

Indian maiden who died just before her wedding night. Seeing a ghostly canoe one night on the lake, lit by a firefly lamp, her groom paddled out to meet her and was never seen again. Even today hunters and fishermen claim to have seen the "Lady of the Lake," and indeed a summer's night is filled with mysterious lights from fox-fire (luminescent fungus) and will-o-the-wisps (burning swamp gas).

In recent years public interest in the Great Dismal Swamp has increased. The swamp over-all has been reduced to only a third of its original size, and much of the original wildlife, including the cougar and wolf, has been annihilated. Logging operations have fallen off for the last quarter century, and the importance of the Dismal Swamp Canal dwindled after completion of the wider, deeper and shorter Chesapeake and Albemarle Canal.

Thus, when The Nature Conservancy, a national land preservation organization, approached Union Camp Corp. with the idea of donating their share of the land as a wildlife reserve, they found a ready customer. Union Camp will be allowed to write-off on taxes an estimated \$12.6 million on their donated land, which represents about a fifth of the swamp. Some 60 percent of the swamp is located in North Carolina, and is not affected by this agreement.

At a presentation ceremony in the Department of the Interior, all parties emphasized the need for more such donations to assure adequate land for America's wildlife. Speaking for ailing Secretary of the Interior Rogers Morton, Under Secretary John Whitaker expressed the hope that "this will serve as a model for future actions by major companies." □

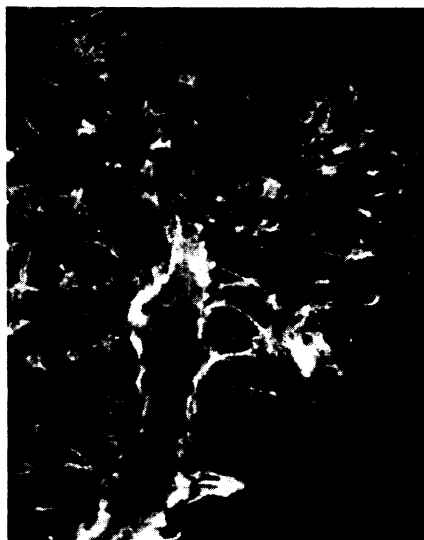
Mission possible: Repair for multiple sclerosis

Multiple sclerosis is a disease of the brain and spinal cord. A half-million Americans are estimated to have it or a related disease. About a third of the victims of multiple sclerosis, a recent Israeli study shows, suffer emotional or intellectual disturbances. Victims may be afflicted with partial blindness, loss of speech, loss of equilibrium or other neurological symptoms. Sometimes multiple sclerosis strikes silently, deadly. A recent autopsy of a 27-year-old woman who committed suicide showed that she had severe brain damage from multiple sclerosis. Yet her only symptom of the disease while alive was a slight tremor. Most victims of multiple sclerosis, regardless of the extent of brain or spinal cord damage they suffer, live many years. There is no ef-

fective treatment to date.

If scientists have learned anything over the past 40 years about the action of multiple sclerosis at the cell level, it is that the disease constitutes a destruction of the fatty (myelin) sheaths that coat nerve fibers. Certain cells in the brain or spinal cord, known as astrocytes, react to myelin damage by forming their own kind of fibers. These astrocytic fibers, or scar tissue, many investigators believe, keep nerve fibers from making new myelin. In other words, the astrocytic fibers prevent nerve fibers damaged by multiple sclerosis from healing. But there has been no evidence to back this hypothesis.

Now, after some years of research, scientists at the Stanford University School of Medicine have what may be preliminary support for such a hypothesis, or at least a means of chemically testing the hypothesis. They have iden-



Bignami/Brain Research

Astrocytes surround a blood vessel.

tified a protein that is an important constituent of astrocytic fibers. This is the first time that anything has been learned about their chemistry.

The finding was reported by two of the Stanford investigators, Doris Dahl and Amico Bignami, this week at the annual meeting of the American Association of Neuropathologists in Washington. Their findings are also in press in *BRAIN RESEARCH*.

Dahl, Bignami and their co-workers first noted that there was a lot more of a certain kind of protein in the brains of multiple sclerosis victims than in the brains of other persons. They set about trying to isolate, purify and identify the protein from both multiple sclerosis brains and from healthy brains. They have now accomplished their aim. They have found that the protein makes up about 20 percent of astrocytic fibers, is found only in the brain and spinal cord and is different from

all other known brain proteins.

The Stanford researchers would now like to get a better idea of how the protein might keep myelin damaged by multiple sclerosis from regenerating. Their long-range goal is to try to find some way of blocking the protein, or the total astrocytic fiber, with radiation, hormones or chemicals. They believe that if they can find an effective block, it might be used to treat multiple sclerosis patients. In other words, such a block would keep astrocytic fibers (scar tissue) from forming and would allow multiple sclerosis-damaged myelin to repair itself. There is evidence that such repair is possible.

The finding is certain to change approaches toward fighting the disease. Jans Muller of Indiana University School of Medicine and chairman of the pathology meeting told *SCIENCE NEWS*: "Over the past 30 or 40 years, almost all research in multiple sclerosis has had to do with the breakdown of myelin. Now Dahl, Bignami and their colleagues have added a new note to this work, that the myelin is not what we should be looking at, but the protein." □

The bitter and sweet of saccharin research

Three years ago the Food and Drug Administration outlawed the use of cyclamates as a food additive (*SN*: 10/25/69, p. 369). At the time, the artificial sweetener had been under attack for several years. Diarrhea in children, deformities in chickens and, finally, cancer in rats had been linked to cyclamates. But it was the cancer find that forced the FDA to take the chemical off the market. The Delaney amendment of the Food, Drug and Cosmetic Act absolutely prohibits the use of any food additive that causes cancer in animals or man. Now there is a chance that the Delaney law might be called down again—this time on saccharin, the only artificial sweetener still on the market.

With the cyclamate scare, fear was voiced that saccharin too might be carcinogenic. The National Academy of Sciences investigated this possibility and ruled that saccharin "does not pose a hazard" (*SN*: 8/1/70, p. 96). The NAS did, however, point out that all the facts were not in.

Now the facts are coming in. Last year the Wisconsin Alumni Research Foundation reported that rats fed a five percent solution of saccharin developed large malignant tumors. The FDA has conducted a similar study and found suspicious bladder tumors in saccharin-fed rats. Pathology and histology studies of these tumors are just

Was the universe born in a cold big bang?

Most cosmologists tend to believe that the universe began with the explosion of a very hot primeval fireball. This is the more or less orthodox big-bang theory. There are a few dissenters from this orthodoxy. One of them is David Layzer of Harvard, who, with some of his students, has been working out a theory in which the universe begins very cold instead of very hot, at absolute zero in fact. Now Layzer and Ray Hively (now of Earlham College in Richmond, Ind.) have published a paper in the *ASTROPHYSICAL JOURNAL* (Vol. 179, p. 361) that shows how the universal background of microwave radio waves, one of the chief pieces of evidence cited in favor of the hot big bang, can be explained in terms of a cold-universe theory.

There are two main reasons, according to Layzer, for going to a cold-universe theory when nearly everyone else is for a hot theory. One of these is the microwave background itself. The hot theory postulates that the germ of this background radiation was present in the original fireball in the form of a lot of photons or light particles, which gradually cool down as the universe expands until they reach the present observed temperature of 2.7 degrees K.

"It is advantageous to try to explain the properties and existence of the microwave background as a consequence of other things," says Layzer. He is concerned to make the theory as simple as possible and to avoid putting ad hoc postulates at the very beginning as the hot theory has to do.

Layzer and Hively make the microwave background arise from radiation given off by primeval supernova explosions. This radiation is then "thermalized," turned into a blackbody type of spectrum by reflection from cosmic dust. This process leaves a lot of burned-out supernova cores around, which can help solve another outstanding problem: how to find enough mass in the universe to bind it together gravitationally and close its curvature.

But what really started Layzer off on the track of a cold theory is the structure of the universe, the existence of galaxies. A fireball of the hot-theory type would tend to be homogeneous and smooth. To get galaxies out of it one has to postulate that for some unstated reason the fireball at the moment of origin contains fluctuations in density that later grow into galaxies. Layzer objects to this for two reasons. First it requires one more ad hoc postulate at the beginning. Second, "the real sticking point," says Layzer, is to see how such microscopic fluctuations can grow into galaxies. Some cosmologists even think that such fluctuations should smooth themselves out as the universe expands instead of developing further into galaxies.

Layzer's cold theory avoids these problems. It begins with a cold aggregation of hydrogen. The hydrogen solidifies in the metallic state and as it expands as a result of gravitational energy aggregations of calculable size naturally break off. These are of planetary size. By galactic standards they are small, but Layzer points out, they are of astronomical size at least, a far distance from microscopic fluctuations.

These planet-sized masses continue to accrete together into larger and larger units. At the time when the accretion stops it happens that the largest masses that can form are about the size of galaxies. This comes about because at that epoch the size of the universe is such that its event horizon, the distance between parts that are receding from each other at the speed of light and therefore cannot communicate with each other, is about the size of a galaxy. Aggregations larger than the event horizon cannot form because their parts could not communicate with each other.

Thus Layzer gets the galaxies very naturally, and the theory can also now predict the microwave background. But more work is needed. The theory does not yet predict the exact temperature of the background although 2.7 degrees lies within the range that would be possible.

beginning and should be completed in a few months. Seven similar studies (including one in Canada and another in Holland) are also nearing completion. When all nine studies are completed (possibly in April or May) the results will be turned over to Julius M. Coon of Thomas Jefferson University in Philadelphia. As chairman of the NAS subcommittee on nonnutritious sweeteners, he will be responsible for a final determination and a report back to the FDA. If the suspect tumors can indeed be linked to saccharin (rather than to impurities in the drug or to other factors), the FDA will once again invoke the Delaney amendment.

Saccharin, discovered in 1879, has been used in liquid and crystal form as a sweetener, and as an additive in dietetic foods, mouthwashes, cosmetics and even tobacco. If cancer in animals is indicated, the FDA would outlaw these uses. The Delaney amendment, however, applies only to food additives, not to drugs. Saccharin would still be available (by prescription) for use as part of the diets of diabetics. □

Soviet craft detect magnetic field on Mars

Magnetic measurements from the Soviet Mars 2 and 3 spacecraft suggest that Mars has a dipole field with a strength at the magnetic equator of about 60 gamma. Earth's is 1,000 times stronger. S. S. Dolginov, E. G. Eroshenko and L. N. Zhuzgov of the Academy of Sciences of the U.S.S.R. believe this is a paleomagnetic field not induced by the interplanetary field carried in the solar wind.

Each week's issue of *SCIENCE NEWS* is mailed the day before the date shown on the cover. Thus this issue was mailed March 2. If there is undue delay in the mail delivery of your copy, please complain to the Postmaster of your city or town. This should help in our efforts to improve delivery service.

—The Editor

The fact the field is so weak may be one reason why NASA's Mariner 4 flyby failed to detect it. (Mariner 9 did not carry a magnetometer.) When the Mars 2 and 3 orbiters were at their closest approach to the planet they detected the strength of the field to be seven to ten times greater than the interplanetary field at the distance of Mars.

In another Mars 2 and 3 report, Soviet scientists say that temperature measurements of Mars suggest the thermal emissions from the surface depend not only on the albedo (the degree to which an object reflects the sun's energy) but also on the effects of thermal inertia (the degree to which the surface retains and conducts heat). Over one area of Mars, the orbiters' data indicated the thermal inertia to be 50 percent greater than that estimated from earth-based measurements. The measurements were taken after sunset over a dark area of Cerberus. The orbiters saw a temperature rise of about ten degrees K. The Soviet scientists speculate the surface material there is unusually coarse. □