

the amphibian oocyte as "a living test tube" for studying gene expression. In experiments with purified cell parts in normal glass test tubes, expression of animal DNA is inefficient and much less accurate than in an intact cell. However when purified DNA from a variety of sources is injected into frog oocyte nuclei, it is reliably copied into messenger RNA, the intermediary between DNA and protein synthesis. Janet E. Mertz and Gurdon demonstrated such gene action for several days after cells were injected with DNA from animal and bacterial viruses, bacterial plasmids and fruit fly genes, they reported in the April PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES. When the amount of SV40 DNA injected is 1,000 times the amount of frog oocyte DNA, most of the new messenger RNA produced is specific to the virus. These viral messenger molecules seem to be the same as those that predominate when the virus infects monkey cells. Therefore, the oocyte closely mimics normal selection of DNA regions and normal processing of messenger RNA. Furthermore, the SV40 and fruitfly DNA can direct production of protein in oocytes, the researchers indicate.

Oocytes may be more suitable "living test tubes" for studying gene control in plants and animals than are bacterial cells because the oocytes are more likely to respond to relevant control signals. Unlike the naked bacterial DNA, genetic material of higher organisms is assembled with proteins into a complex called chromatin. Gurdon and co-workers observe that purified SV40 DNA injected into an oocyte nucleus is also assembled into such a complex. Therefore, the foreign genes may be sufficiently disguised to direct the cell action. The exact role of the nuclear proteins may be revealed by further studies in this system. □

Malaria, herpes vaccines: Progress

In spite of eradication of smallpox and other infectious diseases throughout the world, malaria persists as an enormous problem. One of the difficulties is that the mosquitoes that carry malaria parasites have become resistant to DDT, and biological controls for such mosquitoes have not yet become effective (SN: 8/2/75, p. 73).

However, last year saw a major advance toward a human malaria vaccine. For the first time, human malaria parasites could be continuously propagated in the test tube, thus providing a ready source of vaccine material (SN: 6/5-12/76, p. 361). Now another landmark achievement brings a human malaria vaccine still closer to reality—nonhuman primates have been successfully immunized against a human malaria parasite.

Wasim A. Siddiqui of the University of

Hawaii School of Medicine first maintained *Plasmodium falciparum*, a human malaria parasite, in the lab by serial passages of blood-induced infections in owl monkeys. He then cultivated the parasites in the test tube, harvested them for vaccine purposes and used five owl monkeys in a pilot experiment. Two of the monkeys served as controls, three were vaccinated with a parasite solution twice three weeks apart.

As Siddiqui hoped, the vaccine was weak enough in parasite content that it did not produce any malaria in the monkeys. He then injected all five monkeys with enough of the parasite to trigger malaria. Both control monkeys died two-weeks later. In contrast, the three vaccinated monkeys survived, with one completely malaria-free, and the two others showing only minor infection.

Although the number of monkeys used in this experiment was small, the difference between the course of infection in immunized and nonimmunized animals was impressive, considering how lethal *P. falciparum* usually is for owl monkeys. Indeed, this is the first report of a study in which 100 percent survival has been achieved in owl monkeys following a dose of the human malaria parasite *P. falciparum*. In fact, the only comparable malaria immunity ever achieved in monkeys before was against a nonhuman malaria parasite.

These results, coupled with those of last year, suggest that a human malaria vaccine may become a reality in the not-too-distant future. ***

Significant progress is also being made in the development of a human herpes-virus vaccine. Herpes viruses are known to cause cold sores and genital infections in people. Evidence strongly suggests that herpes viruses also trigger human cervical cancer and some other kinds of human malignancies.

A herpes virus vaccine that is effective in primates has already been developed (SN: 6/29/74, p. 413). The problem with using such a vaccine in humans, however, is that even though it has been inactivated, it contains viral genetic material that might possibly cause infection rather than prevent it. Gary R. Pearson and Robert E. Scott of the Mayo Clinic/Foundation in Rochester, Minn., have conducted experiments to see whether a herpes vaccine might be developed using material obtained from herpes virus-infected cells, not from the viruses themselves. Not containing viral genetic material, such a vaccine would have to be safe. The question is, would it be effective as well?

Using a newly developed method for isolating plasma membrane vesicles from cells, the researchers managed to extract plasma membrane vesicles from herpes-infected cells that were virus-free yet containing virus-induced membrane antigens. The vesicles were then injected into four monkeys and, as the researchers hoped, the vesicles raised anti-

bodies to herpes virus in the animals.

The results of this pilot experiment, the investigators conclude in the June PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES, strongly suggest that a herpes vaccine prepared from herpes-infected cell vesicles would be both effective and safe in humans. □

Test detects liver damage in alcoholics

A New York doctor says he has developed the "first reliable blood test" enabling the early detection of liver disease among alcoholics. Detection at that stage renders many liver problems "fully reversible," heading off more serious ailments, such as cirrhosis of the liver, says Charles Lieber, chief of the Section and Laboratory of Liver Diseases, Nutrition and Alcoholism at the Bronx Veterans Administration Hospital.

The new technique represents a considerable improvement over previous blood tests, which were not specific enough to accurately detect liver damage due to alcohol, Lieber says. Those tests attempted to identify liver problems by measuring transaminase, an enzyme released into the serum by injured body tissues. But the detection of transaminase could indicate problems in any number of tissues, including the liver, he notes. And, he adds, the enzyme is more suited to identifying viral hepatitis than alcohol-related liver complications.

Lieber's test hinges on the activities of the mitochondria, the rod-shaped "power plants" of liver cells, where the cells' energy is produced. Mitochondria exist in every cell but, according to Lieber, play a specific, critical role when liver damage occurs. In such cases, the diseased liver releases glutamate dehydrogenase (GDH), an exclusively mitochondrial substance, into the bloodstream.

In a study of 100 alcoholics versus 100 control patients, Lieber and his colleagues recently measured GDH levels in the blood and compared them to the presence of lesions that develop in the liver. He says the team found an excellent correlation between blood levels of GDH and the degree of liver necrosis in alcoholics.

Researchers still have no sure way of predicting which alcoholic patients with early liver disease would go on to develop cirrhosis, notes Lieber, who is also professor of medicine and pathology at Mount Sinai School of Medicine in New York. But he says the new blood test for liver disease may be a step toward developing "a blood test to predict cirrhosis."

In his search for such a test, Lieber believes that his experiments with baboons have provided some clues. He found that some "alcoholic" animals had pericentral sclerosis in the liver, a condition not present in normal ba-

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AUGUST STARS

BY JAMES STOKLEY

August this year provides a good opportunity to see meteors of the Perseid shower. They appear annually, but bright moonlight sometimes interferes with their observation, as it did last year. Now the moon will be out of the way, and if you want to see them at the best advantage go out into the country where the sky is dark and the city lights are low.

At the height of this year's shower, the night of Aug. 11, you may see one every minute or two, overhead or in other parts of the sky. Although they move in parallel paths all seem to come from the constellation Perseus, low in the northeast, but this is an effect of perspective. Meteors are more numerous after midnight when they hit the earth headon. In the evening they have to catch up to us, and are much fewer in numbers.

The Perseid meteor stream is a long ellipse, extending out some four billion miles from the sun and coming a little nearer to it than the earth's distance of 93 million miles. Vast numbers of the meteoric particles, generally no larger than grains of sand, are scattered around the stream. When the earth crosses the stream in August many of them enter our atmosphere at a height of perhaps 60 miles. As they collide with atmospheric atoms and molecules, atoms are knocked off each particle to form a hot, glowing cloud of gas, which is what we see as a meteor.

Five bright stars are prominent these evenings. Directly overhead is Vega in the constellation Lyra. Because of its brilliant blue-white color it has been called the "arc light of the sky." Stars of such color are very hot, nearly twice the surface temperature of a

yellow star like our sun (about 10,000 degrees F). Relatively close, compared to most stars, Vega's distance is 27 light years, or nearly 160 trillion miles. It emits about 45 times as much light as the sun.

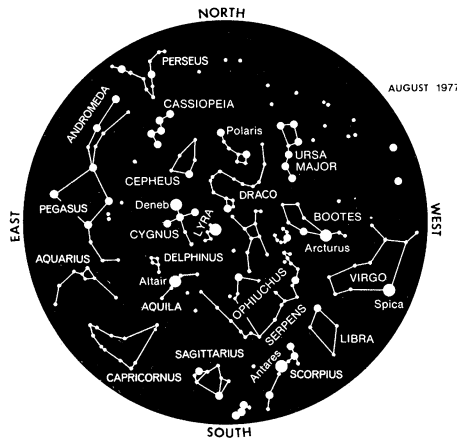
Arcturus, in the west in Böotes, is a giant star, rather reddish in hue. It's 24 times the sun's diameter (865,000 miles) and gives out 96 times the sun's light. Its distance is 36 light years.

Just east of Lyra stands Cygnus with Deneb, at the top of the Northern Cross. And in the south is Altair, in Aquila. Low in the southwest is Scorpio with Antares, another red giant, about 300 times the sun's diameter.

Mercury will be the only planet in the evening sky. On the eighth it will be farthest east of the sun and set about an hour after sunset. You'll have difficulty finding it in the still-bright twilight.

But three other naked-eye planets will appear in the east after midnight. Mars rises about 1 a.m., local daylight saving time. On Aug. 1, about 3 a.m., Jupiter will rise, quickly followed by Venus. Jupiter is about 13 times as bright as Mars and Venus, more than 5 times the brightness of Jupiter. Thus, they will make a striking sight in the east as they climb higher into the sky before dawn. During the month, Venus will draw away from Jupiter. On the 31st, Jupiter will rise about 1 a.m. and Venus about 3:30.

Saturn passes behind the sun on the 13th and won't be visible. But on Aug. 31 it will rise more than an hour before sunrise. You might glimpse it below and to the left of Venus. □



To use star map hold over head with directions oriented as indicated.

August 6	4:40 pm	EST	Moon in last quarter
8	4:00 pm		Mercury farthest east of sun
	8:00 pm		Moon farthest
9	7:00 am		Moon south of Mars
10	9:00 am		Moon south of Jupiter
11	10:00 am		Moon south of Venus
12	early am		Perseid meteors
13	2:00 am		Saturn behind sun
14	5:31 pm		New Moon
21	9:04 pm		Moon in first quarter
24	5:00 am		Moon nearest
28	4:10 pm		Full Moon

... Liver

boons. In a six-year follow-up study of the animals, he found that baboons that had such lesions, and were in the degenerative, fatty liver stage, went on to develop cirrhosis; those without the sclerosis did not.

The Bronx team is in the process of determining whether the same results could hold true for human populations. "We found that a significant percentage of our alcoholics have this lesion at the fatty liver stage," Lieber said. "And if we can verify the evolution toward cirrhosis we may have a tool to segregate in our alcoholics those that have a propensity to develop cirrhosis."

Last year, Lieber reported on a blood test to detect early heavy drinking. In both animal and human studies, he found that 80 percent of verified alcoholics—compared with 1 percent of controls—exhibited astronomically high levels of alpha amino-n-butyric acid in their bloodstream. The test will prove useful, Lieber says, in patients being treated for liver disease who may be hiding their drinking problem, and in the "objective evaluation of treatment modalities" among the approaches employed by various alcoholism programs. □

Eiseley: Into the ultimate night

Loren C. Eiseley, the well-known anthropologist and writer, died earlier this month of cancer. He was 69.

A distinguished scientist and faculty member at the University of Pennsylvania for 30 years, Eiseley served variously as Benjamin Franklin Professor of anthropology and the history of science, as Provost of the University, and as curator of early man at the University Museum. He published frequently in his field, received numerous national science awards and fellowships, and held 36 honorary doctorates.

Perhaps his greatest contribution, however, and the works for which he will be longest remembered, are his 10 books of natural philosophy, observations and poetry. Eiseley was dedicated to interpreting the natural world and the early history of mankind for lay audiences, and did this most effectively with his metaphoric literary style. Among his popular works, four books, *Darwin's Century*, *The Night Country*, *The Firmament of Time*, and *The Unexpected*

Universe, drew vast audiences and brought Eiseley major awards for science and nature writing.

His last book, an autobiography, *All the Strange Hours: The Excavation of a Life*, was published in late 1975. For those raised on Eiseley's nature essays, this brooding account of his troubled life (SN: 2/14/76, p. 109) helps explain the serious tone and deep reflection in his other works.

He had a tragic childhood: a quareling family, a deaf mother, a long, lonely exile during a bout with tuberculosis. He was a railroad hobo during the depression, an introverted, serious scholar, then, for years, a solitary researcher in an isolated outpost in the Badlands of Nebraska.

He was obsessed during his childhood, and even later, as a scientist and teacher at the University of Pennsylvania, with the impermanence of the individual and the "absolute control of chance." He talked frequently in his autobiography about death and about his own "escape," his immortality. One might safely venture, after reading his writings, that Loren Eiseley so enriched the views of his readers toward science and nature (and thus ultimately toward themselves) that he has, indeed, affected his own "escape." □