

New Vaccine Reduces Respiratory Illness

➤ A NEW VACCINE incorporating seven viral strains has reduced severe respiratory illnesses among school children in a Philadelphia suburb.

There is no plan to market such a vaccine in the near future, its developer, Dr. Maurice R. Hilleman of the Merck Institute for Therapeutic Research, West Point, Pa., reported at the Fourth International Congress for Infectious Diseases, Munich, West Germany. However, it is hoped that the experimental vaccine will serve as a model for the further development of multivalent immunizing agents.

The vaccine was used against the most common virus strains likely to cause severe illness in children of school age. Dr. Hilleman emphasized that it would be highly impractical to develop vaccines against all of the hundreds of strains responsible for respiratory infection in man, as well as the others associated with the common cold.

The vaccine used in the study contained purified, concentrated and inactivated respiratory syncytial virus; parainfluenza strains 1, 2 and 3; influenza strains A-2 and B; and *Mycoplasma pneumoniae*, known also as the Eaton agent.

The vaccine was administered just prior to the height of the respiratory disease season in a controlled study by Drs. Joseph Stokes Jr. and Robert E. Weibel of the University of Pennsylvania School of Medicine. The study involved 407 young children.

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PHYSICS

Spilling Electrons Lost From Radiation Belts

➤ THERE ARE LIKELY to be a dozen points over the South Atlantic Ocean where the electrons of the earth's radiation belts spill into the atmosphere producing areas of high intensity ionization and sapping the contents of the Van Allen and the artificial radiation belts.

The possibility that these areas of enhanced ionization may exist in the lower ionosphere, 50 to 80 miles above the earth, was reported by Dr. Alfred J. Zmuda of the Johns Hopkins University Applied Physics Laboratory, Silver Spring, Md.

Dr. Zmuda told the 47th annual meeting of the American Geophysical Union in Washington, D.C., how the spilling of the electrons into the South Atlantic area enhances local ionization and represents one way in which electrons are lost from the Van Allen and artificial radiation belts.

The electrons are spilled from the radiation belts when these particles, sometimes as many as 600,000 in a square centimeter in a second, de-

scend to levels lower than 80 miles and collide with the particles in the atmosphere. Dr. Zmuda found that all electrons that get lower than 80 miles are lost to the belt. In this region they collide with atmospheric particles and lose their energy by producing electron-ion pairs. Depletion of the particles trapped in the South Atlantic belt is counter balanced by a continuous injection of particles into the Van Allen belt at higher altitudes.

Electrons in the Van Allen belt are held in place, or trapped by the earth's magnetic field. Once trapped the particles do not escape but keep reflecting back and forth, bouncing as much as 2,800 times from one hemisphere to another in approximately 11 minutes. The force or value of the magnetic field is lowest over the South Atlantic area. This permits the electrons to drop in altitude into the atmosphere where they ionize oxygen and nitrogen molecules and produce areas of ionization.

Because these high ionization areas affect the ionosphere, they could influence radio communication. Most important, however, a clearer understanding of the spilling of electrons could lead science to understand how the radiation belts are reduced and perhaps replenished.

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GENERAL SCIENCE

Europe Science Tours Open to U.S. Students

➤ THIS SUMMER a limited number of American science students, 17 to 21 years of age, may participate in London's Eighth International Youth Science Fortnight, to be followed by a three-week European tour.

Held from July 27 to Aug. 10, the Fortnight will include lectures, demonstrations, seminars and visits to research and industrial establishments. Students from 30 nations are expected to participate. Costs including accommodations and meals, but not including transportation to London and return, is 34 pounds, or \$95.20.

The participants in the three-week European tour will travel to Brussels, Strasbourg, Interlaken, Innsbruck, Vienna, Prague, West Berlin, Hanover, Amsterdam, Ostende, and return to London. In most cases, accommodations will be in youth hostels. This tour, London to London, extends from Aug. 11 to Sept. 2, and costs 44 pounds or \$123.20, including housing and most meals.

Additional information and application forms are available from Science Clubs of America, an activity of Science Service, Inc., 1719 N St., N.W., Washington, D.C. 20036.

Completed application forms and a deposit of three pounds (\$8.40) must be received by the Science Fortnight offices in London by June 30.

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IN SCIENCE

MEDICINE

Research Advances On Heart Substitutes

➤ PROGRESS toward implanting an entirely artificial heart in the chest of a human being is seen in reports of two substitute hearts that work outside the body—one in Houston, Texas, the other in Brooklyn, N.Y.

Dr. Michael E. DeBakey of Baylor University, and Dr. Adrian Kantrowitz of Maimonides Hospital, Brooklyn, have used implanted tubes with outside pumps for the first time in humans following work by Dr. Willem Kolff of the Cleveland Clinic.

The problem of placing an artificial heart inside a human chest waits on at least two things: a solution to the problem of blood clotting and development of a portable power supply.

A new method that promises to overcome the clotting hazard through coating plastic, which has been developed at Battelle Memorial Institute, Columbus, Ohio, is "quite significant," Dr. Vincent Gott of Johns Hopkins University School of Medicine, Baltimore, told SCIENCE SERVICE. Dr. Gott and his former co-workers at the University of Wisconsin, Madison, developed the first nonclot producing surface for plastic in 1963. Heparin, a powerful anticoagulant, was used in both cases.

The Battelle work, done by Dr. Robert I. Leininger with three others, was reported at a meeting of the American Society for Artificial Organs in Atlantic City.

"The difference in our work is that we used a graphite coating on the material to be heparinized," said Dr. Gott. "Graphite is a semi-rigid material and can't be put on flexible plastic."

The Battelle researchers have developed two ways of bonding heparin to a flexible plastic surface. In one, they first bond to the surface an extremely thin layer of styrene plastic. Then, through a chemical process called chloromethylation, they attach "quaternary ammonium groups" of atoms to the styrene. The heparin can then be chemically attached to these groups.

In the second method a plastic containing amine groups is incorporated in the original plastic to be coated. These amine groups are then quaternized by a chemical treatment and the heparin can be added.

When uncoated plastics are used inside the body they can damage it by liberating hemoglobin from the red blood cells.

Working with Dr. Leininger at the Battelle laboratories on continuing research are Dr. Richard D. Falb, M. M. Epstein and Gerald A. Grode.

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E FIELDS

CONSERVATION

24-Hour Watch Set On Capital's River

► AT THE FLICK of a switch, one of the historic rivers of the United States, the Potomac, began to be sampled and analyzed on a round-the-clock basis.

This is the first river to be outfitted with a system of continuous monitoring equipment, relay communications and computer records.

The automatic system, started at three locations along the river that flows past the nation's capital, will give scientists accurate information about the physical, biological and chemical behavior of the river, said James M. Quigley, commissioner of the Federal Water Pollution Control Administration.

Measurements of such things as dissolved oxygen, temperature, turbidity and acidity will be constantly recorded and transmitted across town to headquarters where the information is being stored in computers for future use and cleaning-up projects.

This system will later be set up on many rivers to help conservationists clean up the nation's waterways.

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MEDICINE

Rubella Vaccine Needs Several Year's Study

► A VACCINE against German measles, or rubella, the disease that causes deformities in babies when it is contracted in the first few months of pregnancy, appears promising, said researchers at the National Institutes of Health, Bethesda, Md.

It may be several years, however, before it reaches the market.

Drs. Harry M. Meyer Jr., and Paul D. Parkman of the Division of Biologics Standards reported a "preparation" at the meeting of the American Pediatrics Society in Atlantic City that may reduce some of the time necessary for total evaluation of the vaccine, however.

Dr. Roderick Murray, director, Division of Biologics Standards, explained the status of the vaccine in House appropriations hearings on the budget requested by the National Institutes of Health.

The two scientists have been working for some time on testing rubella virus in the rhesus monkey and have found that a particular strain of the virus had become weakened to the point that it might be a "possible candidate" for a live rubella vaccine.

Tests on children with the written consent of their parents were successfully carried out at the Arkansas Children's Colony, a state educational institution for mentally retarded children in a rural area near Conway, Ark.

Here the Meyer-Parkman team worked with the cooperation of Dr. Theodore Panos, professor and chairman of the department of pediatrics, University of Arkansas School of Medicine, and with personnel of the colony.

Trials in this type of institution insured that pregnant women would not be exposed to persons vaccinated.

Previously investigators had inoculated volunteers with crude rubella virus, but they developed rubella with rash and infected their contacts.

Two studies at the Arkansas school where children lived in close contact resulted in no transmission between 34 vaccinated children and 30 controls.

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PHYSICS

Gamma Ray Source Discovered in Heavens

► THE FIRST POINT source of gamma rays in the heavens has been discovered from photographs taken 120,000 feet above Texas.

At that altitude, many gamma rays are produced when cosmic rays collide with atmospheric particles. The trick was to find a point source above this background radiation.

The point has been named Cygnus GR-1 by the University of Rochester, Rochester, N.Y., physicists who discovered it. It coincides with a region in the sky already identified as an X-ray source, known as Cygnus XR-1.

Dr. J. G. M. Duthie reported details of the successful detection to the American Physical Society meeting in Washington, D.C. Graduate students Roland W. Cobb and Joseph Stewart assisted in the work.

The high energy gamma rays from Cygnus GR-1 were detected in photographs of nuclear collisions in a spark chamber carried some 23 miles aloft by a balloon launched from Palestine, Texas, last Oct. 23. A statistical analysis of data gathered in the balloon flight yielded conclusive evidence that an unusual amount of radiation was coming from one region.

The results also showed that a number of characteristics of the gamma rays differed somewhat from those of gamma rays produced in earth's atmosphere. Neither Cygnus GR-1 nor Cygnus CR-1, discovered by scientists at the U.S. Naval Observatory, has yet been positively identified with any visible object or radio star. This source radiating both the gamma rays and the X-rays is within the Milky Way galaxy in the constellation Cygnus, the swan.

The project was supported by grants from the National Science Foundation and the National Aeronautics and Space Administration.

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GEOPHYSICS

Laser Beams May Predict Earthquakes

► PULSATING amplified light rays beamed along the sides of active crack zones of the earth's surface may help scientists predict earthquakes.

Set up at two points, one on each side of the fault, lasers could provide continuous and long-term monitoring of strains and creeps along active faults, reported R. A. Fowler and V. Castellano of North American Aviation, Inc., Downey, Calif., and R. B. Hofmann, California Department of Water Resources, Sacramento.

Highly accurate measurements of even minute earth movements could be taken over distances of up to 12 miles, the scientists told the annual meeting of the American Geophysical Union in Washington, D. C.

The accuracy and effectiveness of the laser system are being compared with those of more conventional earth-strain measuring instruments.

A laser project, called the Geodetic Laser Survey System (GLASS), is being run by North American with the State of California in areas along the great San Andreas fault, which stretches along the western coast, one of the most important fault lines of the world. As the earth slowly shifts and moves, strains are built up which are relieved by quakes.

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GENERAL SCIENCE

HEW Secretary Gardner Favors Updating PHS

► SECRETARY OF HEALTH, Education and Welfare John W. Gardner, following President Johnson's Message to the Congress calling for reorganization of the Public Health Service, has issued further details on the proposed plan as it applies to the internal organization of the Service.

Secretary Gardner stressed the need for future Secretaries of Health, Education and Welfare to have the power to reorganize the Service and its components as changing times may require.

"It is important, as the President points out in his message, that the Service be brought up to date. For the long run, any Secretary of Health, Education and Welfare should be able to provide the Surgeon General and his staff with the sort of organization which will best serve the health needs of the nation. It is axiomatic that in a society such as ours, our institutions be continuously ready to make these necessary adaptations."

Secretary Gardner said that the plan envisions the establishment of five operating bureaus including the Office of the Surgeon General.

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