days of open hearings to review medical evidence against smoking and to see what progress has been made toward a safer cigarette. Out of those hearings may come proposed legislative standards of what a safe cigarette is—within the limits of current knowledge. Such a proposal will be fought both by those who contend cigarettes have not been proved unsafe and those who contend no cigarette can be safe—that such standards will simply encourage smoking.



Lung lesions increase with smoking.

On the theory that cigarettes should be as safe as possible, Dr. Moore told the Senate that tar and nicotine contents should be listed on cigarette packages which should also carry a warning that cigarettes are hazardous to health. Federal Trade Commission chairman Paul Rand Dixon, whose agency regulates advertising, agrees. Last June 30 the FTC urged Congress to pass legislation on both of these points.

In May, Senator Magnuson reintroduced such legislation—his previous bill on cigarette labeling and advertising died in the 89th Congress—to strengthen the Cigarette Labeling and Advertising Act of 1965 which required cigarette packages to carry a statement saying "Caution: Cigarette Smoking May Be Hazardous to Your Health."

Although the 1965 act prevents the FTC from requiring manufacturers to list tar and nicotine content on their packages, FTC plans to stimulate competition among manufacturers to develop low tar and nicotine products by issuing quarterly reports listing these levels brand by brand. FTC has already set up its own laboratory to conduct the testing (SN: 12/10/66), but is embroiled in a controversy over how much of a cigarette should be smoked by its test machines.

FTC proposes smoking test cigarettes to a 23 millimeter butt length. The Tobacco Institute argues this is too short because most filter brands cannot be smoked that far down and that most smokers leave a butt length 30 mm. long or longer so they are not inhaling the last few millimeters of smoke anyway. The amount of tar and nicotine taken into the lungs increases as the cigarette gets shorter. So far, no decision has been made.

Dr. Moore also called for minimum standards of effectiveness for filters—current filters vary from exerting a good effect to practically none at all—and for regulations establishing a maximum yield of 15 milligrams of tar and nicotine for all cigarettes. Recently reported tests at Roswell Park showed the average king-size cigarette yields 25 mg. tar and the 12 newly marketed 100 millimeter brands yield about 37 mg. tar. "The marketing of most of the new 100 mm. cigarettes is to be deplored," Dr. Moore told the Magnuson committee.

Also testifying before the Magnuson committee was inventor Robert L. Strickman who announced last July 13 (SN: 7/29) development of a filter that reduces the tar and nicotine yields of cigarettes by as much as 70 percent without reducing flavor. Strickman gave more than 50 percent of the rights to his new filter to Columbia University which is offering it to all cigarette manufacturers.

Strickman, who refuses to release details of how his filter works—namely, how it reduces flavor-carrying tars without reducing flavor—until patent rights are secured, now makes one additional claim of its effectiveness. It not only reduces tars and nicotine, he says. It also cuts down some of the components in the gaseous phase of cigarette smoke.

To date about 550 compounds have

been identified in the particulate phase of smoke and some 200 in the gaseous phase. The gas phase is hazardous because it inhibits mucous transport in the windpipe, thus interfering with the body's ability to carry foreign particles out of the lungs.

According to Dr. Charles J. Kensler of Arthur D. Little, Inc., Cambridge, Mass., a private research organization, the gaseous phase of cigarette smoke may be the most important part of the problem. Charcoal filters, he says, effectively remove between one-half and three-quarters of the toxic hydrogen cyanide and acrolein content of smoke.

Cigarette research at Little is supported in part by Liggett and Myers, manufacturers of Lark and Duke brand charcoal filter cigarettes. ◈

NON-PROLIFERATION

Treaty Nears Final Stage

While U.S.-Soviet relations have suffered from the strains of the Vietnam war and the Middle East crisis, these troubles do not seem to have seriously affected joint efforts to come up with a treaty halting the spread of nuclear weapons.

The two nations have been trying since January 1964 to agree to a draft treaty. They are so eager now, they will offer one despite the fact that they themselves are unable to agree to a key section—inspection.

Last week, as negotiators at the Geneva non-proliferation talks waited for a promised Soviet-U.S. joint draft treaty to be placed on the table—it had been expected for weeks—the following developments were taking place:

- India, which had previously expressed doubts about the treaty, renewed them. Deputy Prime Minister Maraji Desai said he didn't think the pact would have any meaning so long as China was not included.
- The U.S. Atomic Energy Commission continued its postponement of the nuclear excavation tests, which it had called off last February while talks were going on. The AEC asked Congress for funds for the test, called Project Cabriolet, in the fiscal 1968 budget, but no date has been set for it.
- Eleven inspectors from the International Atomic Energy Agency, which would play a major role in policing a non-proliferation treaty, had their first chance to inspect one of the important stopping-places for atomic weapons material: a nuclear fuel reprocessing plant at West Valley, N.Y. They will be studying the inspection procedures for several weeks.

Even when the U.S.-Russian draft is put on the conference table, the treaty will still face two major hurdles:

- The U.S. and the Soviet Union still have not agreed on who will do the inspecting of nuclear plants.
- The non-nuclear nations are not happy with their rights and safeguards under the treaty.

India's expressed doubts are typical of the uneasiness with which the treaty is viewed by non-nuclear nations. Protection from nuclear blackmail by non-signers of the treaty, particularly Red China, is one issue involved. Another is the development of peaceful nuclear explosives technology, with guarantees from nuclear powers to share that knowledge.

Russia wants inspections to be carried out by the International Atomic Energy Agency, which at present has 29 inspectors. The U.S., while an enthusiastic IAEA supporter, is faced with the problem that some European countries, especially West Germany and Italy, have been under inspection by Euratom, the European Common Market agency, and want to continue that system.

Besides the still open inspection provisions, and the pledges regarding international security and peaceful technology, the treaty includes articles under which nuclear signers would promise not to supply weapons to nations that didn't have them, and non-nuclear nations that joined the treaty would agree not to develop the weapons or accept them from any nuclear nation. These provisions were acceptable to both U.S. and Soviet negotiators. ◈

FLU

Epidemic May Test Drug

If there is an epidemic or big outbreak of Asian flu this winter, it could have the advantage of providing a thorough test of the controversial antiviral drug amantadine hydrochloride. Although the drug has been approved for flu prophylaxis by the U.S. Food and Drug Administration, Dr. Albert B. Sabin, of oral polio vaccine fame, and several other virologists have objected to its use on a general prescription basis until field trials are held "under carefully controlled conditions."

The Public Health Service has predicted substantial numbers of A-2 influenza cases this year in areas east of the Mississippi River. Officials at the PHS Communicable Disease Center, Atlanta, Ga., say they expect a possible outbreak to begin in December on the East Coast and work its way west, inasmuch as only a few cases occurred in the area last year and this type of flu runs in two to three-year cycles.

The oral drug amantadine is not mentioned by the Public Health Service, which recommends its own shots beginning Oct. 1 for people who have not been immunized later than 1963. Only one booster shot is necessary for those who have had the vaccine in the past four years.

The American Medical Association's Council on Drugs says evidence to justify the use of amantadine under proper medical supervision is sufficiently strong that it sees no justification in restricting its use by physicians. In an evaluation of the drug it warns about dosage and adverse reactions.

Officials of E. I. du Pont de Nemours & Company, Wilmington, Del., whose laboratories produce amantadine hydrochloride (trade name Symmetrel), say that 13,000 persons have been given the drug in various parts of the world, and they are at a loss to know why there are any objections to it. The Food and Drug Administration approved Symmetrel on Oct. 18, 1966 for prescription use in preventing Asian flu. It is not recommended for treating the disease once a person has it.

Dr. Sabin believes the drug has been inadequately tested. "There is only one valid investigation in human adults," he says. This study was with prisoner volunteers exposed to natural infection with influenza A-2 virus. He said that two studies in institutions for mentally retarded children were inconclusive.

Here are some of his criticisms:

- In the only study carried out in ferrets, the disease was markedly aggravated by the drug.
- When used against German measles, or rubella, during the 1964 epidemic, amantadine "not only failed to show protective effect, but suggested a possible aggravating effect because the incidence of disease was five times higher among children, aged 15 or younger, receiving the drug than in those receiving placebo."

Two influenza vaccines are available for the 1967-68 season. A newly introduced bivalent vaccine contains only the A-2 and B strains that are currently prevalent. The other (polyvalent) vaccine, similar to that used in past years, incorporates older strains (types A and A-1) as well as the newer A-2 and B strains.

The Public Health Service Advisory Committee on Immunization Practices says that use of the bivalent vaccine should provide a greater degree of protection against current strains of flu than previously has been possible. This is true because total activity of the vaccine is divided equally between strains. ◈