

biomedical sciences

New evidence for a slow measles virus

The disease called subacute sclerosing panencephalitis (SSPE) causes stiffness, jerkiness, mental deterioration and death in persons under age 20. A measles virus has been found in the brains of its victims, so a number of investigators believe the virus causes the disease. Because the disease takes place over a period of time, the virus probably works as a slow virus (SN: 4/14/73, p. 246).

Further evidence that a measles virus causes SSPE is reported in the July 7 LANCET by Roger Detels of the University of California at Los Angeles and Jane McNew, Jacob A. Brody and Anne H. Edgar of the National Institutes of Health. All the 43 SSPE victims they studied had antibodies to measles virus in their blood. Thirty-one had had measles at an exceptionally early age (15 months, versus the usual 48 months), and came down with SSPE anywhere from three to fourteen years later.

The researchers also present evidence for a possible source of viral infection—dogs with distemper. About a third of the victims had been exposed to dogs with distemper. Distemper is a fatal canine disease. Although the virus that causes distemper has not been identified, it produces brain damage similar to that produced in SSPE.

Structure of tRNA confirmed

In cells, molecules of DNA pass messages for making proteins to molecules of messenger RNA. Messenger RNA's then pass the messages to molecules of transfer RNA, which in turn line up amino acids into the proteins that are specified. To understand how tRNA actually orders protein synthesis, its molecular structures must be known.

The two-dimensional structure of tRNA was deciphered some time ago. It is a cloverleaf. Last December, researchers at the Massachusetts Institute of Technology determined the three-dimensional structure of a crystal of tRNA. It is an L-shaped double helix (SN: 1/20/73, p. 36). Now R. G. Shulman and his colleagues at Bell Laboratories and at the University of California at Riverside have confirmed previous findings for both the two-dimensional and three-dimensional structures of tRNA. They did their work with tRNA in solution, using the technique called nuclear magnetic resonance. The details are reported in the July PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES.

Such reconfirmation is important. Scientific results do not constitute proof until they can be repeated by a number of researchers. Also, the structure of tRNA in solution is probably the same as it is in living cells.

Fetuses treated during birth

One of the biggest challenges facing perinatal researchers is to find some way of treating fetuses in the womb. This feat has not yet been achieved, but investigators in Basel, Switzerland, have given drugs to fetuses during labor.

T. H. Lippert and V. M. Roemer, in a letter to the July 23 JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION, report that they used a scalp injection technique developed in their clinic to insert glucose and bicarbonate into healthy fetuses as they emerged from the womb. The injections, which lasted a half hour, caused glucose in the blood of the fetuses to rise. Other researchers have found, after inducing asphyxia in animal fetuses, that their survival time could be increased by treating them with carbonate and glucose. So the Swiss researchers hope that injections of glucose and bicarbonate might be used to treat human fetuses suffering from asphyxia during labor.

information sciences

Laser advance may permit optical circuitry

A prime goal of communications technologists is development of integrated (one-piece) optical circuits to process and transmit communication by light in a manner similar to the way integrated electronics circuits now perform in computers and televisions. Such systems would offer advantages in cost, size and weight over present, wire-based electronics communications systems. A thousand color television programs or two million phone conversations, for example, could be carried through a single glass fiber about three-thousandths of an inch thick if the light could be processed.

Now a team of California Institute of Technology electrical engineers, headed by Amon Yariv, has developed a miniature laser they say may provide the key to development of such optical circuitry, as well as open a new area of laser technology research. The problem in making a tiny laser was getting rid of the end mirrors used on conventional lasers, which would be almost impossible to mass-produce in miniature. The team solved this problem by milling the upper surface of a gallium arsenide crystal with an ion beam to create a diffraction grating. The resulting laser is less than an eighth of an inch long, four-hundredths of an inch wide and a few ten-thousandths of an inch thick. At this size, several such devices could be incorporated into a single gallium arsenide chip, and Yariv says the time to begin making simple optical circuits may be at hand.

The coming flood of information

Three times as much scientific and technical information is being generated than previously estimated, produced by four times as many people and growing at a faster rate. This is the conclusion of a paper delivered recently to a small meeting of information specialists in Washington by a leading French economist, Georges Anderla.

Reporting on results of a two-year study he conducted at the request of the international Organization for Economic Co-operation and Development, Anderla said more than 10 million authors are producing scientific writings, more than four times larger than any previous estimate. The total volume of scientific and technical information now grows exponentially at a rate of 12 to 13 percent a year and the rate may jump to 30 or 40 percent after introduction of new, more powerful data handling systems.

The effect, he said, would be "information pollution," and he urged governments to begin ways of more efficiently selecting information for preservation and assuring free flow of information to the public.

Industry briefs: Satellite TV, talking computers

The first satellite-cable TV hookup was demonstrated last month at the television industry's annual convention in Anaheim, Calif. If developed commercially, the most immediate impact would be to allow independent television producers to air national programs without going through the networks. The hook-up system was developed by Scientific-Atlanta, Inc. and the TelePrompTer Corp.

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Talking computers have taken another step forward. Once confined to simple recorded messages, computers can now utilize individual, prerecorded words to make up sentences. A Sperry Univac computer has completed a five-week trial for the Federal Aviation Administration allowing pilots to ask for and verbally receive computer-generated advisories. Another Sperry Univac computer can jabber in 12 languages.